UNIVERSIDADE FEDERAL DE JUIZ DE FORA
FACULDADE DE ECONOMIA
PROGRAMA DE PÓS GRADUAÇÃO EM ECONOMIA

Thaís Lima Felipe

Does the public sector play a role in shaping the impact of motherhood on women's careers?

Juiz de Fora
2025

Thaís Lima Felipe

Does the public sector play a role in shaping the impact of motherhood on women's careers?

Dissertação apresentada ao Programa de Pós Graduação em Economia da Universidade Federal de Juiz de Fora como requisito parcial à obtenção do título de Mestre em Economia.

Orientadora: Prof. Dr. Laura de Carvalho Schiavon

Coorientador: Prof. Dr. Ricardo da Silva Freguglia

Juiz de Fora

2025

Ficha catalográfica elaborada através do Modelo Latex do CDC da UFJF
com os dados fornecidos pelo(a) autor(a)

Felipe, Thaís.
Does the public sector play a role in shaping the impact of motherhood on women's careers? / Thaís Lima Felipe. – 2025.
42 f. : il.

Orientadora: Prof. Dr. Laura de Carvalho Schiavon
Coorientador: Prof. Dr. Ricardo da Silva Freguglia
Dissertação (Mestrado) – Universidade Federal de Juiz de Fora, Faculdade de Economia. Programa de Pós Graduação em Economia, 2025.

Thaís Lima Felipe

Does the public sector play a role in shaping the impact of motherhood on women's careers?

Dissertação apresentada ao Programa de Pós-graduação em Economia da Universidade Federal de Juiz de Fora como requisito parcial à obtenção do título de Mestre em Economia Aplicada. Área de concentração: Economia.

Aprovada em 07 de fevereiro de 2024.

BANCA EXAMINADORA

Drª. Laura de Carvalho Schiavon - Orientadora

Universidade Federal de Juiz de Fora

Dr. Ricardo da Silva Freguglia - Coorientador

Universidade Federal de Juiz de Fora

Drª. Flávia Lúcia Chein Feres

Universidade Federal de Juiz de Fora

Dr. Valdemar Rodrigues de Pinho Neto

Fundação Getúlio Vargas

Juiz de Fora, 14/01/2025.

Documento assinado eletronicamente por **Ricardo da Silva Freguglia**, **Professor(a)**, em 10/02/2025, às 16:51, conforme horário oficial de Brasília, com fundamento no § 3º do art. 4º do Decreto nº 10.543, de 13 de novembro de 2020.

Documento assinado eletronicamente por **Flavia Lucia Chein Feres**, **Professor(a)**, em 11/02/2025, às 00:41, conforme horário oficial de Brasília, com fundamento no § 3º do art. 4º do Decreto nº 10.543, de 13 de novembro de 2020.

Documento assinado eletronicamente por **Laura de Carvalho Schiavon**, **Professor(a)**, em 11/02/2025, às 14:12, conforme horário oficial de Brasília, com fundamento no § 3º do art. 4º do Decreto nº 10.543, de 13 de novembro de 2020.

Documento assinado eletronicamente por **Valdemar Rodrigues de Pinho Neto**, **Usuário Externo**, em 13/02/2025, às 15:34, conforme horário oficial de Brasília, com fundamento no § 3º do art. 4º do Decreto nº 10.543, de 13 de novembro de 2020.

A autenticidade deste documento pode ser conferida no Portal do SEI-Ufjf (www2.ufjf.br/SEI) através do ícone Conferência de Documentos, informando o código verificador **2191134** e o código CRC **1157DBA2**.

ACKNOWLEDGMENTS

I would like to express my deep gratitude to my advisors, Prof. Laura Schiavon, Prof. Ricardo Freguglia, and M.Sc. Ísis Lira Ferreira, for their support, guidance, and encouragement throughout this work. Conducting this research was challenging, but the empathy, dedication, and teamwork made this journey more manageable and inspiring.

I am also sincerely grateful to my committee members, Prof. Flávia Chein and Prof. Valdemar Pinho Neto, for their valuable insights and contributions, which greatly enriched this study.

A special thank you to my parents, Marli and Felipe, my sister Camila, and my entire family, who have always supported and encouraged me to pursue my dreams. I am also deeply thankful for the friends I made during my master's studies, whose companionship and motivation were essential in keeping me on the right path and striving for improvement.

I extend my gratitude to the professors and administrative staff at UFJF and ECONS, whose efforts made the completion of this work possible.

Finally, I am grateful for the financial support provided by Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES) and Fundação de Amparo à Pesquisa do Estado de Minas Gerais (FAPEMIG). I also appreciate the Secretaria de Inspeção do Trabalho (Ministério da Economia) for their support in data collection.

ABSTRACT

We use Brazilian employer-employee data to investigate the impact of motherhood on women's careers in the labor market, with a focus on disparities between the private and public sectors. The arrival of children significantly affects labor force participation and wages, largely driven by changes in hourly wage dynamics. Using an event study approach, our findings reveal a 20% decline in labor force participation in the private sector and a 10% decline in the public sector. This sectoral difference in the impact of motherhood is attributed to the stability and job security provided by the public sector. Mothers employed in the private sector experience a 10% drop in their wages, while wages in the public sector remain stable. We identify specific mechanisms contributing to the child penalty, including occupational choices, sector preferences, and firm-related decisions. Additionally, our findings show that mothers with lower levels of education, fewer skills, lower salaries, and employment in smaller firms face greater challenges in maintaining their positions in the formal labor market. Conversely, more educated and highly skilled mothers, earning higher salaries and working in larger firms, encounter greater difficulties in recovering their pre-childbirth wages. Our evidence contributes to the understanding of the impacts of motherhood on women's careers in Brazil, highlighting sector-specific dynamics and their implications for labor market outcomes.

Key-words: Motherhood. Labor market. Child. Event Study. Public Sector.

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

RESUMO

Utilizando dados de empregador-empregado do Brasil para investigar o impacto da maternidade nas carreiras das mulheres no mercado de trabalho, com foco nas disparidades entre os setores privado e público. A chegada de filhos afeta significativamente a participação na força de trabalho e os salários, principalmente devido a mudanças nas dinâmicas de salários por hora. Utilizando uma abordagem de estudo de evento, os resultados revelam uma queda de 20% na participação da força de trabalho no setor privado e uma queda de 10% no setor público. Essa diferença setorial no impacto da maternidade é atribuída à estabilidade e segurança no emprego oferecidas pelo setor público. Mães empregadas no setor privado enfrentam uma queda de 10% em seus salários, enquanto os salários no setor público permanecem estáveis. Foram identificados mecanismos específicos que contribuem para a penalização pela maternidade, incluindo escolhas ocupacionais, preferências setoriais e decisões relacionadas às empresas. Além disso, os resultados mostram que mães com níveis mais baixos de educação, menos habilidades, salários mais baixos e emprego em empresas menores enfrentam maiores dificuldades para manter suas posições no mercado de trabalho formal. Em contraste, mães mais educadas, com habilidades mais altas, salários mais elevados e emprego em empresas maiores enfrentam maiores dificuldades para recuperar seus salários pré-maternidade. A evidência contribui para a compreensão dos impactos da maternidade nas carreiras das mulheres no Brasil, destacando as dinâmicas setoriais específicas e suas implicações para os resultados no mercado de trabalho.

Palavras-chave: Maternidade. Mercado de trabalho. Filhos. Estudo de Evento. Setor Público.

LIST OF FIGURES

LIST OF TABLES

CONTENTS

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, contraceptive methods, public policies on maternity leave, and gender quotas (??????????). However, gender disparities in women's careers persist, often attributed to domestic and family responsibilities disproportionately assigned to women (??).

The objective of this paper is to investigate the impact of motherhood on women's careers in both the public and private sectors. It specifically examines whether the public sector mitigates the effects of motherhood on career trajectories in the context of a large middle-income country. The arrival of a child requires women to spend more time at home caring for children and handling household chores, reshaping the allocation of their time and resources (??). In Brazil, this dynamic is reflected in labor statistics, where men work an average of 42.7 hours per week compared to 37.9 hours for women (??). However, the disparity extends beyond paid work, as women spend more than twice as much time on domestic and caregiving responsibilities as men, underscoring the unequal burden of motherhood and household duties (??). Consequently, mothers may exhibit a preference for more stable and flexible job positions (????????????).

The public sector's stability and flexibility make it an attractive workplace for women, offering greater adaptability in working hours and lower levels of gender discrimination compared to the private sector (??????). These characteristics, along with more equitable occupation and remuneration structures, can help mitigate the motherhood penalty (??????). In Brazil, where women make up 57% of the public sector workforce (??), the public sector may play a crucial role in mitigating the adverse career impacts of motherhood. Despite its importance, existing literature often treats the public sector as a source of heterogeneous effects, offering limited exploration of its unique role in supporting women's careers.

Using administrative data from Brazil's Annual Social Information Report (RAIS) covering the period from 2008 to 2019, we construct a panel dataset that includes both public and private sector employees. The sample consists of women who gave birth between 2008 and 2019 and were employed for at least three years prior to childbirth. Using the Event Study approach, with women who have not yet had children as the control group, we estimate, separately, the impact of childbirth on labor force participation, remuneration, and hours worked in the public and private sectors. Additionally, comprehensive information on employers and employees — such as occupation, sector, part-time job and firm — enables us to investigate the mechanisms driving the observed impacts.

The first result identifies which mothers are more likely to exit the formal labor market compared to women who have not yet had children. This pattern is observed in

both the public and private sectors. However, women in the private sector experience a 20% decrease in the probability of being employed during the third year after childbirth. In the public sector, this reduction is approximately 10% during the same period. This disparity can be attributed to a key characteristic of the public sector: the stability of its positions, which provides a stronger safety net for employees. Additionally, the decline in the likelihood of remaining employed in the formal labor market persists for up to nine years after childbirth.

For women who remain in the formal labor market, salaries experience a temporary reduction of 10% in their labor income in the private sector. This decline is driven by a reduction in hourly wages rather than a decrease in hours worked. In the public sector, however, there are no wage reductions. The stability of salaries can be explained by the principle of non-reduction of wages[1] . These results are consistent with previous research examining the impacts of motherhood on women's careers in both high- and middle-income countries (**??????????**).

In the second part of the paper, we investigate the mechanisms that may explain the temporary reduction in women's salaries. We identify variation in the probability of occupational change around childbirth for women employed in the private sector. In the year of childbirth, the probability of changing occupations drops by 10%. However, this probability increases by almost 20% between $t = 0$ and $t = 2$. These changes are accompanied by divergent patterns in the likelihood of occupational change among public sector employees, whose probability of changing occupations remains stable around childbirth. While the private sector is generally less stable and more dynamic than the public sector, the sharp variation in the probability of occupational change around childbirth may explain part of the temporary reduction in salaries.

Our next key finding is that the impact of motherhood on labor force participation is generally more pronounced for women with lower levels of education, fewer skills, lower wages, and those working in smaller firms. Conversely, the child penalty on wages is more significant for women who are more educated, highly skilled, earn higher wages, and work in larger firms. This suggests that mothers in less advantageous positions face greater challenges in maintaining their employment while balancing motherhood responsibilities, whereas mothers in higher socioeconomic conditions find it easier to retain their jobs. However, even for these women, the impact on wages is more substantial. It is likely more difficult for women in better conditions to retain an occupation or job with the same remuneration they had prior to childbirth. This pattern is observed in both the private and public sectors. Among public sector employees, statutory and CLT contracts offer

[1] The Brazilian Consolidation of Labor Laws guarantees the principle of non-reduction of wages, which ensures that salaries cannot be unilaterally decreased by the employer, except in specific legal circumstances or by mutual agreement, thus protecting workers from arbitrary pay cuts (**??**).

greater job stability but slower wage recovery, while temporary contracts result in faster wage rebounds. Mothers in municipal positions face more severe and lasting negative effects compared to those in state or federal roles.

