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How Should We Design Parental Leave Policies? Evidence from Two Reforms in Italy

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Abstract

This paper studies the role of different policy instruments in the design of parental leave policies. Taking advantage of a unique environment in which women, after childbirth, can choose between returning to work, less generous benefits with job protection, and more generous benefits without job protection, I disentangle the effects of different parental leave parameters on women's decisions to return to work, labor market outcomes, and welfare. When cash benefits become more generous, many mothers choose to forgo job protection and substitute out of the standard parental leave program. While this brings them greater financial security in the short run, it drives long-lasting declines in employment and earnings, most of which occur after the benefits are exhausted. Using a revealed preference approach, I find that mothers attribute a significant value to transfers after childbirth relative to job protection. The high utility value of benefits partially reflects a high cost of working after childbirth. The welfare analysis suggests that increasing the level of benefits with job protection and relaxing constraints by increasing childcare availability is welfare improving for mothers.

JEL Classification: H31, H53 J08, J13, J16, J18, J22, I38.

Keywords: Parental leave, Family Policies, Social Insurance, Revealed Preferences.

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1 Introduction

Despite women narrowing the gap with men in labor force participation and surpassing them in educational attainment, gender differences in labor market outcomes persist. Recent research shows that the bulk of labor market gender inequality can be attributed to the unequal impacts of parenthood on men and women (Kleven, Landais, and Søgaard 2019; Kleven et al. 2020). This fact has spurred increasing interest in how government interventions can mitigate the adverse effects of childbirth on women's labor market outcomes. Parental leave programs are among these interventions; they have the double objective of insuring women against income losses when temporarily out of work and keeping them engaged in the labor force.

Evidence on how to *optimally* design leave policies and their welfare effects is, however, scarce. Parental leave policies are a bundle of three core features: the duration of benefits, the replacement rate of benefits, and the provision of job protection. While a sizable literature has studied partial elements of the parental leave system (Dahl et al., 2016; Kleven et al., 2020; Lalive et al., 2014; Schönberg and Ludsteck, 2014; Raute, 2019), we still lack a general understanding of how the effectiveness of parental leave policies depends on these different design features. The main difficulty in isolating the effects of different policy instruments is that they usually move together, making it difficult to disentangle their effects and individuals' valuations of each.

This paper disentangles the effects of *different parental leave parameters* on women's decisions to return to work, labor market outcomes, and welfare. I do so by taking advantage of a unique environment in which women, after childbirth, can choose between returning to work, less generous benefits with job protection, and more generous benefits without job protection.

In Italy, mothers are compelled to take maternity leave which ends three months after birth. Once that ends, women can choose to take up the standard parental leave program, which replaces pre-birth earnings at a 30% rate for six months, or go back to work and arrange for childcare. In addition, the Italian social insurance network grants *special unemployment insurance eligibility* to women who decide to quit their jobs before their child's first birthday. This implies that unemployment insurance in the Italian context can be viewed as *paid parental leave* without job protection and can serve as a substitute or complement to standard parental leave policies.

I consider two different policy experiments that mimic expansions of paid parental leave without job protection by exogenously changing the generosity of unemployment insurance benefits. The first reform, introduced in 2013, increased the replacement rate of unemployment insurance from 60 to 75%. The second reform, introduced in 2015, increased the duration of unemployment

insurance from 8 months to a maximum of 24 months. Both reforms changed the generosity of the transfers that women could receive after childbirth without offering job protection, providing the opportunity to disentangle the effects of transfers from job protection and overcoming one of the main challenges in the literature, as benefits and job protection are usually tied together in parental leave policies[1].

Using novel and rich administrative data on the universe of mothers working in the private sector before childbirth provided by the Italian Social Security Institute (*INPS*), I analyze the effects of the reforms on separations from pre-birth employers, decisions to return to work, take-up of other social programs and long-term labor market outcomes. I implement a difference-in-differences design that compares birth cohorts differentially exposed to the unemployment insurance reforms before and after childbirth. The treatment and control groups are defined as a function of the end of the compulsory maternity leave date. Identification of the effects comes from comparing the evolution of outcomes after childbirth of cohorts of mothers who gave birth in the year of the reform to cohorts of mothers who gave birth in the year before.

The empirical analysis provides novel insights into the trade-offs mothers face in making parental leave decisions, the value of short-term benefits relative to job protection after childbirth, and the incentive costs associated with parental leave benefits. I find that mothers choose to forgo job protection when benefits become more generous. The evidence shows that increasing the generosity of unemployment benefits increases UI take-up by 18 to 20% relative to the pre-reform baseline. Voluntary separations drive the increase in UI take-up. Both reforms lead to a significant crowd-out of parental leave benefits and significantly delay women's return to work.

Overall, a significant portion of mothers is willing to give up the possibility of returning to their employer for higher benefits in the short run. What are the implications of these choices in terms of labor market outcomes? This question is crucial to evaluate the fiscal externalities of the reforms and the private trade-off that mothers face when making their decisions. Both reforms lead to long-lasting declines in earnings, driven by participation, most of which occur after the exhaustion of UI benefits. Mothers exposed to more generous benefits are about 1% less likely to work three to four years after compulsory maternity leave. After both reforms, the child penalties in earnings increase by around 4% one year after the end of maternity leave, with the negative effects persisting up to four years after childbirth. The results suggest that while taking up unemployment benefits brought mothers greater financial security in the short run, it costs them significant decreases in

[1] Baker and Milligan (2008); Dahl et al. (2016); Kleven et al. (2020); Lalive et al. (2014); Schönberg and Ludsteck (2014); Tô (2018); Raute (2019)

future earnings.

Using these estimates, I can quantify the private trade-off that mothers face when making parental leave choices, which informs how much they are willing to give up in terms of future earnings for an increase in benefit level or duration in the short run. I find that marginal women forgo a large amount of future labor earnings to gain additional short-term benefits. Increasing the *replacement rate* of benefits yields an average net benefits increase of 5,040 EUR for mothers who take this up; the cost of this is 31,000 EUR in foregone future earnings. Increasing the *length* of benefits yields an extra 14,400 EUR per mother; the cost of this is 36,000 EUR in foregone future earnings.

The trade-off between higher short-term benefits and foregone future earnings can be used to infer the value of the increased benefits for mothers. Using information on women's choices and on the earnings losses associated with giving up job protection[2], I develop a revealed-preference method to infer the implicit value of the benefits relative to job protection. I estimate a marginal benefit greater than 1 in both reforms, suggesting that the implicit value of transfers right after childbirth is substantial for marginal mothers. The high utility value of benefits partially reflects a high cost of working after childbirth, highlighting the importance of constraints in explaining the observed behavioral responses. I find evidence of a significant negative correlation between earnings responses and childcare availability, supporting the notion that the cost of working right after childbirth plays a significant role in this context.

I probe the significant effects and valuation of benefits by performing a heterogeneity analysis to clarify the drivers of behavioral responses and labor market effects. I perform a simple complier analysis and find that compliers to the replacement rate reform are, on average, younger, less likely to work full-time, more likely to work in "low-quality" establishments and earn less than always and never-takers. They are also significantly less likely to work in regions with a high unemployment rate. The findings align with the idea that individuals induced to take up UI by the replacement rate reform are less likely to value job protection, less likely to have the means to smooth consumption and more likely to highly value short-term benefits. Increases in unemployment duration are valued by a broader population of mothers who are less likely to be identified off their pre-birth characteristics in a clear-cut way. The one characteristic that stands out is childcare availability. Increases in UI duration are highly valued by mothers who do not have access to formal childcare options. The high cost of childcare is a plausible explanation for why women are willing to give up future earnings for more extended benefits. In regions with relatively high levels

[2] Giupponi (2019); Landais and Spinnewijn (2021)

of childcare availability, women are only willing to forgo 13,666 EUR in future earnings, compared with 40,950 EUR in regions with relatively low availability of childcare.