Our research contributes to two distinct strands of literature. First, we extend the body of work that quantifies the effects of children on maternal labor outcomes, a field that has predominantly focused on developed countries (??????????????). Within this literature, our study is particularly aligned with those examining the impact of the first child, which generally report significant and persistent effects on mothers' labor market outcomes. We contribute to the literature exploring the relationship between fertility and maternal labor market outcomes in developing countries (????????). Second, we advance the literature that studies differences between mothers and non-mothers in the demand for workplace flexibility. This literature indicates that mothers prioritize family amenities over pecuniary rewards, often opting for more family-friendly and part-time jobs (????????????).

This paper introduces an approach that compares the effects of these variables across the public and private sectors. Our findings reveal a consistent pattern, but with varying magnitudes in the impact of motherhood between these sectors. Specifically, working in the public sector appears to mitigate some of the negative effects of motherhood. Across all variables, women in the private sector experience more pronounced effects compared to those in the public sector. We further investigate whether motherhood influences the likelihood of occupying managerial or high-skilled positions, which might offer the flexibility needed to balance work and family responsibilities (??). Our research enhances the understanding of sector-specific labor market dynamics in Brazil, offering valuable insights into how these differences shape the career trajectories of working mothers. Our findings contribute to the recent literature on the child penalty by highlighting the heterogeneity of its impact among different groups of mothers, particularly in a large and diverse country like Brazil.

This paper is organized as follows. Section 2 provides an overview of the institutional framework surrounding maternity leave and the key characteristics of the public sector in Brazil. Section 3 describes the data sources and presents the descriptive statistics. Section 4 outlines the methodological approach. Section 5 presents the main findings, including an analysis of the heterogeneous impacts of motherhood. Section 6 discusses the specific impacts on public sector employees. Finally, Section 7 concludes with a discussion of the key insights and implications of the study.

2 INSTITUTIONAL BACKGROUND

2.1 MATERNITY LEAVE POLICY

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.

2.2 AN INTRODUCTION TO PUBLIC SECTOR EMPLOYMENT IN BRAZIL

The public sector in Brazil plays a critical role in providing essential services such as healthcare, education, and public safety. It operates across three levels of government—federal, state, and municipal—each with distinct responsibilities defined by the Brazilian Constitution. The public sector accounts for approximately 12.5% of formal employment in the Brazilian labor market, contrasting with the global average of 17.9% (**??**). A significant proportion of public employees (59.7%) are engaged at the municipal level, while the federal and state levels employ 8.6% and 31.6%, respectively (**??**).

The Brazilian public service is characterized by a complex job categorization system which require a competitive examinations for entry. Entry into the public sector usually requires passing a civil service exam (*concurso público*), which varies by position and

government level. Employment is governed by three main types of contracts: statutory, CLT-based (Consolidation of Labor Laws) and temporary contract. Statutory employees, regulated by specific laws such as Law No. 8,112/1990, enjoy greater job security and benefits, including stability after a three-year probationary period (**??**). In contrast, public employees under CLT contracts—used in both the public and private sectors—have access to standard labor protections, such as pensions, paid leave, and unemployment insurance, but with less long-term stability (**??**). Temporary contract refers to short-term work contracts for specific roles or projects, without permanent status.

Job stability is a defining feature of the statutory regime in the public sector. After the probationary period (3 years), dismissals can only occur under specific legal circumstances, insulating workers from political interference and promoting impartiality. The predictability of public employment, combined with regulated career progression, secure pensions, and retirement benefits, makes it an attractive option for workers.

Brazil's governance is structured around a system of checks and balances, divided among three distinct branches: the Executive, Legislative, and Judiciary. The Executive Branch is headed by the President, who simultaneously serves as the head of state and government, charged with enforcing laws and administering public policy. The Legislative Branch features a bicameral system, consisting of the Chamber of Deputies and the Federal Senate, responsible for law-making. The Judiciary interprets the law and administers justice independently from the other branches, safeguarding citizens' rights and upholding the Constitution. It encompasses various levels of courts, culminating in the Supreme Federal Court (STF), which represents the highest authority in matters of constitutional law.

Despite the Brazilian public sector being regarded as a more stable employment sector, particularly for women, it continues to exhibit gender-based hierarchical segregation, often referred to as the "glass ceiling"(**????**). While women represent the majority of public employees in municipal and state services, as well as in the Executive and Judiciary branches at all federal levels, they remain underrepresented in leadership roles. Although women comprise 44% of the federal workforce, they hold only 34% of top leadership positions, with just 20% in Senior Leadership and Advisory Positions (DAS) (**??**).

The gender disparity in Brazil's public sector persists, with women being overrepresented in traditionally female-dominated sectors like education and healthcare, while men dominate areas such as planning and defense (**??**). Despite this, the gender wage gap remains, with women in Federal Public Administration earning only 86.1% of men's wages in 2022 (**??**). Additionally, Brazil ranks last in female leadership representation in Latin America, with only 18.6% of women holding leadership positions (**??**).

Given the significant representation of women in the public sector, it is essential to examine the impact of motherhood on women's careers within this context. Despite the

flexibility and stability offered by public sector employment, it is important to investigate whether this sector mitigates the child penalty relative to the private sector. The persistence of the gender wage gap underscores the need to explore the intersection of gender, career and motherhood, as these factors may deepen existing disparities and inform policies aimed at achieving gender equity.

3 DATA AND STATISTICS

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 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 2008 and 2019. Database consists of detailed worker-level information on demographic characteristics, average wages, firm size, occupation, admission date, maternity leave, along with other variables. Firstly, we excluded duplicate observations for the same CPF[1] within the same year. For individuals with multiple jobs in a given year, we retained the employment with the highest salary and seniority. Additionally, we restricted the sample to women who were at least 18 years old and no older than 65 years throughout the study period.

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 does not allow us to identify a woman's first child. To evaluate labor force participation, 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 labor force participation; all other information for these imputations was marked as missing. By imputing labor force participation data for these missing years, we created a balanced panel.

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 estimation sample, we included only employees who took maternity leave between 2008 and 2019. The final database contains only women who were treated at some point during the analysis period. Our analysis is restricted to women who were employed in the formal labor market for at least three years before the treatment (childbirth). For women who took maternity leave in 2008, we verify their employment status in 2005,

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

2006, and 2007 to ensure they meet this criterion. Similarly, for women who gave birth in 2009 and 2010, we confirm their employment records for the preceding three years. 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 positions[2] were excluded from the sample. Additionally, in cases where maternity leave extended across consecutive years with fewer than 180 days were included.

After applying the restrictions described above, the database now contains only women who were treated between 2010 and 2019. This exclusion process inadvertently removed women who had become mothers in 2008 and 2009. However, we still retain observations for these women in a panel spanning from 2008 to 2019. Also, log transformations were applied to both the deflated remuneration variables and the contracted hours and hourly wage variables.

At the conclusion of the sample selection process, we have a balanced panel[3] consisting of 26,396,484 observations representing 2,199,707 female employees. Among these, 270,384 women are employed in the public sector, while 1,929,323 are employed in the private sector.

3.2 DESCRIPTIVE STATISTICS

Table 1 displays summary statistics for female workers who gave birth at some point between 2008 and 2019, 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 3,201.85 Brazilian reais per month, which is higher than the earnings of private sector workers, who earn 1,784.94 Brazilian reais per month. In addition, nearly 50 percent of female workers in public sector and 17 percent of female workers in private sector have a college degree, 24 percent of public female workers and 11 percent of private female workers are above of 35 years old, 96 percent of public female workers and 43 percent of private female workers are employed in large establishments with at least 100 employees, and 7 percent of female workers in public sector and 4 percent of female workers private sector hold a managerial

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

[3] We create a balanced panel by imputing labor force participation for women missing from the RAIS database in certain years, indicating when they were outside the formal labor market. This allows us to track the labor force participation in formal labor market of each individual (CPF) from 2008 to 2019, ensuring continuous data coverage over the entire period.

position.

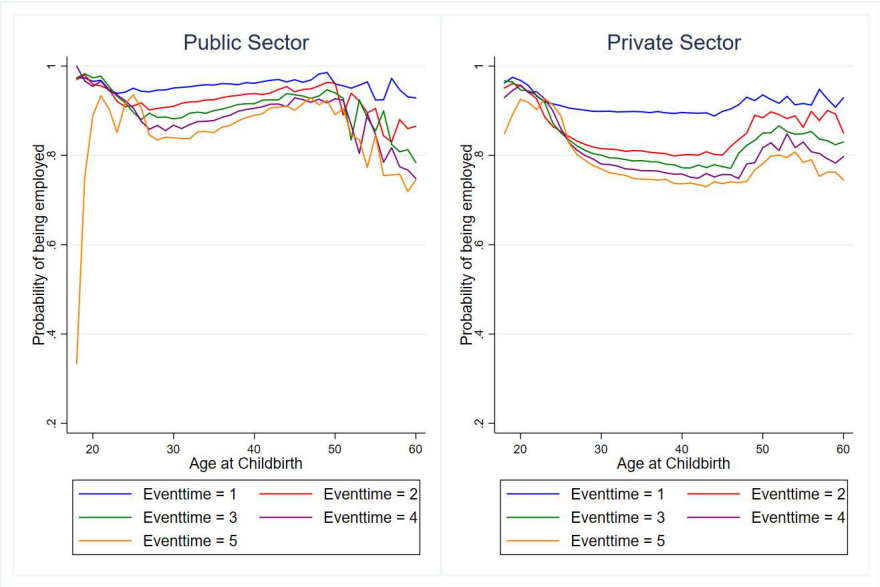
Table 1 – Summary Statistics at t = - *1*

	(1) Public Sector		(2) Private Sector	
	Mean	SD	Mean	SD
Wage				
Wages (in *reais*)	3,201.85	3,912.08	1,784.94	1,911.61
Log Earnings	7.57	1.28	7.16	1.15
Hourly Wage (in *reais*)	97.96	130.21	47.31	115.34
Log Hourly Wage	4.05	1.31	3.45	1.16
Firm Size				
0-9 Employees	0.01	0.07	0.16	0.37
10-49 Employees	0.02	0.14	0.26	0.44
50-99 Employees	0.02	0.13	0.15	0.36
100+ Employees	0.96	0.20	0.43	0.50
Education				
Basic Education	0.10	0.30	0.20	0.40
High School	0.40	0.49	0.64	0.48
College	0.50	0.50	0.16	0.37
Age				
Age	31.85	5.74	28.75	5.51
less or equal to 25	0.13	0.33	0.30	0.46
26-35	0.63	0.48	0.59	0.49
36-45	0.23	0.42	0.11	0.31
more than 45	0.01	0.12	0.00	0.07
Occupation				
Managerial	0.07	0.26	0.04	0.19
Professional	0.54	0.50	0.19	0.39
White Collar Lower Level	0.21	0.41	0.34	0.47
Blue Collar	0.18	0.38	0.44	0.50
Firm Size				
0-9 Employees	0.03	0.18	0.16	0.37
10-49 Employees	0.05	0.22	0.26	0.44
50-99 Employees	0.04	0.19	0.15	0.36
100+ Employees	0.87	0.33	0.44	0.50
Government Level				
Federal	0.06	0.24	0.00	0.00
State	0.15	0.36	0.00	0.00
Municipal	0.56	0.50	0.00	0.00
Type of Contract				
Contract	0.07	0.25	0.02	0.08
Statutory	0.66	0.47	0.00	0.00
CLT	0.27	0.44	0.98	0.15
Women	270,384		1,929,323	
Observations	3,244,608		23,151,876	

Note: This table presents descriptive statistics for female workers from RAIS data. It focuses on women who gave birth between 2008 and 2019 and were employed at least three years before childbirth. Columns (1) and (2) show statistics for public sector workers, while columns (3) and (4) report private sector data.

The next two figures provide key descriptive analyses to better understand the dataset and the relationship between childbirth and employment. Figure 1 illustrates the probability of employment across age cohorts around the time of childbirth, with separate analyses for the public and private sectors. Each line corresponds to a specific time interval relative to childbirth, offering valuable insights into employment patterns and trends associated with this significant life event.

Figure 1 – Probability of being employed by age around childbirth

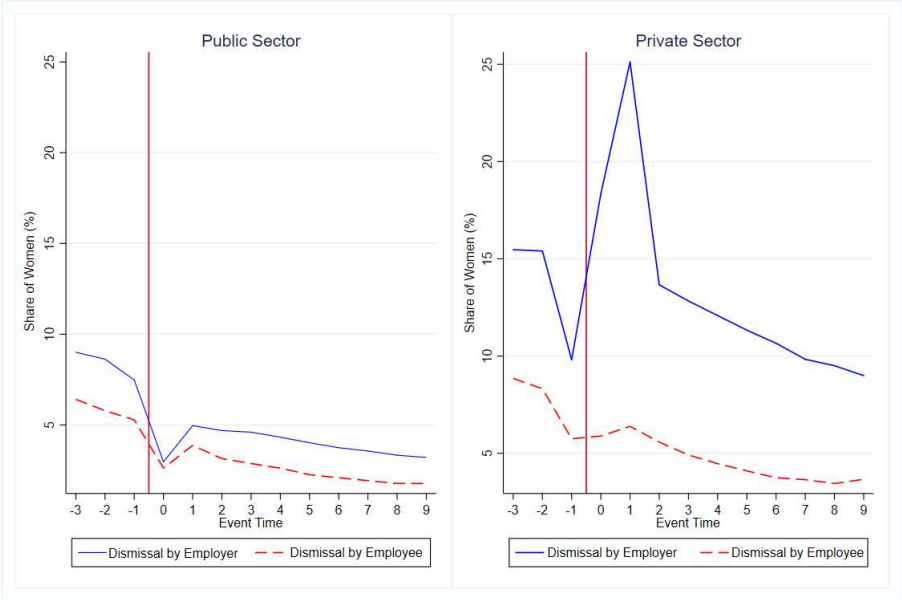


Data Source: RAIS. The figure illustrates the probability of employment across different age cohorts, categorized by the distance from childbirth (event time), for both the public and private sectors separately. The probability of employment variable was constructed based on labor force participation at each event time. The analysis is restricted to women who were employed in the formal labor market for at least three years prior to childbirth.

Figure 1 highlights employment probabilities around childbirth for workers in the public and private sectors, revealing significant sectoral disparities. Public sector employees exhibit higher and more stable employment probabilities, with smaller and less persistent declines after childbirth. In contrast, private sector employees face sharper and more prolonged drops, with probabilities falling from over 80% in the first year to above 70% by the fourth and fifth years. These trends underscore the resilience of public sector jobs and the heightened vulnerability in the private sector, emphasizing the need to consider sectoral differences in post-childbirth labor market outcomes.

Figure 2 examines job dismissals around childbirth, distinguishing between employer-initiated dismissals and voluntary resignations in the public and private sectors. In the public sector, both types of dismissals decrease gradually around childbirth, reflecting a stable employment environment unaffected by the event.

Figure 2 – Number of women dismissal by employer or employee decision



Data Source: RAIS. The figure illustrates the share of women dismissed around childbirth, categorized by employer and employee decision, separately for the public and private sectors. The data is based on the proportion of women who experienced job separation at each time interval relative to the event, expressed as a percentage of the total number of women in the sample at each corresponding event time. The analysis is limited to women who were employed in the formal labor market for at least three years prior to childbirth.

In contrast, voluntary resignations exhibit a gradual and steady decline before and after the event, lacking the pronounced fluctuations seen in employer-initiated dismissals. This pattern suggests that voluntary resignations are less directly influenced by childbirth compared to employer decisions. The significant rise in employer-initiated dismissals following childbirth underscores the need to investigate the child penalty in the female labor market. The disparity between these two types of dismissals highlights the differential impact of childbirth on employment outcomes.

The figures highlight the significant impact of childbirth on women's employment, with a sharp drop in employment probability after childbirth, particularly in the private sector, which shows greater vulnerability compared to the public sector. Employer-initiated dismissals rise notably post-childbirth in the private sector, while voluntary resignations remain steady. These patterns underscore the importance of addressing the child penalty through targeted policies to support women's workforce participation and mitigate risks, especially in the private sector.

4 EVENT STUDY METHODOLOGY

This study examines the average differential effect of 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 by 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 (**??**). 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 birth of the child relative to all the years in the sample.

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.

$$y_{ist} = \sum_{j \neq -1} \alpha_j \cdot I(j = t) + \sum_k \beta_k \cdot I(k = \text{age}_{is}) + \sum_{yr} \gamma_{yr} \cdot I(yr = s) + \epsilon_{ist} \tag{4.1}$$

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 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. In order to ensure valid results, the model must meet the exogeneity assumption of the treatment date and the parallel trends assumption. This means that, in the absence of the treatment, the treated and control groups should exhibit similar pre-treatment trends in behavior, ensuring that any differences observed post-treatment can be attributed to the treatment itself rather than pre-existing differences between the groups.

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 **??**) '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 the impacts of motherhood on the probability of being employed in each year after childbirth.

Continuous variables were log-transformed to facilitate interpretation of results. We investigated the following variables: labor force participation ($y_{ist} = 1$ if employed in year t), salary, hourly wage, hours worked, variables indicating managerial, professional, white collar lower level and blue collar positions. Indicators 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 or firm 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 (CBO[1]), or firm (CNPJ-CEI [2]).

[1] CBO (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.

[2] CNPJ (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.

5 ESTIMATING THE IMPACTS OF MOTHERHOOD

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 employment, wages, hours worked, and hourly wages. Subsequently, we delve into understanding these effects further by exploring how mother's choices regarding dismissal, sector, occupation, firm and part-time job are shaped by motherhood.

5.1 IMPACTS ON EMPLOYMENT, WAGE AND HOURS WORKED

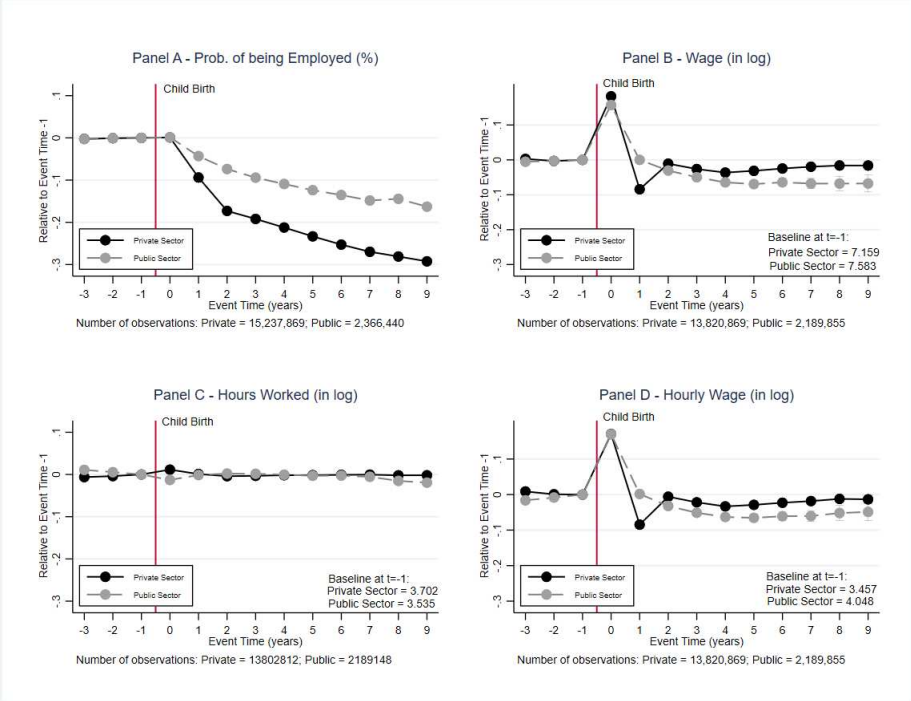
Figure 3 reports the impacts of children on outcomes at each event time t relative to the year preceding the childbirth *(t = 1)*, with adjustments nonparametrically for age and temporal trends. The figure includes 95 percent confidence intervals around the event coefficients. Panel A illustrates the differential impact of childbirth on employment outcomes for women in both the public and private sectors. In the private sector, women experience 20% drop in employment following childbirth, which deepens to a 30% decline after nine years. In contrast, women in the public sector face a smaller initial reduction of 10%, with a more gradual long-term decline of approximately 20% over the same period. This divergence can be explained by a defining feature of the public sector: the stability of its positions. The greater job security offered in the public sector acts as a safety net, buffering employees from the more substantial employment disruptions seen in the private sector. While maternity leave laws offer temporary stability, delaying employment loss during the year of childbirth, this protection ultimately proves insufficient to prevent job loss in both the medium and long term across both public and private sectors.

Panel B, conditional on continued employment *(employment = 1)*, illustrates that, after accounting for life-cycle and time trends, women with and without children follow similar earnings trajectories until the onset of motherhood. During the maternity leave year, mothers in both the public and private sectors experience a wage increase of approximately 15%. Subsequently, wages in the private sector decline by 10% relative to t *= -1*, but they show a recovery in the following years. In contrast, public sector wages return to pre-childbirth levels. These wage changes can be attributed to two primary factors: hours worked and hourly wage. Panels C and D of Figure 3 further explore this by showing that while Brazilian women who remain in the formal labor market do not reduce their working hours, they experience significant declines in hourly wages, especially in the private sector. Given that the Brazilian Consolidation of Labor Laws (CLT) upholds the principle of non-reduction of salaries, any unilateral wage decrease by an employer is prohibited. Consequently, the observed temporary reduction in wages necessitates a more detailed investigation to identify the underlying mechanisms that contribute to this effects.

These findings are consistent with prior research from developed and developing

countries highlighting significant impacts of motherhood on labor force participation and wages (??????????????). For instance, ??) report a persistent 15% reduction in participation rates lasting up to 20 years after childbirth, emphasizing the long-term implications of motherhood on women's economic outcomes. In Brazil, ??) found that motherhood leads to declines in earnings, formal employment, and managerial roles, while increasing participation in the public sector and part-time work.

Figure 3 – Motherhood impact on Employment, Wage and Hours Worked

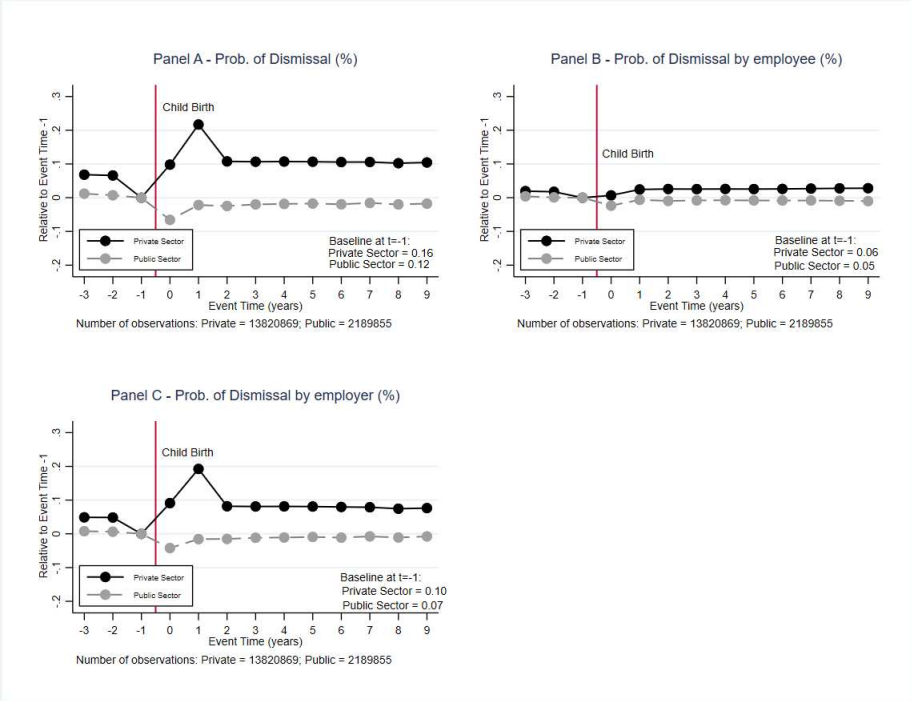


Data Source: RAIS. The figure shows event time coefficients estimated from equation (1) as a percentage of the counterfactual outcome, separately for different outcomes in the public and private sectors. We restrict the sample to women who were employed in the formal labor market for at least three years 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 2008 and 2019. The effects on wages, hours worked, and hourly wages are estimated conditional on labor force participation. The shaded 95 percent confidence intervals are based on robust standard errors.