In the last part of the analysis, I evaluate the welfare effects of the two reforms. While the reforms studied in this paper might have low external validity, they are helpful to estimate the welfare effects of changes to PL benefits while keeping the other relevant parameters fixed. I develop a conceptual framework to evaluate the welfare effects of changes to parental leave policies in terms of empirically measurable sufficient statistics. I apply a simple model based on Baily (1978); Chetty (2008); Schmieder, Von Wachter, and Bender (2012); Schmieder and Von Wachter (2016) to parental leave policies to study the welfare effects of benefit levels and benefit durations and how different policy instruments address the incentive-insurance trade-off. Using the estimated costs and benefits from the analysis above, I derive the Marginal Value of Public Funds (MVPF, Hendren and Sprung-Keyser, 2020) associated with the two changes in unemployment insurance benefits. I find that the MVPF of the reforms is almost always less than one suggesting that supporting women through increases in benefits' generosity costly per euro provided if it does not come with job protection.

In terms of policy implications, my welfare analysis reveals that extending the level of benefits while at the same time extending job protection (and therefore reforming the standard PL system) is welfare improving for mothers by significantly decreasing the fiscal externality due to lost tax revenue. The results also suggest that relaxing constraints by increasing childcare availability is welfare improving, provided that the cost of doing so is not too high. Finally, the analysis shows that program substitution is an important margin of adjustment for mothers, suggesting that analyzing social programs in isolation is insufficient to evaluate their effectiveness.

This paper contributes to different strands of literature. First, it contributes to the rich literature on the effects of leave policies on employment and earnings (Dahl et al., 2016; Olivetti and Petrongolo, 2017; Kleven, Landais, and Søgaard, 2019; Kleven et al., 2020). By disentangling the effects of different policy instruments, this paper contributes to our understanding of whether job-protected and paid leave entitlements have desired consequences for gender inequality in labor market outcomes. This is especially important given recent research showing persistent gender differences in the labor market, mainly attributable to differential impacts of childbirth. Most of the papers analyzing parental leave policies find no effects on labor market outcomes in the long run (Baker and Milligan, 2008; Dahl et al., 2016; Kleven et al., 2020), suggesting that these policies have no impact on gender inequality. The results of this paper offer a different assessment and find that offering benefits without job protection around childbirth significantly increases child penalties in

the labor market[3].

Secondly, this paper contributes to the literature on *how* to design parental leave policies (Lalive et al., 2014; Schönberg and Ludsteck, 2014; Jørgensen and Søgaard, 2021; Ginja, Jans, and Karimi, 2020). It is closest in spirit to Lalive et al. (2014) and Schönberg and Ludsteck (2014), which study the relative importance of job protection and duration of cash benefits for parental leave policies in Austria and Germany. The first contribution of this paper to this literature is to analyze the importance of the level of benefits in addition to the duration of benefits. Secondly, using a revealed preferences approach, it provides novel insights into the trade-offs that mothers face in making their parental leave decisions, the value that mothers assign to different elements of parental leave policies, and the incentive costs associated with parental leave benefits. By investigating how the relative value of benefits and job protection changes with different reforms, this paper provides one of the first welfare assessments of parental leave policies[4]. Using the MVPF framework, I can compare the welfare effects of increasing the benefit levels and the benefit duration of leave policies, including the possibility that information frictions may make it difficult for mothers to trade off between short-term benefits and future earnings losses and internalize the earnings losses associated with their leave-taking decisions. I directly consider the case in which women may not be forward-looking and may not make optimal decisions.

Finally, this paper contributes to the recent and growing literature on program interactions and their implications for individual outcomes and welfare. While there is increasing evidence on the importance of the interaction between unemployment and disability insurance programs (Inderbitzin, Staubli, and Zweimüller, 2016; Borghans, Gielen, and Luttmer, 2014; Lawson, 2017; Leung and O'Leary, 2019), evidence in other public policy contexts has been scarce. I provide novel evidence of the interaction between parental leave and unemployment insurance and highlight the importance of accounting for program substitution when thinking about how to optimally design parental leave policies. This paper clearly shows that substitution between programs is an important margin of adjustment in mothers' behavioral responses to policy changes and that accounting for the consequent fiscal externalities is critical in designing optimal social insurance policies. More generally, one should ideally analyze social insurance and tax policies in a unified framework rather than optimizing each program separately (Chetty and Finkelstein, 2013).

The paper is structured as follows. Section 2 describes the institutional background and the conceptual framework. Section 3 describes the data used in the empirical analysis and presents

[3]This is consistent with the results in Schönberg and Ludsteck (2014) that find that one reform that extended cash benefits beyond job protection lowered maternal employment through the first six years after childbirth.

[4]Jørgensen and Søgaard (2021) study the behavioral effects and efficiency cost of earmarked parental leave policies.

the empirical strategy. Estimates of the behavioral responses to the changes in generosity of unemployment benefits are presented in Section 4. Section 5 estimates the costs of the changes in generosity of unemployment benefits in terms of labor market outcomes. Section 6 discusses the implications of the estimates for mothers' private trade-offs and willingness to pay for benefits after childbirth. Section 7 performs welfare analysis and explores the policy implications of the findings. Section 8 concludes.

2 Institutional Background and Conceptual Framework

2.1 Institutional Background

In Italy, social insurance for working mothers is divided into a period of compulsory maternity leave and a period of parental leave. Compulsory maternity leave (ML) starts two months before the estimated date of birth of the child and lasts for five months[5]. During the compulsory maternity leave period, mothers cannot work and get a government transfer that replaces 80%[6] of the average daily wage in the last month before the start of the compulsory maternity leave.

After the compulsory maternity leave, mothers are entitled to optional parental leave (PL). Each household is entitled to 10 months of optional parental leave, which can be used up to the child's 8th birthday. The first six months are paid at a 30% replacement rate if used before the child's 6th birthday, while the remaining months are unpaid. Each parent can take up at most six months of parental leave. If the father uses at least three months of PL, the household is entitled to an additional month (for a total of 11 months). While this clause was introduced to increase fathers' PL take-up, parental leave is used almost exclusively by mothers, representing over 90% of the beneficiaries of paid parental leave benefits. Moreover, paid parental leave benefits are usually exhausted in the first six months after birth.

Between 300 days before the expected birth date and the child's first birthday, mothers are entitled to *job protection*, irrespective of whether they take up parental leave. During that period, they cannot be fired and have the right to maintain the same pre-birth working conditions in terms of role, tasks, and salary.

[5]The start of ML can be anticipated if the occupation is deemed risky for the pregnancy or if the pregnancy is at risk. In these cases, the compulsory ML lasts more than five months. Also, women are entitled to some degree of flexibility regarding the start date of the compulsory maternity leave: they can also choose to use one month of leave before the estimated date of birth and the remaining four months afterward.

[6]Some CBAs dictate that the employer is responsible for integrating the difference between the transfer from the social security institute and the pre-birth wage so that the replacement rate is effectively 100% in many cases.

In addition to the maternity leave and parental leave benefits, the Italian social insurance system grants special unemployment insurance eligibility to women who *voluntarily* resign before their child's first birthday. This is a crucial exception to the unemployment insurance (UI) system, as in ordinary circumstances, workers who quit their jobs are not entitled to UI benefits. This provision implies that the unemployment insurance program can effectively work as *paid parental leave* without *job protection*: if a woman decides to resign before her child's first birthday, she loses the right to job protection, but she receives cash transfers from the government in the form of unemployment insurance. In recent years, this option has become popular and has been advertised as an alternative (to use as a substitute or complement) to standard parental leave policies (Figure A1).

I exploit this peculiar feature of the Italian system to study the effects of increasing the level and duration of benefits without offering job protection. I take advantage of two unemployment insurance reforms that changed the generosity of benefits and thus changed the policy choices available to women after compulsory maternity leave. Figure 1 shows the timeline of women's decisions. I focus on mothers' choices between $t = 3$ and $t = 12$, the "choice period", where mothers can choose between returning to work, taking up PL, taking up UI, or taking up PL and UI in combination. The analysis investigates how providing different incentives to mothers' in the time window right after childbirth impacts the incentive-insurance trade-off of parental leave policies.

The Unemployment Insurance Reforms of 2013 and 2015 Until 2012, the main unemployment insurance subsidy available to Italian workers was the Ordinary Unemployment with Normal Requirement (*Disoccupazione Ordinaria a Requisiti Normali, OUNR*). This UI subsidy covered all employees in the non-agricultural sector. Age at layoff entirely determined the potential benefit duration with a threshold mechanism: workers fired before turning 50 were eligible for 8 months of unemployment benefits, while workers fired after turning 50 received up to 12 months of subsidy. The subsidy amount was proportional to the average wage in the three months preceding the layoff. Workers received 60% of their average wage for the first six months of the subsidy, 50% for the following two months, and 40% for the remaining four months, if still eligible. The subsidy amount was capped by law, and the threshold changed every year. To be eligible, workers needed to meet two main requirements: the worker should have contributed for the first time to social security at least two years before the start of the unemployment benefit spell; the worker should have worked for at least 52 weeks in the last two calendar years. The relative strictness of these

requirements implied that not all workers were eligible for UI after a separation.

In 2013, the unemployment insurance system was reformed entirely with the primary goal of increasing coverage. The reform affected all terminations after January 1st, 2013, and bringing about two main changes. First, the *Aspi* subsidy substituted the *OUNR*: while the eligibility requirements were constant, the initial replacement rate increased from 60 to 75%. The potential benefit duration of the subsidy was increased for older workers but remained constant to 8 months for our sample of interest (mothers who just gave birth, who are presumably younger than 50 years old). Secondly, the replacement rate reform introduced an additional UI subsidy, the *MiniAspi*, with less strict eligibility criteria: to be eligible, workers needed only 13 weeks of contribution in the year before the start of the unemployment spell. The potential benefit duration of the *Miniaspi* was equal to half of the weeks of contribution in the last year, and the replacement rate was 75%. Figure 3 shows the changes in UI generosity after the replacement rate reform. Panel A reports the average daily UI benefit by month-of-end-of-termination bin for women less than 50 years old with a permanent contract around the introduction of the replacement rate reform. It shows that, after the reform, the daily benefit increased by around 4 EUR. Panel B reports the average potential unemployment insurance duration before and after the replacement rate reform and confirms that the reform did not change the duration of the UI subsidy. Figure A2 shows that the introduction of the *Miniaspi* resulted in around 300,000 extra claims, an increase of 50% relative to the baseline before the reform.

Not long after the replacement rate reform, the unemployment insurance system was reformed again. In 2015, the government combined the *Aspi* and *MiniAspi* subsidies into one insurance subsidy, the so-called *Naspi*. The reform kept the initial replacement rate unchanged while modifying the rules determining the potential benefit duration, making it dependent on the number of weeks of contribution in the four years before the start of the UI spell. The potential benefit duration was equal to half of the weeks of contribution in the four years before the start of the UI spell, with a maximum of 2 years. This implied an average increase in potential benefit duration, particularly for workers with relatively long and stable contribution histories. Panel C of Figure 3 shows that the average daily UI benefit by month-of-end-of-termination bin did not significantly change after the duration reform. Panel D clearly shows that the reform had a significant impact on duration. The average potential unemployment insurance duration for women younger than 50 increased by around 250 days, jumping to around 500 days. This corresponds to a 100% increase in average potential duration. Figure A8 shows the distribution of potential benefit duration for mothers who decided to use unemployment insurance after the duration reform: on average, the reform

increased the potential benefit duration from 8 months to around 16 months.

Child Care Availability When thinking about mothers' return to work choices around childbirth, it is not possible to abstract from the role played by institutional child care. Formal child care in Italy is divided into nursery care (*Asili Nido*), covering children from 0 to 2 years old, and pre-school care (*Scuola dell'Infanzia*) for 3 to 5 years old children. Pre-school care is prevalently public and regulated by the Ministry of Education. Pre-schools are considered the first level of the school system: they are almost free (except for a relatively low lunch fee) and broadly available. Indeed, they are used by over 95% of 3-5 years old children. While pre-school availability and attendance are almost universal, the situation is significantly different for nursery schools in short supply and considerably more expensive than pre-schools. As reported in Carta and Rizzica (2018), in Italy, a family composed of two working adults and one child with a yearly household income of 44,200 EUR pays on average 311 EUR per month for a full-time seat in a *public* nursery (CittadinanzaAttiva, 2015). *Private* nurseries, which in some regions outnumber public ones, cost around 487 EUR per month (IstitutoDegliInnocenti, 2011). Together, public and private nurseries accommodate only 24% of children from 0 to 2 years old, with public nurseries accounting for less than half of this share. There is pronounced heterogeneity at the regional level, with some regions able to accommodate less than 10% of children in nursery care.

2.2 Conceptual Framework

As illustrated in Section 2.1, in the Italian social insurance system, unemployment insurance is effectively a paid parental leave without job protection since it provides, after childbirth, cash benefits b for a period of time B. This feature allows to consider the unemployment insurance reforms as policy experiments that mimic expansions of paid parental leave (through b or B), keeping constant the other parameters. I take advantage of this unique environment in which women can choose, after childbirth, between work, lower benefits and job protection, and higher benefits and no job protection, to study mothers' willingness to pay for benefits relative to job protection.

The focus of the analysis is on the choices mothers make in the *"choice period"*, as illustrated in Figure 1. At the end of their compulsory, mothers can:

1. Go back to work at $t = 3$, earn their pre-birth wage w_0 and arrange for childcare formally or informally, with a cost c_t, decreasing over time

2. Take up parental leave, which pays a monthly benefit equal to $b_{PL} = \alpha_{PL} w_0$, where α_{PL} is

the replacement rate, equal to 30%. Parental leave lasts for a number of period $B_{PL} = 6$. Mothers are entitled to job protection and can go back to their pre-birth job after exhausting PL benefits

3. Quit their job and take up unemployment insurance. Unemployment insurance pays a monthly benefit $b_{UI} = \alpha_{UI} w_0$, where $\alpha_{UI} > \alpha_{PL}$ and lasts for B_{UI} months but is associated with a cost e, which can be interpreted as the search cost to find a new job when UI benefits are exhausted due to the absence of job protection

The main idea behind this setup is that women can opt for a higher benefit level ($\alpha_{UI} > \alpha_{PL}$), but this comes at a cost e. The level of benefits and the costs associated with each possibility affect mothers' selection of programs after childbirth. To simplify, I assume that mothers who decide to take up UI either do so at $t = 3$ or at $t = 9$, so either completely substitute between UI and PL or complement by exhausting their PL benefits first. This assumption is aligned with the patterns observed empirically (Figure A3). Figure 2 describe how the reforms changed the choice set of women after the end of their compulsory maternity leave.

The reforms change mothers' choice set after childbirth. Assume that each mother has utility $u_{it}(c, z)$ where $c \in \{w, pl, ui\}$ indexes the choice at the end of the maternity leave (work, parental leave, unemployment insurance) and $z \in \{0, 1\}$ indexes eligibility status for more generous UI. Mother i chooses the c that maximizes her utility, before the reform ($z = 0$):

$$C_{it}(0) = argmax_{c \in \{w,pl,ui\}} u_{it}(c, 0)$$

For the set of mothers who switch to UI because of the reform ($C_{it}(0) \neq ui$ and $C_{it}(1) = ui$, i.e. the compliers, marginal mothers), by revealed preferences, $u_{it}(ui, 1) > u_{it}(C_{it}(0), 1)$. The utility associated with choosing UI after the reform is higher than the utility of the pre-reform option.