For understand the impacts on labor force participation, we exploit the probability of dismissal around childbirth by comparing the private and public sectors (Figure 4). Each panel highlights a different aspect of dismissal: overall dismissal probability, employer-initiated dismissals, and voluntary resignations by employees. In the private sector, the probability of dismissal increases by 20% around the time of childbirth, followed by a 10% decrease at $t = 2$, after which it stabilizes. In contrast, the probability of dismissal in the public sector remains consistently low and stable throughout the event period. This indicates a more secure employment environment for public sector employees, highlighting the protective role of job stability in mitigating the risks of dismissal during this life event

Panel C reveals that the overall increase in dismissals is primarily driven by a rise in employer-initiated terminations. In the private sector, these dismissals show a pronounced increase following childbirth. This pattern suggests that childbirth significantly elevates the risk of job loss due to employer decisions in the private sector. Conversely, the likelihood of voluntary resignations by employees in the public sector remains stable post-childbirth. Although the dismissal variable may not be the most reliable indicator of dismissals, the significant difference between employer-initiated and employee-initiated terminations is noteworthy. This finding suggests that, while some women may choose to leave their jobs after having children, the primary driver of the increased dismissal rates in the private sector is employer-initiated.

Figure 4 – Motherhood impact on Dismissal



Data Source: RAIS. 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 2008 and 2019. The effects on wages, hours worked, and hourly wages are estimated conditional on labor force participation.The shaded 95 percent confidence intervals are based on robust standard errors.

The results underscore the contrast between the private and public sectors regarding job security around childbirth. In the private sector, there is a noticeable increase in dismissals following childbirth, indicating a period of employment vulnerability for women. In contrast, the public sector exhibits a more stable employment environment, characterized by minimal fluctuations in labor force participation and dismissal probabilities around

childbirth, regardless of whether dismissals are initiated by employers or are voluntary.

The stability inherent in the public sector partially mitigates the child penalty. However, for mothers who continue to participate in the formal labor market, motherhood still influences their careers. Our analysis demonstrates that the impact of motherhood on wages primarily affects hourly wages. We also examine other mechanisms related to the child penalty on hourly wages, including occupations and firms characteristics. These mechanisms will be explored in further detail in the following section.

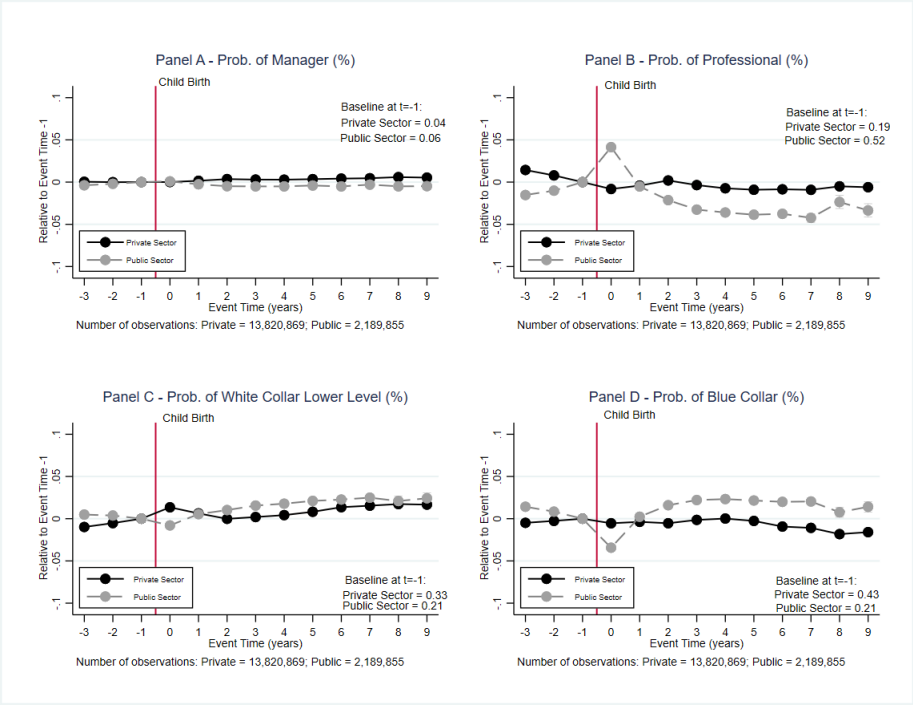
5.2 IMPACTS ON OCCUPATION, FIRMS AND SECTOR

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 (??????). Moreover, the temporary wage reductions observed among private sector employees around childbirth appear to contradict the principle of non-reduction of wages, as stipulated by labor laws. To further investigate this, we analyze occupational and firm characteristics to shed light on how motherhood influences career trajectories. This section provides empirical evidence that addresses this gap, offering deeper insights into the mechanisms at play.

The literature on the child penalty demonstrates that childbirth reduces the likelihood of women attaining managerial positions (??????). Consistent with this, we expect a decrease in the probability of holding managerial roles, alongside an increase in the likelihood of occupying lower-skilled positions (e.g., blue-collar jobs). Using the previously framework, Figure 5 Panel A examines the probability of holding managerial positions at each event time (t). The trends for women in both the public and private sectors align prior to childbirth. However, giving birth does not significantly affect the probability of attaining managerial positions in both sectors.

Panel B examines the impact of motherhood on professional occupations, specifically in sciences, arts, and middle-level technical roles. In the private sector, the trend around childbirth remains stable, while in the public sector, the probability of working in these roles initially increases during the year of childbirth but decreases in the following years. Panel C focuses on the impact of childbirth on white-collar lower-level occupations, finding no significant effect in either sector. Finally, in blue-collar occupations, there is no significant change in the probability of women working in these roles after childbirth. In the public sector, however, the probability initially decreases but gradually increases in subsequent years.

Figure 5 – Motherhood impact on Occupation Characteristics



Data Source: RAIS. 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 gave a birth between 2008 and 2019 and were employed in the formal labor market for at least three years before the childbirth. Group of occupation are created based on the major grupos of occupations of CBO 2002. Managerial positions refer to upper members of organizations (1); Professional occupations refer Professionals in sciences and arts (2) and Middle-level technicians (3); White Collar Lower Level: Administrative services workers (4) and Blue-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). The shaded 95 percent confidence intervals are based on robust standard errors.

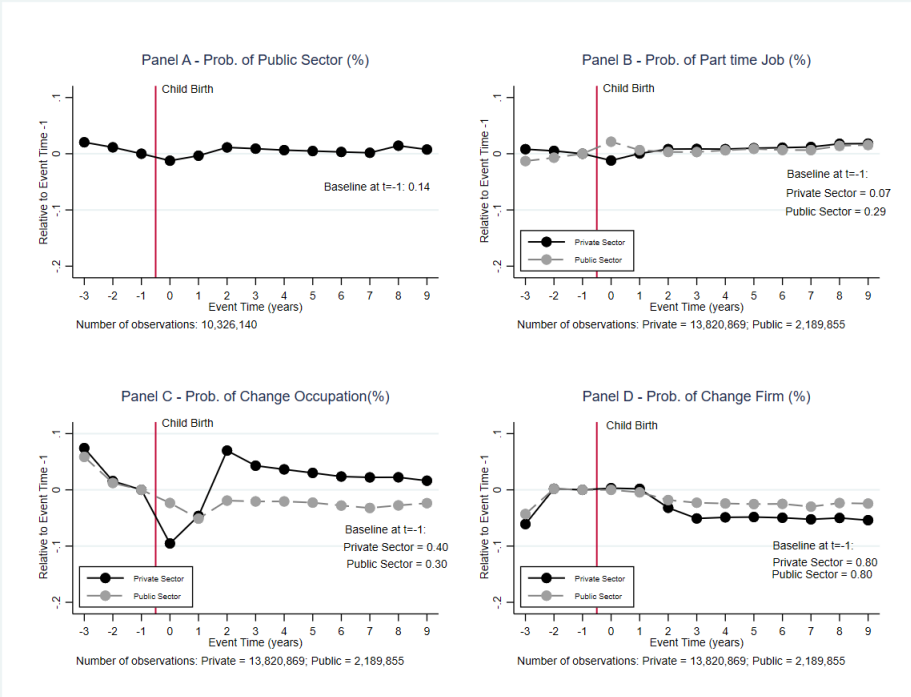
Another mechanism commonly explored in understanding the child penalty is women's preference for family-friendly workplaces, as examined by (??????????). Motherhood's impact on women's labor market outcomes can lead to shifts in occupational choices, with a movement towards more flexible work arrangements (??). We investigate the likelihood of women working in the public sector and part-time jobs, which are often considered more flexible and family-friendly. Our main hypothesis is that the probability of working in the public sector or part-time would increase after childbirth (??). Contrary to the expectations set forth in the literature, we observe a stable trend in the probability of working in the public sector and holding a part-time job around childbirth (Figure 6 - Panel A).

The observed decline in wages is primarily driven by reductions in hourly wages, which contradicts the non-reduction of wages principle under the CLT. Accordingly, our central hypothesis posits that women are more likely to change occupations or firms following childbirth, and that these changes may significantly affect their salary trajectories.

So, we examine the likelihood of occupational and firm changes. In the private sector, the probability of changing occupations decreases during the year of childbirth (t = 0) but starts to rise in the subsequent years. This initial decline can likely be attributed to job stability provided by maternity leave policies. Conversely, the likelihood of changing firms drops by approximately 5% at t = 3. In the public sector, the probabilities of changing occupations or firms do not exhibit significant variations.

These findings align with the results of **??**), who indicated that while men's job-to-job mobility steadily decreases over the life cycle, women's mobility is closely linked to the timing of parenthood. Specifically, women experience lower mobility in the years immediately surrounding childbirth but higher mobility in the years prior. This pattern suggests that part of the observed decline in hourly wages may be attributed to occupational changes within firms.

Figure 6 – Motherhood impact on Sector and Firms



Data Source: RAIS. 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 2008 and 2019. The effects on wages, hours worked, and hourly wages are estimated conditional on labor force participation.The shaded 95 percent confidence intervals are based on robust standard errors.

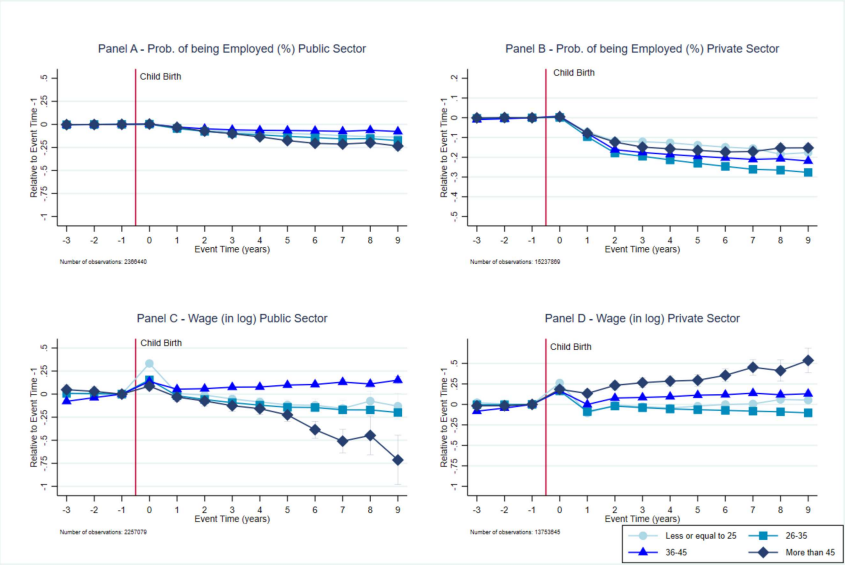
Our analysis highlights the significant impact of motherhood on women's labor market outcomes, particularly in terms of wages, occupational choices, and job mobility. While the existing literature identifies various mechanisms, such as a preference for family-

friendly jobs and shifts in occupational roles, our findings suggest that the decline in hourly wages may be closely linked to changes in occupations within firms. Furthermore, we observe that while the public sector and part-time employment may not show substantial shifts immediately following childbirth, occupational changes and job mobility do tend to increase in the years following childbirth, particularly in the private sector. These results underscore the complexity of the child penalty and point to the importance of considering job mobility and occupation-related factors when analyzing the long-term effects of motherhood on women's careers.