For example, consider mothers who, because of the reform, decide to take up UI and, in the absence of the reform, would have taken up standard PL. By revealed preferences, $u_{it}(ui, 1) > u_{it}(pl, 1)$. This implies that:

$$u(B_{UI} \alpha_{UI} w_0 - e) > u(B_{PL} \alpha_{PL} w_0) \tag{1}$$

where e is the cost of taking up UI, which can take a very general form and be interpreted as the losses in future earnings due to losing job protection by choosing UI instead of PL. Marginal mothers value the net extra benefits more than the cost associated with this choice and are therefore

trading off higher short-term benefits and job protection. The extent to which marginal mothers are willing to give up the possibility of returning to their pre-birth employer and future earnings reveals the value of short-term benefits.

In the following sections, I use the behavioral responses to the reforms to estimate the relative value that women assign to benefits and job protection.

3 Data and Empirical Strategy

3.1 Data

I use novel, confidential administrative data from the Italian Social Security Institute (*INPS*) on the universe of private-sector employees. My primary data source is matched employer-employee records at the monthly level for the period 2009-2019. For each worker-firm record, the following information is available: beginning and end date of the contract, alongside the underlying motivation for termination (e.g., layoff, resignation); type of contract (permanent vs. temporary, full-time vs. part-time); broad occupation group (blue-collar, white-collar or manager); earnings, wage and number of days worked, and a unique firm and worker identifier. I link these records to workers' and firms' registers containing baseline information, such as gender and age of employees and opening date, sector, and location of businesses.

Importantly, these records also contain information on any event that might lead to the entitlement to a benefit for a given worker at the monthly level. These events include, among others, maternity leave, parental leave, and sick leave. I identify maternity and parental leave events, supplementing the information on events from the employer-employee records with information from the registers on maternity leave and parental leave applications. These records contain more detailed information about maternity and parental leaves, such as the exact beginning and end date of each leave period, the date of application, the expected birth date and the actual birth date of the child, the type of leave (e.g., standard or anticipated for medical reasons in the case of maternity leave applications), a child identifier and spouse identifier. This level of detail allows me to pinpoint the exact leave periods and the exact beginning and end of job protection[7].

I link these records to information on unemployment insurance claims from the *Sistema Percettori* database (*SIP*), which collects information on the universe of income support measures administered by INPS as a consequence of job separations. I observe the scheme type (e.g., *Aspi* vs *Naspi*), its start date, potential duration, actual duration, and total amount paid for every claim.

[7]See Appendix A for more details.

I build up a panel of mothers' working and benefit histories at monthly frequency by combining the archives described above. The final dataset is a balanced[8] panel containing all mothers who gave birth to their *first* child (parity one) between 2012 and 2016. The panel spans from 2 years before the end of their compulsory maternity leave to 4 years after and comprises approximately 640,000 mothers employed in the private sector before giving birth. I focus on mothers giving birth to their *first* child for a number of reasons. First, the labour market history of first-time mothers before birth is more informative about their skills and earnings capacity than for higher-parity mothers. Second, the decision of whether to take up unemployment insurance or parental leave and in general the return-to-work decision is likely to be influenced by total fertility as there might be selection of higher-parity mothers into participating in the labor market. Lastly, unemployment insurance eligibility is likely to be higher for parity one mothers since they are more likely to have worked continuously prior to giving birth. Parity one mothers are also less likely than higher-parity mothers to have experienced significant periods of interruptions from work before childbirth. My primary sample also excludes mothers whose temporary contract expires around the end of their maternity leave. This is because mothers with temporary contracts are not entitled to job protection and therefore face a different set of incentives than other mothers[9].

Table A3 reports the mean and standard deviation of a set of individual characteristics for the main sample. Mothers working in the private sector and giving birth to their first child in the sample period are on average 33 years old and have consistently worked for their pre-birth employer in the two years before giving birth. The vast majority of them are employed with a permanent contract (93%), 65% are employed full-time, 60% are employed in white-collar occupations while 30% are employed in blue-collar occupations. Their contracted monthly wage is 1,417 EUR, and their monthly earnings are slightly higher at 1,521 EUR. Monthly earnings will be the preferred earnings measure for the rest of the analysis[10]. In terms of characteristics of firms in which they work, 40% of them are employed in small firms (with less than 15 employees), and 65% are employed in "high quality" firms. "High quality" firms are measured by whether the firm is above the median AKM firm fixed effects estimated from AKM two-way fixed effects regressions (Abowd,

[8]Details on the construction of the dataset are reported in Appendix Section A.

[9]Details on the construction of the dataset and on the selection of the sample are reported in Appendix Section A. Results are robust to fully restricting to women with permanent contracts, as discussed in Appendix Section A.

[10]The contracted monthly wage refers to the wage that the worker would get in the absence of events that might lead to the entitlement of benefits. It does not include overtime and bonuses. The monthly earnings refer to the actual gross monthly earnings inclusive of overtime, bonuses and adjusted for the events that happened during the month. This implies that this wage measure is not contractual but is tightly linked to how many hours and days are effectively worked during the month.

Kramarz, and Margolis, 1999)[11].

3.2 Empirical Strategy

The main goal of the empirical analysis is to estimate the effects of having access to more generous unemployment insurance subsidies after the end of compulsory maternity leave on different outcomes of interest. The reforms naturally define a treatment and a control group as a function of the end of compulsory maternity leave date: mothers who, based on their date of maternity leave, *had the option* to resign with the more generous unemployment insurance benefits and mothers who, based on their end of maternity leave, did not. I formally define *treatment* as having the possibility to quit and be eligible for the more generous unemployment insurance regime between the end of their compulsory maternity leave and when the child turns one year old (between $t = 3$ and $t = 12$ in Figure 1).

The possibility of unemployment take-up within the *"choice period"* needs to be considered when estimating the effects of the reforms. Taking the replacement rate reform as an example, while the reform was effective from January 2013 onwards, women who ended their maternity leave *before* January 2013 were eligible for the more generous UI benefit for a portion of their *"choice period"*. This is exemplified in Table A1, which shows the eligibility status of mothers for the more generous UI regime by their end of maternity leave date and by the timing of their resignations. The table highlights that women who ended their maternity leave from January 2013 onwards were eligible for the new UI regime regardless of the timing of their resignations. On the other hand, women who ended their maternity in July 2012 were eligible for the old regime if they decided to resign at $t = 3$ but for the new UI regime if they resigned at $t = 9$. Table A2 reports the same information for the duration reform. I refer to the subsample of mothers eligible for the more generous UI regime only for a portion of their *"choice period"* as *partially treated* mothers. Figure A4 illustrates the three groups mothers can be divided into based on their end of maternity leave date.