5.3 HETEROGENEOUS IMPACTS OF MOTHERHOOD

We investigate whether motherhood impacts on employment and wages differ by age, educational level, categories of minimum wages and occupation. To this end, we divided the sample into the following subgroups: less than 25 years old, between 26 and 35 years old, between 36 and 45 years old and more than 45 years old; college graduates versus non-college graduates; up to 2 minimum wages, 2 to 4 minimum wages, 4 to 8 minimum wages and more than 8 minimum wages; manager, professional, white collar lower level and blue collar. Along with the figures, we will present an estimated difference in child penalties.

Figure 7 – Impacts of Motherhood by Age



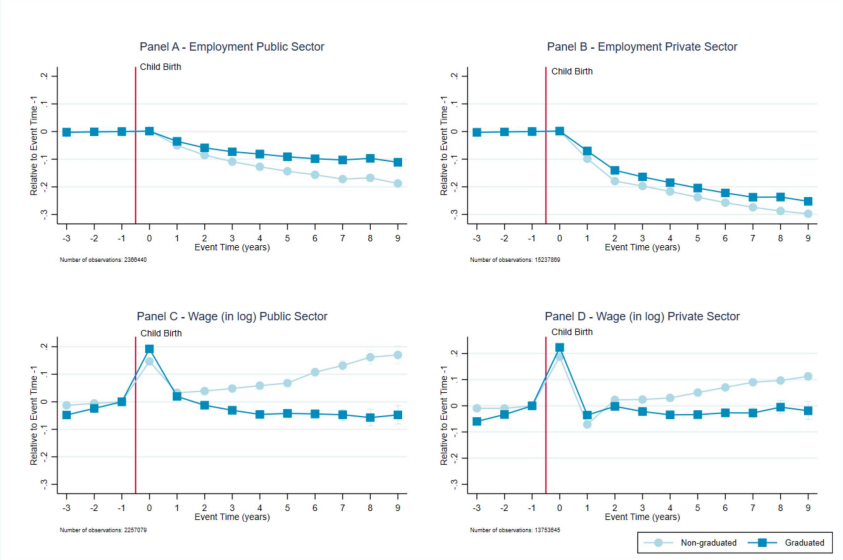
Data Source: RAIS. The figure presents the evolution of employment and wages across different subgroups. The subgroups are categorized based on the mother's age in the year of childbirth. The number of women in each age group is as follows: up to 25 years – 438,663; 26-35 years – 1,341,763; 36-45 years – 402,996; and over 45 years – 16,285. The figure highlights the differences in post-childbirth penalties across these age groups, with 95% confidence intervals calculated using robust standard errors.

Panels A-D (Figure 7) examine the heterogeneity in child penalties based on maternal age. In the public sector, older mothers (over 45 years old) experience a more

pronounced decline in labor force participation and wages. In contrast, in the private sector, younger women (between 26 and 35 years old) face a greater reduction in their probability of remaining employed. This is likely because younger women are at the early stages of their careers, and childbirth during this period may limit the time they can devote to career development. The impact is particularly significant in the private sector, which is more competitive and demands greater career continuity.

Figure 8 focus on heterogeneity in child penalties based on educational attainment, comparing women with a university degree to those without. More educated mothers demonstrate a stronger attachment to the formal labor market across both sectors. However, non-graduated mothers face a faster wage recovery compared to graduated mothers.

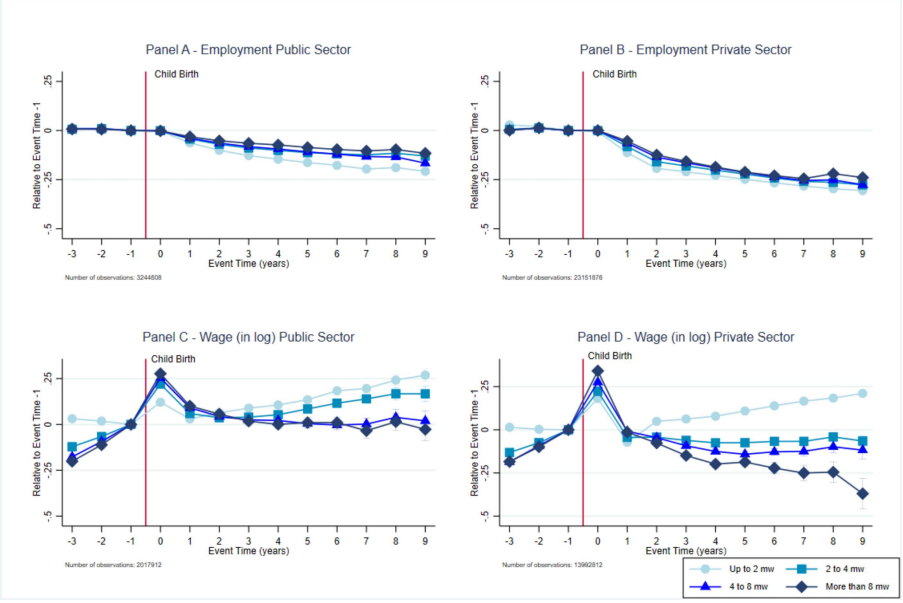
Figure 8 – Impacts of Motherhood by Education level



Data Source: RAIS. The figure presents the evolution of employment and wages across different subgroups. The subgroups are categorized based on the mother's education level in the year of childbirth. The number of women in each education group is as follows: non-graduated - 1,693,916 ; and graduated - 505,791.The figure highlights the differences in post-childbirth penalties across these age groups, with 95% confidence intervals calculated using robust standard errors.

Mothers in higher-income groups are more likely to remain employed after childbirth than those in lower-income brackets (Figure 9). This protective effect of higher earnings is observed in both the public and private sectors, although it is more pronounced in the public sector. Conversely, women earning more than 8 minimum wages experience larger wage declines compared to those earning up to 2 minimum wages.

Figure 9 – Impacts of Motherhood by Wages

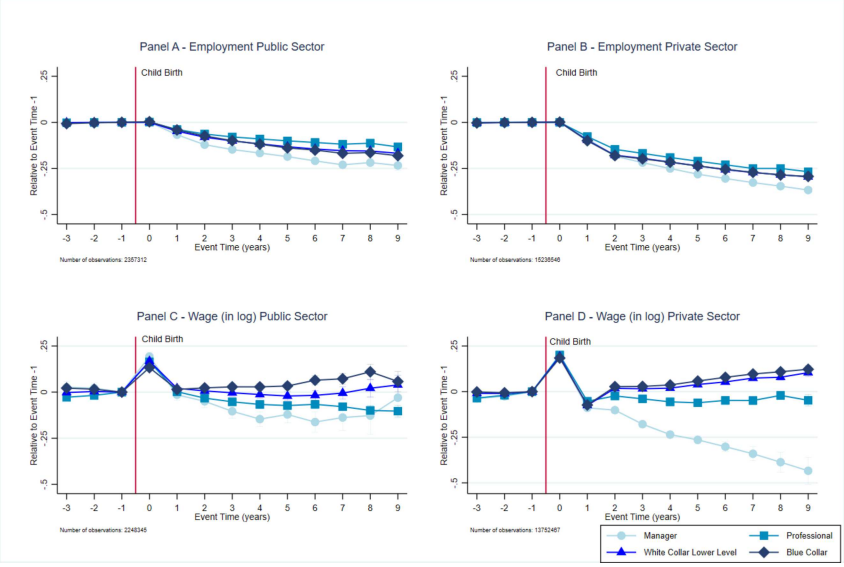


Data Source: RAIS. The figure presents the evolution of employment and wages across different subgroups. The subgroups are categorized based on the mother's wages in the year of childbirth. The number of women in each minimum wages group is as follows: up to 2 minimum wages – 1,537,934; 2-4 minimum wages – 425,638; 4-8 minimum wages – 163,010; and more than 8 minimum wages – 73,125. The figure highlights the differences in post-childbirth penalties across these age groups, with 95% confidence intervals calculated using robust standard errors.

Figure 10 examines the wage penalties associated with childbirth, revealing that occupational status further influences both wage and labor force participation penalties. Women in managerial positions experience larger wage reductions compared to blue-collar and lower-level white-collar workers. The public sector shows greater resilience in mitigating these penalties, highlighting its role in reducing the economic impact of motherhood on women's wages. In contrast, these disparities are more pronounced in the private sector, where employment penalties tend to be significantly higher in the long term.

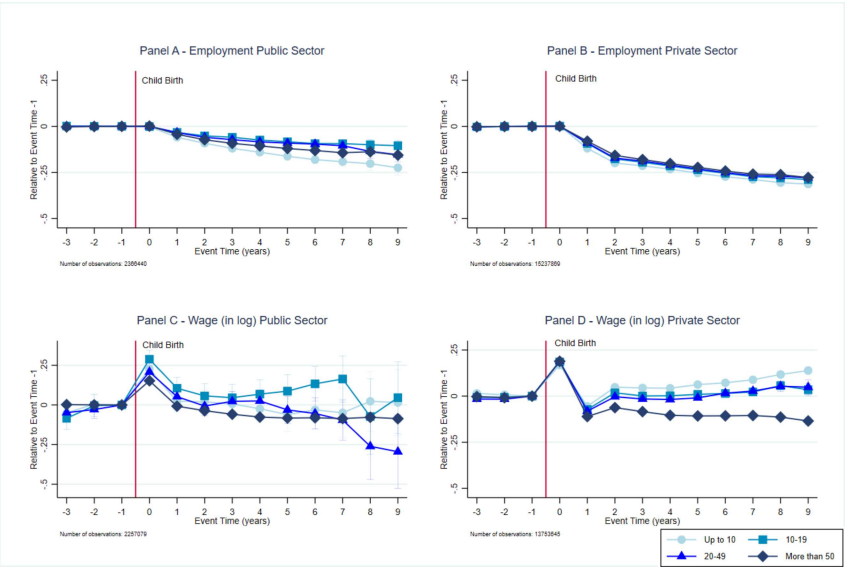
Figure 11 analyzes the heterogeneous effects of childbirth on employment across different firm size categories. The results indicate that women employed in smaller firms exhibit lower probabilities of remaining employed after childbirth compared to those working in larger firms. This pattern is consistent across both the public and private sectors. In term of wage penalties, mothers employed in larger firms (with more than 50 employees) in the private sector experience greater wage reductions following childbirth. In the public sector, a similar trend is observed; however, mothers working in firms with 20–29 employees face a more prolonged impact on wages. These findings underscore the importance of firm size in shaping both employment and wage penalties associated with motherhood.

Figure 10 – Impacts of Motherhood by Occupation



Data Source: RAIS. The figure presents the evolution of employment and wages across different subgroups. The subgroups are classified according to the mother's occupation in the year of childbirth. The number of women in each occupation group is as follows: Manager – 95,627 ; Professional – 537,671; White Collar Lower Level - 707,511; and Blue Collar – 857,650 . The figure highlights the differences in post-childbirth penalties across these age groups, with 95% confidence intervals calculated using robust standard errors.

Figure 11 – Impacts of Motherhood by firm size



Data Source: RAIS. The figure presents the evolution of employment and wages across different subgroups. The subgroups are classified according to the size of the mother's firm in the year of childbirth. The number of women in each firm size group is as follows: up to 10 employees – 524,377 ; 10-19 employees – 262,072; 26-49 employees - 293,980; and more than 50 – 1,119,278. The figure highlights the differences in post-childbirth penalties across these age groups, with 95% confidence intervals calculated using robust standard errors.