While the reforms would create a natural setting for a regression discontinuity design, the presence of partially treated mothers complicates the use of this empirical strategy. As my main empirical strategy, I use a difference-in-differences approach similar to Kleven et al. (2020), that

[11] When estimating AKM regressions I restrict the sample to the largest connected set of workers and firms that contains all workers that have ever been employed at one of the firms in the group and all the firms that have ever hired one of the workers in the group. Specifically, I estimate the following regression: $log(w_{it}) = \alpha_i + \psi_{J(i,t)} + \varepsilon_{it}$, where $log(w_{it})$ is the log weekly wage of worker i in year t, α_i and $\psi_{J(i,t)}$ are worker and firm fixed effects. Although the analysis focuses on mothers, I consider both men and women workers in my sample period for the estimation.

compares cohorts of mothers over time. I compare the outcomes of women fully eligible for the new UI regime to women fully ineligible based on their date of end of compulsory maternity leave (Figure A4). I estimate the following equation:

$$Y_{it} = \alpha + \sum_{k=-L}^{R} \delta_k D_{it}^k + \sum_{k=-L}^{R} \beta_k D_{it}^k \cdot T_i + \gamma T_i + \lambda_i^m + \mathbf{X_i'}\eta + \varepsilon_{it} \quad (2)$$

where t denotes event time ($t = 0$ corresponds to the month of end of compulsory maternity leave)[12], D_{it}^k is an event study indicator for each month relative to the month before the end of compulsory maternity leave, λ_i^m are month of end of maternity leave fixed effects, to control for seasonality of births and $\mathbf{X_i'}$ contains a set of pre-birth individual-level controls such as age fixed effects, average earnings in the two years before the end of maternity leave and occupation. T_i is an indicator for whether the mother is in the treatment group, namely for whether she has the option to resign with the more generous unemployment benefits. For the replacement rate reform, $T_i = 1$ if a mother ended her compulsory maternity leave between January and May 2013 and $T_i = 0$ if a mother ended her compulsory maternity leave between January and May 2012. For the duration reform, $T_i = 1$ if a mother ended her compulsory maternity leave between May and September 2015 and $T_i = 0$ if a mother ended her compulsory maternity leave between May and September 2014[13]. Standard errors are clustered at the individual level. Depending on the outcome considered, I estimate the specification above on different relative time windows (up to 12 or 48 months from the end of ML). I omit the event time indicator at $t = -1$ so that the coefficients β_k measure the differential impact of the reforms in the treatment group relative to the control group with respect to the month before the end of compulsory maternity leave.

The causal interpretation of the results relies on the assumption that there is no confounding trend in outcomes by birth cohort. To validate this assumption, I consider several identification checks. First, I show that both reforms' treatment and control groups are very similar in pre-birth characteristics and pre-birth labor market outcomes. Table 1 shows that the treatment and control group samples defined by the replacement rate reform are balanced across a variety of characteristics, including pre-birth age, type of contract (permanent vs. temporary, part-time vs. full-time), type of occupation, gross monthly earnings, tenure in the last two years and days worked. Table 2 reports the same balance table for the treatment and control group samples defined by the duration

[12]Figure 1 and 2 defined $t = 0$ as the month of birth of the child. Since I am interested in estimating the effects of the unemployment insurance reforms on women's choices and since the "choice period" for mothers starts from the end of maternity leave, from now onwards, I will define $t = 0$ as the month of end of maternity leave.

[13]All results are robust to both narrower and broader definitions of both reforms' treatment and control groups.

reform. While the characteristics are generally balanced, there are two instances in which the treatment and control groups have slightly significantly different means. Control group mothers are somewhat more likely to be full-time workers and slightly more likely to have a permanent contract. As a robustness check, I estimate specification 2 using the predicted values of my outcomes of interest calculated from a regression on observable characteristics as dependent variable.

Second, I show placebo results from specification 2 using a sample of mothers who gave birth in 2009 vs. 2010 and 2010 vs. 2011. The placebo results, reported below in more detail, support the identifying assumption by showing no significant differences in take-up of unemployment insurance benefits across birth cohorts.

Note that using the preceding year of a reform as the control group is common in the literature (Schönberg and Ludsteck 2014; Kleven et al. 2020). However, it is important to recognize that the identified causal effect is the effect of having been potentially exposed to the more generous UI system. For all outcomes measured at 12 months or more after birth, the control group could also become eligible for the more generous UI regime if they have another child. As a robustness check, I investigate the role of subsequent fertility by estimating the dynamic effects of the UI reforms on the restricted sample of mothers with only one child (with completed fertility of one). I also consider the effects of the reform on average completed fertility. As an additional robustness check, I also use the regression discontinuity design described in Appendix Section B as alternative empirical strategy with the primary goal of checking the robustness of the results to different specifications and the inclusion of partially treated mothers.

Recent econometric literature has raised concerns about the validity of difference-in-differences designs rely on staggered timing for identification (De Chaisemartin and d'Haultfoeuille, 2020; Sun and Abraham, 2020; Callaway and Sant'Anna, 2021; Goodman-Bacon, 2021). My empirical strategy is unlikely to be subject to these concerns. Firstly, my design is not staggered in calendar time, implying I do not use already-treated units as controls. Second, my design relies on a balanced panel in relative event time, where the treatment is centered at the same "relative treatment date", which allows me to estimate a conventional TWFE model controlling for group and event time fixed effects.

4 Behavioral Responses to Changes in Unemployment Insurance Benefits

This section analyzes mothers' behavioral responses to changes in the generosity of unemployment insurance benefits. I document how the take-up of unemployment insurance changes when the level and duration of benefits change. I then document the pattern of program interactions between unemployment insurance and parental leave and the effects of the reforms on mothers' decisions to return to work.

4.1 The Impact of Increasing Unemployment Benefits on Separations After Childbirth

I start the analysis by plotting the share of women taking up unemployment insurance during their "choice period" by month-of-end-of-maternity-leave bin. Figure A5, Panel A reports the results for the replacement rate reform while Panel B reports the results for the duration reform. The red vertical lines indicate the month of end of maternity leave from which women become partially exposed to the more generous unemployment insurance regime (Table A1), grey points represent partially treated mothers. After both reforms, there is a clear increase in take-up of unemployment insurance, corresponding to an increase of 20% relative to the baseline mean for the replacement rate reform and to a 18% increase for the duration reform.

To understand how much of the increase in UI take-up is driven by *active choices* of women, I estimate specification 2 using as dependent variable the probability of voluntary separation[14] from pre-birth employers at relative time t[15]. A potential concern is that separations recorded as voluntary might reflect pressure from employers to resign rather than actual choices. I believe this is unlikely for two reasons. First, women who decide to resign around childbirth have to follow a specific process that involves an interview with the governmental office of labor, where they have to declare that they are voluntarily quitting their job. Second, survey evidence suggests that most mothers who resigned between 2010 and 2016 decided to do so voluntarily.

Figure 4 Panel A shows the dynamics of separations in the treatment group relative to the control group after the replacement rate reform. There is a significant increase in separations at $t = 0$ of around 0.25 percentage points and an additional increase of 0.18 percentage points at $t = 8$. Figure 4 Panel B reports the results for the duration reform. There is an even sharper

[14] I categorize as voluntary separation, resignations and other separations that do not involve firing for just cause, firm closures and mass-layoffs. For robustness, Figure A10 shows the effect separately for resignations and other separations.

[15] I expect these two types of separations to reflect active choices of mothers to leave their pre-birth employer, unlike separations due to firm closures or mass layoffs.

increase in $t = 0$ of 1 percentage point, followed by an additional increase in separations between $t = 5$ and $t = 7$ of 0.6 percentage points.

Table A4 reports the reduced-form estimates (pooled over the period $t \in [0, 12]$) scaled by the amount by which the generosity of unemployment benefits increases due to the reforms, in terms of replacement rate and duration, respectively. A one percentage point increase in the replacement rate of benefits increases separations by 0.03 percentage points. A one-month increase in benefit duration increases separations by 0.2 percentage points. To compare the effects of the two reforms, I also report the elasticity of separations with respect to benefit level $\varepsilon_b = \frac{\delta y}{\delta b}\frac{b_0}{\bar{y_0}}$ and duration $\varepsilon_B = \frac{\delta y}{\delta B}\frac{B_0}{\bar{y_0}}$, where y refers to the share of separations, b_0 refers to the pre-reform UI benefits, B_0 refers to the pre-reform UI duration and $\bar{y_0}$ indicates the baseline level of separations before the reforms. According to the evidence, a 1% increase in the level of benefits increases separations by 0.4% while a 1% increase in the duration of benefits increases separations by 0.16%.

These findings clearly indicate that women are willing to give up the certainty of returning to their pre-birth employer for more generous benefits in the short-run. The comparison between ε_b and ε_B suggests that increasing the generosity of benefits by increasing the duration has a smaller effect on separations than increasing the level of benefits.

4.2 The Impact of Changes in Unemployment Benefits on Parental Leave and Return to Work

The increase in take-up of unemployment insurance after the end of compulsory maternity leave must correspond to a decrease in one of two margins: the probability of returning to work and the probability of taking up standard parental leave. To investigate the dynamics behind the behavioral responses, I estimate specification 2 on three different dependent variables: an indicator equal to 1 if a mother is taking up unemployment insurance in relative month t (UI), an indicator equal to 1 if a mother is on parental leave (PL) in relative month t and an indicator equal to 1 is working in month t ($Work$). I define a mother as working in month t if she has positive earnings and is not on leave or unemployed.

Figure 5 shows the dynamic evolution of these three outcomes. Panel A shows the results of the replacement rate reform. The figure shows a clear pattern: in the first six months after the end of compulsory maternity leave, the increase in UI take-up induced by the reform is compensated by a decrease of similar magnitude in take-up of standard parental leave. This suggests that women who took up unemployment insurance after the reform would have taken up parental leave in the absence of the reform. A consequence of the switch from protected benefits to unemployment

benefits is that, from $t = 6$ onwards, women in the treatment group are less likely to return to work. The decrease in the share of women returning to work is of the same magnitude as the decrease in take-up of PL benefits between $t \in [0, 6]$ and is partly mechanical: UI benefits have a duration of 8 months while PL benefits have a duration of 6 months. However, even after the exhaustion of UI benefits (at $t = 9$), the share of women returning to work is still significantly lower in the treatment group relative to the control group. This result highlights the importance of job protection in incentivizing women to go back to work earlier.

Figure 5 Panel B shows the same results for the duration reform. When the duration of unemployment benefits increases, the increase in UI take-up is partially compensated by a decrease in take-up of standard parental leave in $t \in [0, 6]$. However, most of the behavioral responses are concentrated around $t = 6$. The figure shows that the increase in duration induces a significant share of mothers in the treatment group to not return to work at $t = 6$ but to take up unemployment insurance instead. This is consistent with the evidence on separations shown in Section 4 and suggests that mothers respond to the increase in UI duration by taking up PL benefits and UI benefits in combination to maximize the total subsidized time women can spend out of the labor force.

To better understand the magnitude of the effects, Table 4 reports the coefficients β_k from model 2 for $k = 0$, $k = 6$ and $k = 12$ on the share of women taking up UI, the share of women taking up PL, and the share of women working.

Interpretation Looking at the timing and dynamics of the estimates in Figure 4 and Figure 5 is helpful to interpret the results above and compare them across reforms. The increase in replacement rate induces women to separate from their pre-birth employers right after compulsory maternity leave and switch from parental leave benefits to unemployment insurance benefits. Following the discussion in Section 2.2, by revealed preferences, this implies that for marginal mothers, the net value of the additional benefits obtained by switching from PL to UI is larger than the value of (or cost of losing) job protection. On the other hand, mothers respond to the increase in duration by separating at $t = 0$ and at the time of PL benefits exhaustion, indicating both substitution and complementarity responses between PL and UI. By revealed preferences, the value of additional benefit duration for marginal mothers is higher than the value of returning to their pre-birth employer.

Figure 6 illustrates how the reforms and the interactions between PL and UI affect the total subsidized time women spend not working. This is an integral part of the insurance-incentive

trade-off and translates into fiscal externalities for the government. Panel A and B show that the replacement rate reform does not significantly affect the total subsidized time mothers spend out of work but only on the type of leave taken up by mothers. On the other hand, the duration reform effectively results in an increase in the total subsidized non-work time, as shown in Figure 6 Panel C and D. Despite these differences, Appendix Figure A14 shows that both reforms have a positive and significant effect on the total non-participation time after childbirth[16]. I investigate this more in detail in Section 5.

To summarize, the evidence shows that increasing the generosity of unemployment benefits increases UI take-up by 20% relative to the pre-reform baseline for the replacement rate reform and by 18% relative to the pre-reform baseline for the duration reform. Voluntary separations drive the increase in UI take-up. Both reforms lead to a significant crowd-out of parental leave benefits and significantly delay women's return to work. Finally, the main take-away from this first part of the analysis is that mothers are willing to give up the possibility of returning to their employer for higher benefits in the short run.

4.3 Robustness

As mentioned in Section 3.2, the key identification assumption for the difference-in-differences model in 2 is that there are no confounding trends in outcomes by birth cohort. In a standard difference-in-differences model, this assumption could usually be validated by looking at the evolution of pre-trends. In my specific case, it is not possible to look at pre-trends when considering UI take-up as an outcome since mothers are, by construction, employed before birth. I, therefore, take advantage of a different set of overidentifying restrictions. I perform placebo tests estimating equation 2 comparing mothers who ended their maternity leave in 2010 ($T_i = 1$) to mothers who ended their maternity leave in 2009 ($T_i = 0$), mothers who ended their maternity leave in 2011 ($T_i = 1$) to mothers who ended their maternity leave in 2010 ($T_i = 0$), and so on. Results are reported in Figure A9 and support the identifying assumption by showing no significant trend in UI take-up across birth cohorts.

Another potential concern is that the increase in resignations and separations is driven by factors other than the increase in generosity of unemployment insurance (differences in macroeconomic conditions, differences in unemployment rates, or differences in firms' behaviors). If this is the case, we would expect to see differences in separations that are not impacted by workers'

[16]This is defined as the total time spent not working and not on parental leave. Using as an alternative measure the total time spent not working (including months spent on parental leave) leads to similar qualitative results.

decisions (layoffs, firm closures, separations for just cause[17]). Figure A12 shows that this is not the case and provides suggestive evidence that the increase in UI take-up is driven by women's choices.

One important thing to notice is that the magnitude of the effect of the replacement rate reform on separations is significantly smaller than the magnitude of the effect on UI take-up, particularly around $t = 6$. Table 3 reports the coefficients β_k (for $k = 0$, $k = 6$, and $k = 12$) estimated from equation 2 using as dependent variable the probability of taking up UI at time k and the probability of separations at time k and confirms this finding. This pattern is driven by the fact that the replacement rate reform also expanded the pool of eligible mothers, as shown in Figure A13, which decomposes the effect of the reform on UI take-up into the effect driven by the increase in replacement rate and the effect driven by the expansion in eligibility. At least a portion of newly eligible mothers are inframarginal: they would have exited the labor force even in the absence of the reform but are now eligible to take up UI.

4.4 Heterogeneity and Complier Analysis

The results above show that marginal women are willing to give up the certainty of going back to their pre-birth employer for more generous benefits in the short term. In this section, I characterize compliers in terms of observable characteristics and perform a heterogeneity analysis to pin down the mechanisms behind the observed behavioral responses.

As a first step to shed light on the drivers behind the differential behavioral responses after the two reforms, I conduct a simple complier analysis. The goal is to trace some persistent observable attributes that characterize mothers who respond to the two reforms and distinguish them from mothers who do not. Investigating the characteristics of compliers, always-takers (women who would have taken up UI both under the less generous and more generous UI system) and never-takers (women who would not take up UI under either the more generous or the less generous system) for the different reforms can provide policy-relevant insights on who responds to different changes in incentives.

Because compliers are defined based on a counterfactual (I never simultaneously observe the outcome for any given mother under both the more generous and the less generous UI system), I infer their characteristics of compliers by comparing the demographic characteristics of the cohort of mothers ineligible for the more generous UI regime (control group, to the left of the cutoff in

[17]Note that these types of separations are exempt from the job protection rule: mothers can be fired even during the protected period for one of these reasons.

Figure A5) to the characteristics of the cohort of mothers eligible for the more generous UI regime (treatment group). The comparison is based on a simple intuition: ineligible mothers who take up UI are, by definition, always-takers. Eligible mothers who take up UI are a mix of always-takers and compliers. Assuming monotonicity – i.e., mothers who would take up UI under the less generous system would certainly do so under the more generous system - we expect the demographic characteristics of always-takers to be the same in expectation before and after the policy change. This fact allows us to back out the demographic characteristics of compliers, as described in detail in Appendix Section C.