6 MOTHERHOOD IN THE PUBLIC SECTOR: CONTRACTS AND GOVERNMENT LEVELS DIFFERENCES

As discussed earlier in the institutional background section on the public sector, this segment of the labor market presents specific characteristics that may mitigate some of the negative impacts of motherhood on women's careers. However, to better understand why motherhood continues to affect public employees despite the job stability associated with this sector, we further analyze the type of employment contract and the level of government (federal, state, or municipal) in which these women are employed.

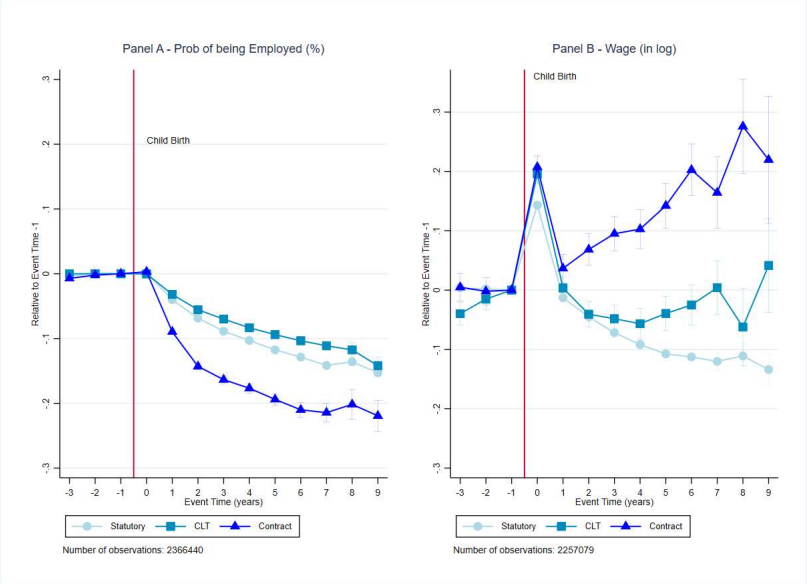
Figure 12 analyzes the impact of motherhood on employment outcomes across different types of employment contracts. Among public sector employees, both statutory employees[1] and CLT employees[2] exhibit similar trajectories around childbirth, including the post-birth period. However, contracted employees, who do not benefit from long-term job stability, experience significant disruptions in labor force participation. Their employment patterns closely resemble those observed in the private sector, as illustrated in Figure 3.

In terms of wages, contracted mothers experience a temporary spike in earnings, with salaries increasing by 20% in the year of childbirth (event time = 0). However, these earnings decline by 17% in the first year following childbirth before returning to an upward trajectory. Statutory and CLT employees also see a 20% increase in wages during the year of childbirth, followed by a pronounced decline in subsequent years.

[1] Statutory positions refer to roles obtained through competitive civil service exams and governed by Law 8.112/97. These positions confer legal labor force participation with specific privileges, including job stability after a probationary period, as well as distinct rules for retirement and benefits. This regime applies to public employees at the municipal, state, and federal levels.

[2] The CLT (Consolidation of Labor Laws) governs formal employment in Brazil, ensuring workers' rights such as FGTS contributions, social security (INSS), paid vacation, a 13th-month salary, and an 8-hour workday. It also provides protections such as paid leave and wage guarantees.

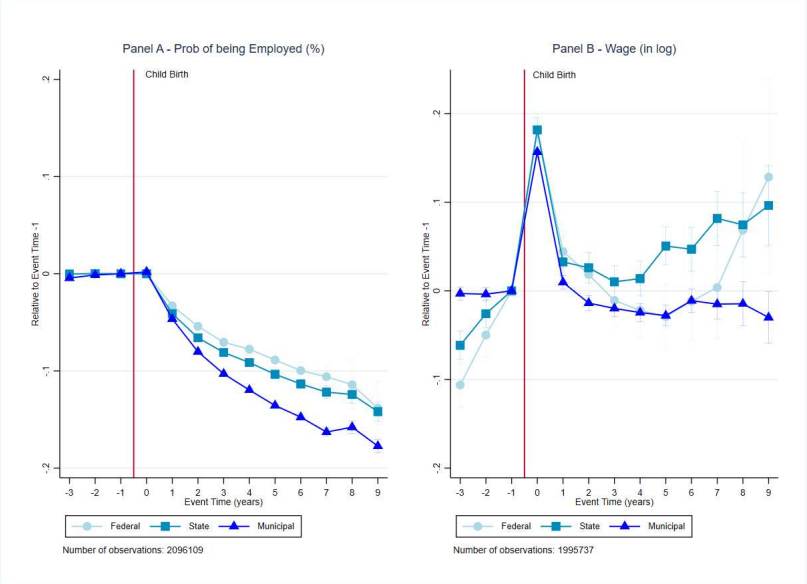
Figure 12 – Impacts of Motherhood by type of contract



Data Source: RAIS. The figure presents the evolution of employment and wages across different subgroups. The number of women in each type of contract group is as follows: Statutory – 225,943 ; CLT– 20,387 ; and Contract - 24,054. The figure highlights the differences in post-childbirth penalties across these age groups, with 95% confidence intervals calculated using robust standard errors.

We examine the same outcomes across different levels of government. As illustrated in Figure 13, mothers employed at the municipal level experience a more significant impact on their labor force participation compared to those employed at the state and federal levels, respectively. Regarding wages, a similar overall effect is observed, as shown in Figure 3. However, mothers working at the municipal level experience a more prolonged negative impact on their wages.

Figure 13 – Impacts of Motherhood by Government level



Data Source: RAIS. The figure presents the evolution of employment and wages across different subgroups. The number of women in each government level group is as follows: Federal – 19,803 ; State – 51,557; and Municipal - 196,438. The figure highlights the differences in post-childbirth penalties across these age groups, with 95% confidence intervals calculated using robust standard errors.

These findings underscore the relative stability provided by statutory and CLT contracts in maintaining labor force participation, particularly in the public sector. However, the advantages of these contracts diverge significantly when considering wage trajectories. While mothers employed under statutory and CLT contracts generally maintain a higher probability of continued employment after childbirth, their wage recovery following childbirth is slower and less pronounced compared to mothers employed under public sector contracts without long-term job stability.

Mothers in temporary or contracted positions in the public sector, despite facing a higher risk of employment disruption, experience a quicker wage recovery if they remain employed after childbirth. This swift wage rebound suggests that, for contracted workers who manage to overcome the initial employment instability, the economic recovery process is more favorable than for their statutory or CLT counterparts. In contrast, wage declines among statutory and CLT employees tend to persist over a longer period, highlighting a disadvantage in income resilience despite their relative employment stability. Additionally, mothers employed at the municipal level face more significant and prolonged negative impacts on both labor force participation and wages compared to those employed at the state and federal levels.

7 FINAL CONSIDERATIONS

This paper provides empirical evidence on the impacts of childbirth on women's careers in a developing country. We document that women employed in the private sector are more likely to experience job loss and wage reductions after becoming mothers, compared to their counterparts in the public sector. These disparities can largely be attributed to the greater job stability inherent in public sector employment, which offers stronger protections against employment disruptions. These insights contribute to the broader literature on family-friendly workplace policies by highlighting the sectoral differences in how motherhood affects women's careers, emphasizing the importance of employment structures in shaping maternal labor market outcomes.

Our study reveals that, contrary to evidence from other developing and developed countries, the wage reductions observed in our study are primarily driven by declines in hourly wages rather than a reduction in hours worked. Additionally, we find that the job stability provided by maternity leave laws helps delay employment loss in both sectors, offering a temporary buffer against the immediate negative impacts of childbirth on women's careers. However, this stability is insufficient to prevent job loss in the medium and long term. The employment losses appear to be primarily driven by employer-initiated dismissals, although the dismissal variable does not fully capture the entire range of separations.

Our findings also reveal that mothers in less advantageous positions face greater challenges in maintaining their employment while balancing motherhood responsibilities. In contrast, mothers in higher socioeconomic conditions are better able to retain their jobs, although they often struggle to secure positions with the same level of remuneration as prior to childbirth. Among public sector employees, statutory and CLT contracts provide greater job stability but are associated with slower wage recovery, whereas temporary contracts facilitate quicker wage rebounds. Furthermore, mothers employed in municipal positions experience more severe and prolonged negative impacts compared to those working at the state or federal levels.

This paper acknowledges several limitations for future research. Firstly, our results do not necessarily correspond to the first-child penalty on women's careers. While we aimed to explore the impact of the first child, we were unable to precisely identify this variable for all women. Secondly, there exist novel empirical strategies that could be applied to this study, providing opportunities for further investigation.

REFERENCES

ADDA, J.; DUSTMANN, C.; STEVENS, K. The career costs of children. *Journal of Political Economy*, v. 125, 12 2016.

AGUILAR-GOMEZ, S.; ARCEO-GOMEZ, E.; TOLEDO, E. De la C. SSRN Scholarly Paper, *Inside the black box of child penalties: Unpaid work and household structure*. Rochester, NY: Social Science Research Network, 2019. Available on: <https://papers.ssrn.com/abstract=3497089>.

ANGELOV, N.; JOHANSSON, P.; LINDAHL, E. Parenthood and the gender gap in pay. *Journal of Labor Economics*, v. 34, n. 3, p. 545 – 579, 2016. Available on: <https://EconPapers.repec.org/RePEc:ucp:jlabec:doi:10.1086/684851>.

BAYARD, K.; HELLERSTEIN, J.; NEUMARK, D.; TROSKE, K. New evidence on sex segregation and sex differences in wages from matched employee-employer data. *Journal of Labor Economics*, v. 21, n. 4, p. 887–922, 2003. Available on: <https://EconPapers.repec.org/RePEc:ucp:jlabec:v:21:y:2003:i:4:p:887-922>.

BERNIELL, I.; BERNIELL, L.; de la Mata, D.; EDO, M.; MARCHIONNI, M. Motherhood and flexible jobs: Evidence from latin american countries. *World Development*, v. 167, p. 106225, 2023. ISSN 0305-750X. Available on: <https://www.sciencedirect.com/science/article/pii/S0305750X23000438>.

BERNIELL, I.; BERNIELL, L.; MATA, D. de la; EDO, M.; MARCHIONNI, M. Gender gaps in labor informality: The motherhood effect. *Journal of Development Economics*, v. 150, p. 102599, 2021. ISSN 0304-3878. Available on: <https://www.sciencedirect.com/science/article/pii/S0304387820301747>.

BERTRAND, M.; DUFLO, E.; MULLAINATHAN, S. How much should we trust differences-in-differences estimates? *The Quarterly journal of economics*, MIT Press, v. 119, n. 1, p. 249–275, 2004.

BERTRAND, M.; GOLDIN, C.; KATZ, L. F. Dynamics of the gender gap for young professionals in the financial and corporate sectors. *American Economic Journal: Applied Economics*, v. 2, n. 3, p. 228–55, July 2010. Available on: <https://www.aeaweb.org/articles?id=10.1257/app.2.3.228>.

BOOTH, A.; van Ours, J. Hours of work and gender identity: Does part-time work make the family happier? *Economica*, Wiley-Blackwell Publishing Ltd, v. 76, n. 301, p. 176–196, 2009. ISSN 0013-0427.

BRASIL. Lei nº 5.452, de 1º de maio de 1943. *Diário Oficial da República Federativa do Brasil*, Brasília, DF, 1943. Available on: <http://www.planalto.gov.br/ccivil$_0$3/*decreto* − *lei*/*del*5452.*htm*>.

BRASIL. Constituição da república federativa do brasil de 1988. *Diário Oficial da República Federativa do Brasil*, Brasília, DF, 1988. Available on: <http://www.planalto.gov.br/ccivil$_0$3/*constituicao*/*constituicao.htm*>.

Brasil. *Lei nº 8.112, de 11 de dezembro de 1990*. 1990. Accessed: 2024-10-16. Available on: <https://www2.camara.leg.br/legin/fed/lei/1990/lei-8112-11-dezembro-1990-322161-publicacaooriginal-1-pl.html: :text=Disp

BRASIL. Lei nº 11.770, de 09 de setembro de 2008. *Diário Oficial da República Federativa do Brasil*, Brasília, DF, 2008. Available on: <http://www.planalto.gov.br/ccivil$_0$3/$_a$to2007 − 2010/2008/*lei*/*l*11770.*htm*>.