Results of the complier analysis are reported in Table 5, which provides an overview of the pre-birth characteristics of the three groups for the replacement rate reform. A clear pattern emerges: women that are induced to take up UI in response to an increase in replacement rate are on average younger, less likely to be working full-time, more likely to work in "low-quality" establishments (measured by whether the firm is below or above the median AKM firm effect, low- and high-wage firms, respectively) and lower-earners than both always-takers and never-takers. Compliers are also less likely to hold permanent jobs and to live in regions with significantly less childcare availability than never-takers. Finally, compliers are significantly less likely to work in regions with a high unemployment rate than always-takers. Job protection is valuable only in a labor market with search frictions, therefore, it is likely to be more valuable when the unemployment rate is higher. These findings are overall in line with the idea that individuals induced to take up UI by the replacement rate reform are less likely to value job protection, less likely to have the means to smooth consumption and therefore more likely to value short-term benefits.

Table 6 reports the results for the duration reform. Women that are induced to take up UI after an increase in UI duration are less likely to be identified off their pre-birth characteristics in a clear-cut way. Compliers are more likely to have permanent jobs, work in blue-collar occupations, and work part-time than always- and never-takers. On the other hand, compliers earn significantly more than always-takers but still less than never-takers. Overall, the evidence indicates that the duration reform affected a broader population of mothers. Interestingly, compliers are significantly less likely to live in regions with high childcare availability. This suggests that increases in UI duration are particularly appealing to mothers who do not have access to formal childcare options. The cost or unavailability of childcare is likely to enter the trade-off between benefits and job protection by decreasing the relative value of going back to work.

I complement the complier analysis by presenting estimates of treatment effect heterogeneity of the UI reforms on UI take-up. For each covariate, I separately estimate equation 2, splitting

the sample according to the pre-birth value of the characteristic. Results are reported in Figure 8. Panel A reports the results for the replacement rate reform, while Panel B reports the results for the duration reform. Overall, the results primarily reflect the conclusions of the complier analysis.

5 The Effects on Labor Market Outcomes

Section 4 provides evidence that women are more likely to separate from their pre-birth employer when the generosity of unemployment benefits increases. The findings indicate that women are willing to give up the certainty of returning to their pre-birth employer for more generous benefits, both in terms of *level* and *duration*. In this section, I investigate the long-term effects of these choices on women's labor market outcomes. I then relate the estimates to the private trade-off mothers face when making their leave decisions.

5.1 The Labor Market Costs of Giving Up Job Protection

I start the analysis by estimating the effects of the reform on labor force participation patterns. I estimate specification 2 using as dependent variable the probability that a mother is working at relative time t[18]. Figure 7 shows the results. The solid red line represents the time of exhaustion of parental leave benefits, while "End of UI" indicates the time window of exhaustion of UI benefits if women resign in $t \in [0, 6]$[19]. For the replacement rate reform (Panel A), there are no differences in participation between the treatment and control group in the first six months after the end of compulsory maternity leave, consistent with the fact that women in the treatment group who take up UI would have used PL in the absence of the reform (Figure 5). The coefficients become negative and significant from $t = 6$ onwards. While the gap in participation temporarily narrows around the exhaustion of UI benefits, the difference is overall negative and persistent: four years after the end of compulsory maternity leave, the share of mothers working in the treatment group is still 1% lower than in the control group. This suggests that giving up job protection has persistent adverse effects on labor force participation.

Figure 7 Panel B shows the dynamic of participation for the duration reform. There are no

[18] I consider a woman working at a given point in time if: *(i)* I observe her matched with an employer in the data at time t, *(ii)* she has positive earnings at time t, *(iii)* she is not on leave at time t.

[19] While the replacement rate reform did not affect the UI duration, which was constant at 8 months, after the duration reform the potential benefit duration of unemployment benefits for each mother is equal to half of the weeks of contribution in the 4 years before the start of the UI spell, with a maximum of 24 months. The time window reported in the figure assumes a potential benefit duration of 24 months. Appendix Figure A8 shows the distribution of potential benefit duration for mothers who take up UI after the duration reform.

significant differences between $t = 0$ and $t = 6$. From $t = 6$ onwards, the coefficients β_k from specification 2 become negative and significant, with the gap between the treatment and control group reaching almost 2% by $t = 8$. The gap in participation starts to narrow around the time of UI benefits exhaustion, suggesting that some women can go back to work when benefits end. Overall, the negative effect of the reform is relatively persistent but the gap between the treatment and control group almost completely closes by t=48 .

Although both reforms increased the share of people giving up job protection, the evidence presented suggests increasing the *level* of benefits has worse long-term effects in terms of participation than increasing the duration of benefits. This is potentially explained by the fact that longer unemployment benefits allow mothers to search for better jobs while at the same time keeping some attachment to the labor force.

How do these patterns translate into earnings losses? I estimate specification 2 using monthly gross labor earnings as dependent variable, specified in levels in order to keep the zeros from non-participation. Figure 7 Panel C and D report the evolution of the β_k coefficients normalized by the predicted earnings in the treatment group in the absence of children: $\frac{\hat{\beta_k}}{E\left[\tilde{Y_{ik}}|k,T=1\right]}$, where $\tilde{Y_{ik}}$ is the predicted outcome when omitting the contribution of the event time dummies (Kleven, Landais, and Søgaard 2019, Kleven et al. 2020). This normalization allows to interpret the earnings results in terms of impact on child penalties for women eligible to more generous unemployment benefits[20]. Panel C reports the results for the replacement rate reform, while Panel D reports the results for the duration reform. The patterns are roughly similar to those in participation. The replacement rate reform increased child penalties by almost 4% in $t = 9$. The gap between the treatment and control group subsequently narrows but remains stable at around 2% even four years after the end of compulsory maternity leave. The duration reform had an even larger impact on child penalties in the short run, with the gap between the two groups peaking around $t = 24$ reaching 4%, then progressively closing as UI benefits start to expire. Table 7 summarizes the results on labor market outcomes at $t = 12$, $t = 24$ and $t = 48$.

Overall, it is important to note that both reforms lead to long-lasting declines in employment and earnings, most of which occur *after* the UI benefits expired. This result highlights the crucial role of job protection in reducing the incentive costs associated with parental leave reforms and keeping women attached to the labor force.

Table 8 reports the difference-in-difference reduced form estimates of the effects of the reforms on mothers' cumulative earnings through month 48 after the end of maternity leave. Mothers ex-

[20]Figure A15 reports the β_k from Figure 7 without the normalization.

posed to higher *levels* of unemployment benefits lose, on average, 493 EUR in cumulative earnings over the four years after the end of maternity leave. Mothers exposed to *longer* unemployment benefits lose, on average, 662 EUR in cumulative earnings. Scaling the coefficients by the increase in generosity of unemployment benefits, I find that one percentage point increase in replacement rate of unemployment benefits decreases cumulative earnings by 33 EUR. On the other hand, one month increase in duration decreases cumulative earnings by 82.75 EUR. To compare the effects of the two reforms on cumulative earnings, I calculate the elasticity of earnings with respect to benefit levels $\varepsilon_b = -0.03$ and with respect to duration $\varepsilon_B = -0.01$. A 10% increase in benefit level decreases cumulative earnings by 0.3%, while a 10% increase in duration decreases earnings by 0.1%.

Mothers' Private Trade-Offs The results presented above show that taking up unemployment benefits has large negative effects on mothers' future earnings. How do these costs compare to the extra benefits that marginal mothers gain from making these choices?