BRASIL. Lei nº 13.257, de 8 de março de 2016. *Diário Oficial da República Federativa do Brasil*, Brasília, DF, 2016. Available on: <http://www.planalto.gov.br/ccivil$_0$3/$_a$to2015 − 2018/2016/*lei*/*l*13257.*htm*>.

ENAP. *Datathon: Desigualdades de Gênero no Serviço Público*. Enap, 2024. Acesso em: 23 dez. 2024. Available on: <https://repositorio.enap.gov.br/bitstream/1/8069/1/GNOVA

GOLDIN, C. A grand gender convergence: Its last chapter. *American Economic Review*, v. 104, n. 4, p. 1091–1119, 2014.

GOLDIN, C.; KATZ, L. F. A most egalitarian profession: Pharmacy and the evolution of a family-friendly occupation. *Journal of Labor Economics*, v. 34, n. 3, p. 705–746, 2016.

GONZAGA, G.; OAQUIM, M.; TERRA, C. *Gender Wage Gap and Job Flexibility*. 2020.

HOTZ, V. J.; JOHANSSON, P.; KARIMI, A. *Parenthood, Family Friendly Workplaces, and the Gender Gaps in Early Work Careers*. 2017. (Working Paper Series, 24173). Available on: <http://www.nber.org/papers/w24173>.

IBGE. *Diferença do rendimento do trabalho de mulheres e homens nos grupos ocupacionais*. 2018. Available on: <https://agenciadenoticias.ibge.gov.br/media/com$_m$ediaibge/arquivos/694dba51d3592761fcbf9e1a5

IBGE. *Estatísticas de Gênero: Indicadores Sociais das Mulheres no Brasil*. 2018. (Estudos e Pesquisas. Informação Demográfica e Socioeconômica, 38).

IBGE. *Pesquisa Nacional por Amostra de Domicílios Contínua (PNAD Contínua)*. 2022. Disponível em: <https://www.ibge.gov.br>. Acesso em: 6 jan. 2025.

KLEVEN, H.; LANDAIS, C.; POSCH, J.; STEINHAUER, A.; ZWEIMULLER, J. Child penalties across countries: Evidence and explanations. *AEA Papers and Proceedings*, v. 109, p. 122–26, May 2019. Available on: <https://www.aeaweb.org/articles?id=10.1257/pandp.20191078>.

KLEVEN, H.; LANDAIS, C.; SøGAARD, J. E. Children and gender inequality: Evidence from denmark. *American Economic Journal: Applied Economics*, v. 11, n. 4, p. 181–209, October 2019. Available on: <https://www.aeaweb.org/articles?id=10.1257/app.20180010>.

KLEVEN, H.; LANDAIS, C.; SøGAARD, J. E. Children and gender inequality: Evidence from denmark. *American Economic Journal: Applied Economics*, v. 11, n. 4, p. 181–209, October 2019. Available on: <https://www.aeaweb.org/articles?id=10.1257/app.20180010>.

KUZIEMKO, I.; PAN, J.; SHEN, J.; WASHINGTON, E. *The Mommy Effect: Do Women Anticipate the Employment Effects of Motherhood?* 2018. Available on: <https://ideas.repec.org/p/nbr/nberwo/24740.html>.

LUNDBORG, P.; PLUG, E.; RASMUSSEN, A. W. Can women have children and a career? iv evidence from ivf treatments. *American Economic Review*, v. 107, n. 6, p. 1611–37, June 2017. Available on: <https://www.aeaweb.org/articles?id=10.1257/aer.20141467>.

MACHADO, C.; NETO, V.; SZERMAN, C. Firm and worker responses to extensions in paid maternity leave. *Journal of Human Resources*, University of Wisconsin Press, 2024. ISSN 0022-166X. Available on: <https://jhr.uwpress.org/content/early/2024/05/01/jhr.0322-12232R2>.

MEDEIROS, M. O. d. *Motherhood Penalty in Labor Market: Evidence from Brazil*. 52 p. Dissertação (Dissertação de Mestrado) — Pontifícia Universidade Católica do Rio de Janeiro, Rio de Janeiro, 2022.

MELENTYEVA, V.; RIEDEL, L. *Child Penalty Estimation and Mothers' Age at First Birth*. 2023. Available on: <https://ideas.repec.org/p/ajk/ajkdps/266.html>.

MGI. *A presença das mulheres na administração pública federal*. 2024. Ministério da Gestão e da Inovação. Retrieved December 23, 2024, from <https://www.gov.br/gestao/pt-br/central-de-conteudo/publicacoes/artigos/a-presenca-das-mulheres-na-administracao-publica-federal-1>.

MULLIGAN, C.; RUBINSTEIN, Y. Selection, investment, and women's relative wages over time. *The Quarterly Journal of Economics*, v. 123, n. 3, p. 1061–1110, 2008. Available on: <https://EconPapers.repec.org/RePEc:oup:qjecon:v:123:y:2008:i:3:p:1061-1110.>.

NAKAMURA, L. M.; VAZ, D. V. Quão heterogêneo é o setor público no brasil? uma análise das diferenças salariais entre os poderes executivo, legislativo e judiciário. *Administração Pública e Gestão Social*, v. 12, n. 4, set. 2020. Available on: <https://periodicos.ufv.br/apgs/article/view/5809>.

NETO, A. M.; SEVERIAN, D. Emprego público no brasil: bases atuais da coesão federativa e do desenvolvimento territorial - da constituição federal de 1988 ao presente. In: *Administração Pública. Governo. Estado: Capítulos de Livros*. Instituto de Pesquisa Econômica Aplicada (Ipea), 2021. Available on: <https://repositorio.ipea.gov.br/handle/11058/11743>.

OECD. *OECD Public Service Leadership and Capability Review of Brazil*. 2022. Available on: <https://repositorio.enap.gov.br/bitstream/1/7593/2/1.

ROSSIN-SLATER, M. *Maternity and Family Leave Policy*. 2017. (Working Paper Series, 23069). Available on: <http://www.nber.org/papers/w23069>.

ROSSIN-SLATER, M.; RUHM, C. J.; WALDFOGEL, J. The effects of california's paid family leave program on mothers' leave-taking and subsequent labor market outcomes. *Journal of Policy Analysis and Management*, v. 32, n. 2, p. 224–245, 2013.

VAZ, D. V. O teto de vidro nas organizações públicas: evidências para o brasil. *Economia e Sociedade*, Instituto de Economia da Universidade Estadual de Campinas, Publicações, v. 22, n. 3, p. 765–790, Dec 2013. ISSN 0104-0618. Available on: <https://doi.org/10.1590/S0104-06182013000300007>.

WISWALL, M.; ZAFAR, B. Preference for the workplace, investment in human capital, and gender. *The Quarterly Journal of Economics*, v. 133, n. 1, p. 457–507, 2018. Available on: <https://EconPapers.repec.org/RePEc:oup:qjecon:v:133:y:2018:i:1:p:457-507.>.

World Bank. *Six Facts on Gender Laws and the Public Sector*. 2020. <https://blogs.worldbank.org/governance/six-facts-gender-laws-and-public-sector?CID=WBW_AL_BlogNotification_EN_EXT>. Accessed: 2021-08-23.

APPENDIX A – Variable Construction using RAIS

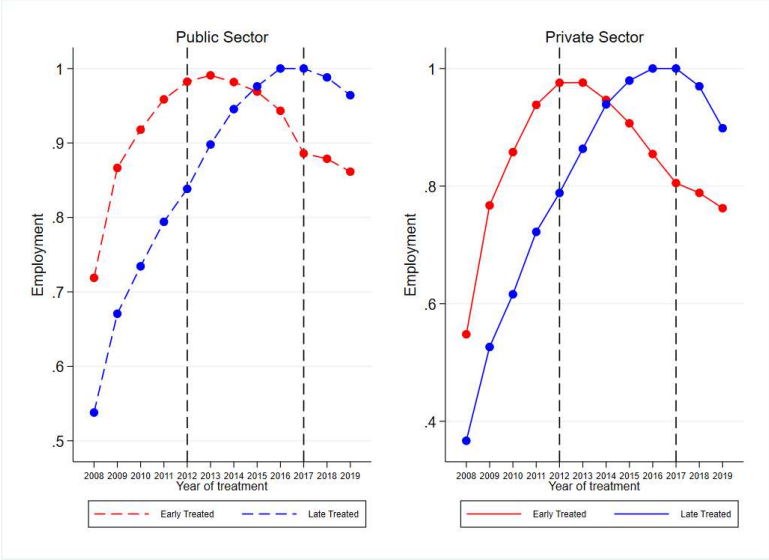
- **Employment** is coded as 1 if the woman appears in the database for that year, and 0 if the woman is not present in RAIS for that year.
- **Wage** is defined as the real average wage (in R$ 2019) related to the main contract in that year.
- **Public** is a binary variable construct based on legal entity codes and statutory contract.
- **part-time** is a binary variable equal to one women work less than 30 hours per week in the main contract.
- **Dismissal** is a binary variable equal to one in the year the worker is dismissed for any reason
- **Dismissal by employer** is a binary variable equal to one when the dismissal is due to "Just cause termination by employer or dismissed employee"or "Unjust cause termination by employer initiative"
- **Dismissal by employee** is a binary variable equal to one when the dismissal is due to "Just cause termination by employee initiative (indirect termination)"or "Unjust cause termination by employee initiative or resignation"

Table 2 – Classification of Occupations by CBO Code

CBO Code	Description of Occupation	Group
0	Members of the Armed Forces, Police Officers, and Military Firefighters	Dropped
1	Senior Members of Public Power, Directors of Public Interest Organizations and Companies, Managers	Managerial Position
2	Science and Arts Professionals	Professional Position
3	Middle Level Technicians	Professional Position
4	Administrative Services Workers	White Collar Lower Level
5	Service Workers, Commercial Sellers in Stores and Markets	Blue Collar
6	Agricultural, Forestry and Fishery Workers	Blue Collar
7	Workers in the Production of Industrial Goods and Services	Blue Collar
8	Workers in the Production of Industrial Goods and Services	Blue Collar
9	Workers in Repair and Maintenance Services	Blue Collar

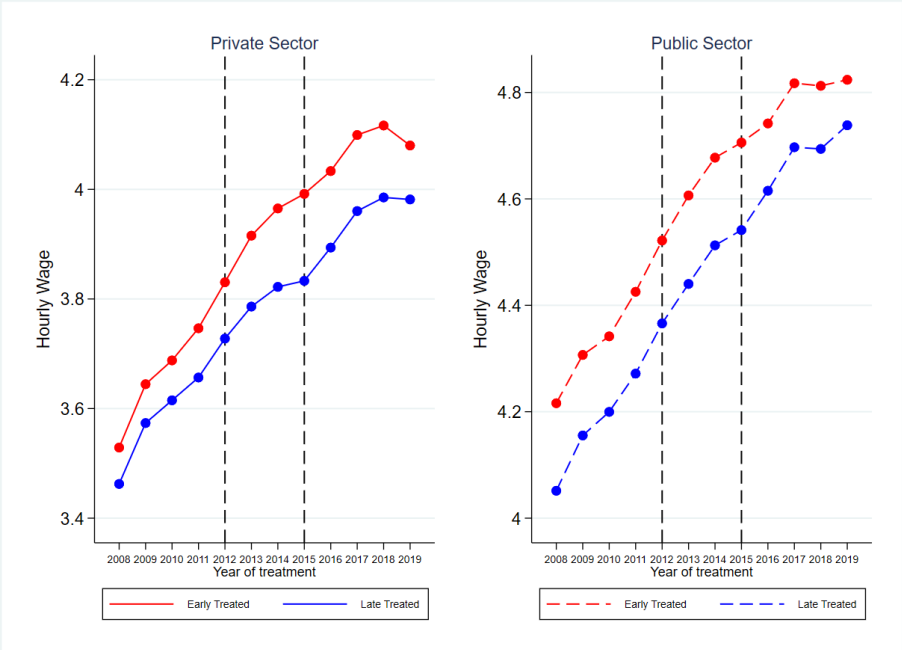
APPENDIX B – Descriptive Statistics: Early Treated *versus* Late Treated

Figure 14 – Trends of Employment between early treated and late treated



Data Source: RAIS. This figure illustrates the trends labor force participation for early-treated (indicated by the red line) and late-treated (indicated by the blue line) employees within the selected sample. The dashed lines represent the public sector, while the solid lines depict the private sector. The analysis focuses on women who were employed in the formal labor market for a minimum of three years prior to childbirth.

Figure 15 – Trends of Hourly Wages (log) between early treated and late treated



Data Source: RAIS. This figure illustrates the trends in log wages for early-treated (indicated by the red line) and late-treated (indicated by the blue line) employees within the selected sample. The dashed lines represent the public sector, while the solid lines depict the private sector. The analysis focuses on women who were employed in the formal labor market for a minimum of three years prior to childbirth.

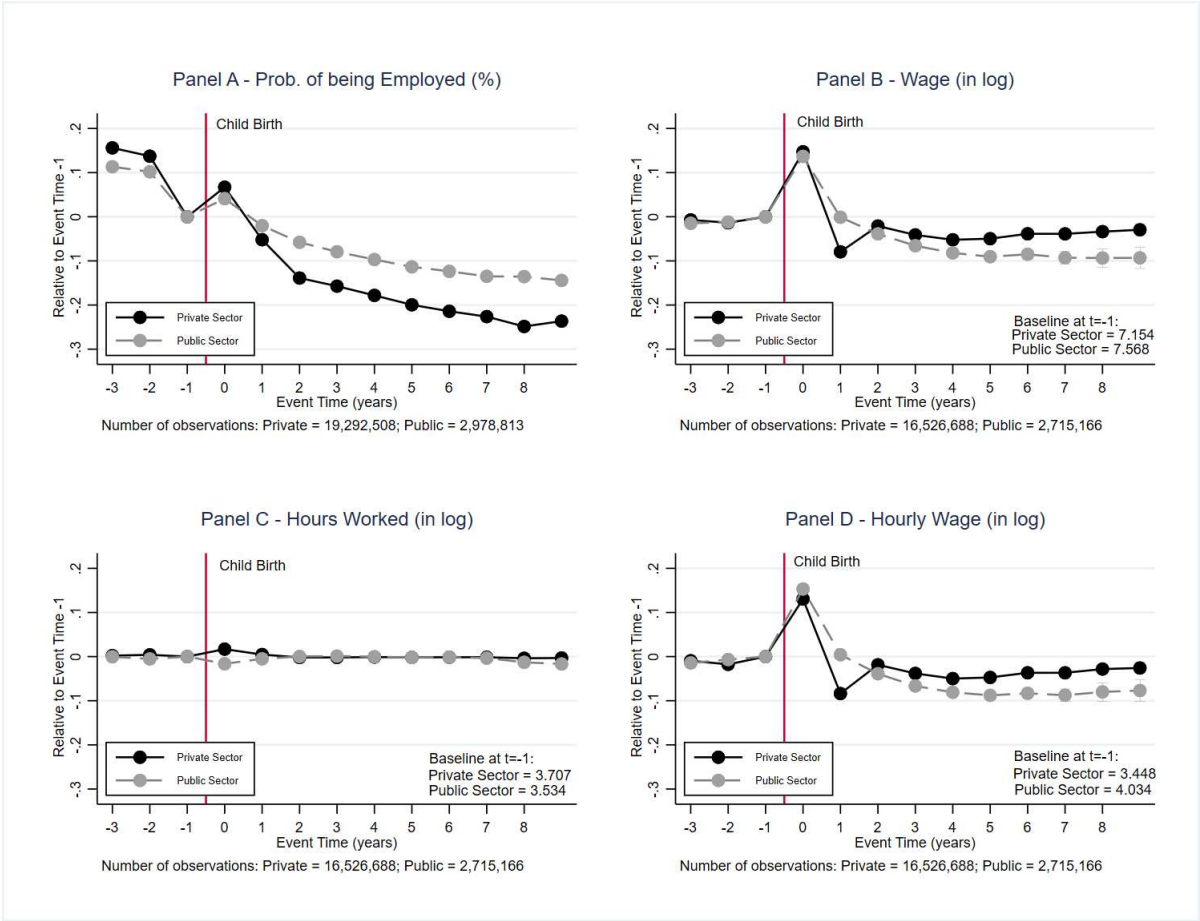
Table 3 – Descriptive statistics of employees - Pre-Treatment

	Public Sector		Private Sector	
	Early Treated	Late Treated	Early Treated	Late Treated
Wage				
Wages (in *reais*)	2,437.40	2,117.64	1,480.24	1,376.68
	(3,411.50)	(2,970.30)	(1,649.51)	(1,428.32)
Log Earnings	7.30	7.18	6.99	6.93
	(1.22)	(1.26)	(1.08)	(1.12)
Hourly Wage (in *reais*)	74.83	64.20	38.91	36.03
	(128.21)	(131.29)	(93.40)	(71.56)
Log Hourly Wage	3.74	3.59	3.29	3.23
	(1.27)	(1.29)	(1.09)	(1.13)
Education				
Basic Education	0.13	0.11	0.19	0.14
	(0.34)	(0.32)	(0.40)	(0.35)
High School	0.41	0.35	0.47	0.34
	(0.49)	(0.48)	(0.50)	(0.47)
College	0.46	0.54	0.34	0.52
	(0.50)	(0.50)	(0.47)	(0.50)
Age				
Age	28.40	24.83	25.07	21.75
	(5.88)	(5.84)	(5.84)	(5.61)
Occupational Categories				
Managerial	0.05	0.04	0.03	0.03
	(0.21)	(0.20)	(0.17)	(0.16)
Professional	0.45	0.39	0.17	0.16
	(0.50)	(0.49)	(0.37)	(0.37)
White Collar Lower Level	0.25	0.28	0.34	0.35
	(0.43)	(0.45)	(0.47)	(0.48)
Blue Collar	0.25	0.29	0.46	0.46
	(0.43)	(0.45)	(0.50)	(0.50)
Firm Size				
0-9 Empregados	0.09	0.10	0.18	0.14
	(0.28)	(0.30)	(0.39)	(0.34)
10-49 Empregados	0.09	0.10	0.20	0.14
	(0.29)	(0.30)	(0.40)	(0.35)
50-99 Empregados	0.04	0.04	0.08	0.06
	(0.19)	(0.20)	(0.27)	(0.23)
100+ Empregados	0.78	0.76	0.54	0.67
	(0.41)	(0.42)	(0.50)	(0.47)
Level of Government				
Federal	0.06	0.08	0.00	0.00
	(0.24)	(0.27)	(0.00)	(0.00)
State	0.17	0.17	0.00	0.00
	(0.37)	(0.37)	(0.00)	(0.00)
Municipal	0.65	0.68	0.00	0.00
	(0.48)	(0.47)	(0.00)	(0.00)
Type of Contract				
Contract	0.08	0.09	0.00	0.00
	(0.26)	(0.29)	(0.00)	(0.00)
Estatutário	0.78	0.78	0.00	0.00
	(0.42)	(0.41)	(0.00)	(0.00)
CLT	0.15	0.12	1.00	1.00
	(0.35)	(0.33)	(0.06)	(0.07)
Women	173,692	97,456	1,192,409	581,941
Observations	2,084,304	1,169,472	14,308,908	6,983,292

Note: Data Source: RAIS. This table presents descriptive statistics for the Early-treated group (those treated between 2012 and 2015) and the Late-treated group (those treated after 2015). The means and standard deviations (in parentheses) are calculated for the years preceding 2012. The sample consists of employees who had a child between 2008 and 2019.

APPENDIX C – Robustness Checks: Late Treated

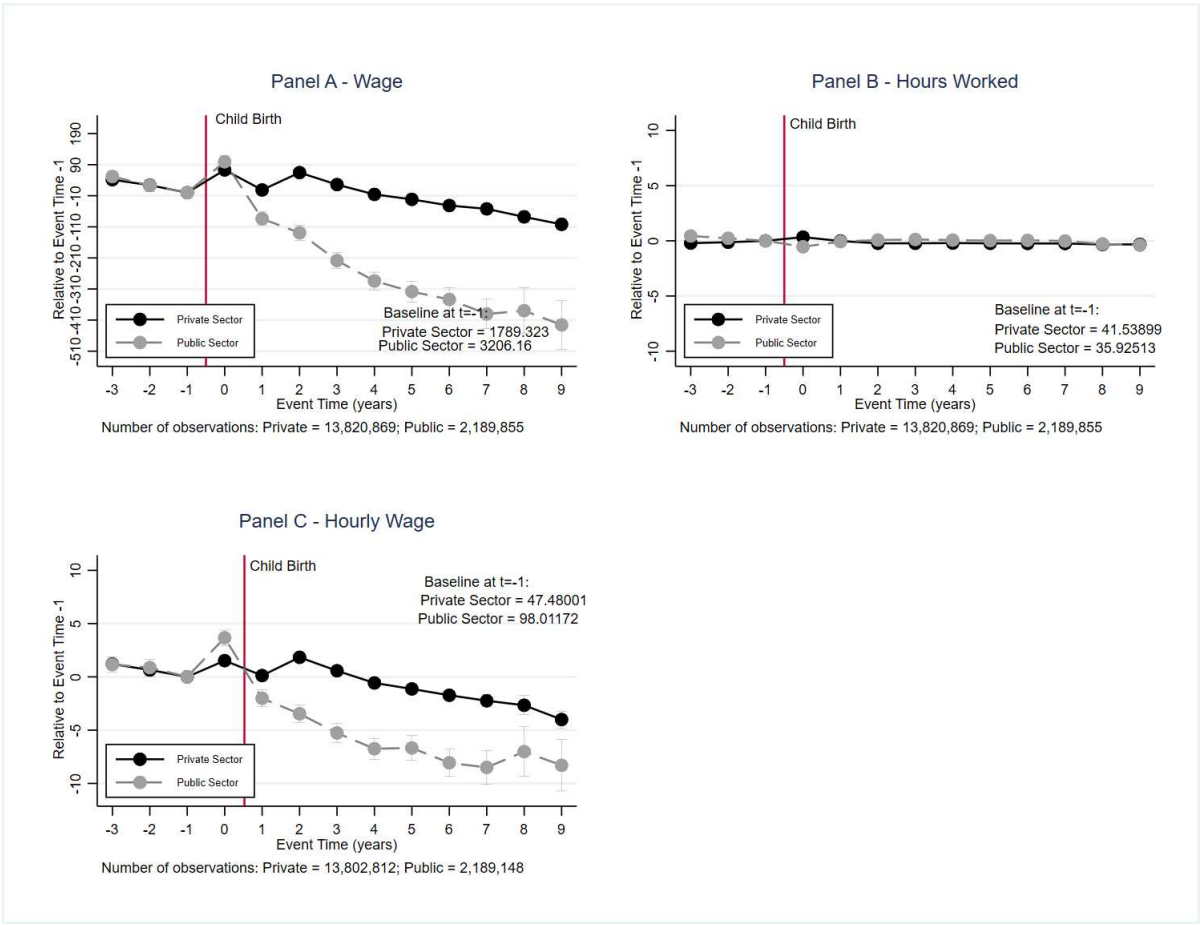
Figure 16 – Motherhood impact on Wage, Hours Worked and Hourly Wage



Data Source: RAIS. The figure presents event-time coefficients estimated from equation (1) as a percentage of the counterfactual outcome, separately for different outcomes in the public and private sectors. The control group consists of women who gave birth between 2017 and 2019, while the treatment group includes women who were treated before 2017. The sample is restricted to women employed in the formal labor market for at least three years prior to childbirth. The shaded areas represent 95% confidence intervals, calculated using robust standard errors.

APPENDIX D – Motherhood impact without log

Figure 17 – Motherhood impact on Wage, Hours Worked and Hourly Wage



Data Source: RAIS. 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. The estimations correspond to linear variables that have not been log-transformed. 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 2008 and 2019. The effects on wages, hours worked, and hourly wages are estimated conditional on labor force participation. The shaded 95 percent confidence intervals are based on robust standard errors.