Table 8 reports the IV-scaled coefficients for cumulative earnings: $\hat{\gamma}_{IV} = \frac{\hat{\lambda}}{\hat{\alpha}}$ where $\hat{\lambda}$ is the reduced-form effect on cumulative earnings and $\hat{\alpha}$ is the first-stage effect of the reforms on UI take-up. The IV-scaled coefficient is the relevant estimate to evaluate the private insurance trade-off for compliers, i.e., for mothers who take up UI because of the reform. The estimates imply that taking up UI benefits and giving up *job protection* has a considerable cost in terms of future income for mothers. In the replacement rate reform context, increasing the replacement rate of benefits yields an average net benefits increase of 5,040[21] EUR for marginal mothers. The cost of this is 30,843 EUR in foregone future earnings. On the other hand, increasing the length of benefits yields an extra 14,400 EUR per mother; the cost of this is 36,777 EUR in foregone future earnings. These estimates imply that marginal women are willing to forgo a large amount of future earnings to gain additional benefits in the short term.

Other Outcomes The effect on gross labor earnings can be decomposed along three margins: participation, intensive margin, and wage rate. After examining the effect on the participation margin, I check whether the reforms impacted the intensive margin of labor supply and the wage rate. Since the administrative data do not provide information on hours worked, I use days worked

[21] This is calculated considering the total amount of benefits that marginal mothers have after switching to UI compared to what they would have had in the counterfactual case, using the results from Section 4. For example, for the replacement rate reform, this is calculated as the difference between the more generous UI benefits for marginal mothers (calculated using the average earnings of compliers, see Section C) and the parental leave benefits they would have taken in the absence of the reform.

conditional on employment to measure of the intensive margin of employment. The wage rate is defined as earnings per day worked conditional on employment. The results are reported in Table 7 which reports the β_k coefficients from equation 2 at $k = 12$, $k = 24$, and $k = 48$ for different outcomes. Panel A reports the results for the replacement rate reform. The effects on days worked, albeit small, are positive and significant at $t = 12$ and $t = 24$. This can be explained by selection into working: in the short run, working mothers in the treatment group are likely to be positively selected. There are no significant differences in days worked four years after the end of compulsory maternity leave. The table also reports the effects on the daily wage rate. While there is a slight negative effect at $t = 12$, there is no significant differences at $t = 24$ and $t = 48$. Panel B of Table 7 reports the results for the duration reform. Again, we observe a positive and significant effect on days worked at $t = 12$ but zero effects at $t = 24$ and $t = 48$. There are no significant differences in wage rate four years after the end of compulsory maternity leave.

As mentioned in Section 3.2, subsequent fertility might impact the evolution of child penalties, particularly in the long run. Appendix Figure A16 reports the dynamic effects of the UI reforms on child penalties, restricting the sample to mothers with only one child (with completed fertility of one). The results for the replacement rate reform remain almost unchanged. On the other hand, the results for the duration reform show that the gap in child penalties between the treatment and the control group closes earlier in the sample of mothers with only one child. This suggests that the duration reform, by increasing the subsidized time mothers can spend without working, might positively impact fertility. Moreover, it confirms that, at least for this subsample, the duration reform has almost no effects on women's long-run outcomes, while the replacement rate reform has a persistent negative effect on child penalties even four years after the end of compulsory maternity leave.

To summarize, both reforms led to long-lasting declines in earnings, driven by participation, most of which occurred after the exhaustion of UI benefits. I do not find evidence of significant effects on the intensive margin or the wage rate. As expected, I find a significant decrease in the share of mothers working for their pre-birth employer.

5.2 Heterogeneity and Mechanisms

Mean effects on labor market outcomes mask substantial heterogeneity across subgroups. In this section, I conduct a heterogeneity analysis to understand the possible mechanisms behind the effects of the reforms on labor market outcomes. I focus on three main dimensions of heterogeneity: occupation, regional unemployment rate, and childcare availability.

I start by investigating whether the effects of the reforms are different for blue-collar workers and white-collar workers. This distinction can be informative on the role of *human capital depreciation*, as experience effects have been estimated to be smaller for blue-collar occupations than for white-collar ones. Figure A17 Panel A and B report the results of the estimation of specification 2, splitting the sample by occupation, on the probability of working at time t. There are no significant differences in the evolution of participation after the reforms by occupation category. The results look very similar when focusing on earnings instead of participation (Appendix Figure A18). This seems to suggest that human capital depreciation does not play a significant role in explaining the long-term effects of increasing UI generosity on labor market outcomes. However, there is a critical caveat to this analysis: the occupation categories reported in the data are vast and do not provide much details on the type of occupations other than the distinction between blue and white-collar. Experience effects are likely to be small also in many white-collar occupations, and this might explain the lack of significant differences in labor market outcomes by occupation.

Another useful dimension of heterogeneity is the unemployment rate in the region of residence. I test whether the effects on participation are significantly different by different levels of the regional unemployment rate (above the median or below the median). This distinction can be informative on the importance of search frictions and on the role of job protection in influencing labor market outcomes. Results are reported in Figure A17 Panel C and D. As expected, the reforms' long-term effects on participation are significantly smaller in regions with lower unemployment rates. After the duration reform, women in low unemployment regions can return to work as soon as they exhaust their unemployment benefits (around $t = 24$). This is not the case for women in high unemployment regions. For the replacement rate reform, we observe no significant effects in the long run in regions with low unemployment. This suggests that job protection is critical in the presence of search frictions.

Finally, I test whether the effects on labor market outcomes are different by childcare availability. The results confirm that the lack of formal childcare is one of the main drivers of the take-up of unemployment insurance. They also suggest that the difficulty of finding childcare is a clear explanation for women's willingness to forgo an enormous amount of future labor earnings (the cost of losing job protection) in order to gain additional short-term benefits. In regions with relatively high levels of childcare availability, women are only willing to forgo 13,666 EUR in future earnings, compared with 40,950 EUR in regions with relatively low availability of childcare. Moreover, note that, after the duration reform, the gap in participation between the treatment and control group starts to close at around $t = 30$, which roughly corresponds to the age at which the child can start

formal and free childcare.

Figure 9 summarizes these results and reports additional results on the heterogeneity of the effects of the reforms on participation along other dimensions. Panel A shows the results for the replacement rate reform. Panel B reports the results for the duration reform. It is interesting to notice how women living in regions with high childcare availability experience less negative long-run effects on participation, while women living in regions with high unemployment experience more negative long-run effects on participation, mirroring the results presented above.

6 The Value of Benefits After Childbirth

A central result of the paper is that many mothers are willing to forgo a significant amount of future earnings to get more benefits in the short run. Why is this the case? If mothers are willing to decrease future earnings to gain additional benefits, these additional benefits must be of high utility value. A high implicit utility value might reflect mothers' underlying preferences or specific constraints (e.g. high cost of working in the short-term) that might drive the demand for higher benefits after childbirth.

In this section, I first develop a revealed-preference method to infer the value of the increased benefits for mothers, which is informative about the trade-off between higher short-term benefits and foregone future earnings that mothers are willing to make. I then provide evidence of the importance of constraints associated with the observed behavioral response.

6.1 Earnings Losses and the Value of Benefits

Ceteris paribus, the extent to which marginal mothers are willing to forgo future earnings in response to the reforms reveals the utility value of short-term benefits relative to job protection. Larger income losses must mean that, for marginal mothers, short-term benefits are highly values and there are welfare gains from making this choice.

The value of the marginal unit of transfers (denoted by MB) is captured by the percent change in the marginal utility of consumption between the on-leave state and the employed state.

$$MB = \frac{u'(c_l) - v'(c_e)}{v'(c_e)}$$

In this setting, we can use a revealed-preference approach to estimate MB by using choices between programs to infer the value of transfers. Following Landais and Spinnewijn (2021), the

willingness to take up extra benefits depends on the relative price ($\frac{p_l}{p_u}$) to do so, which is equal to the ratio between the cost of higher benefits and the extra benefits: $\frac{Costs\ higher\ benefits}{Net\ extra\ benefits}$.

Since we do not observe the actual prices of the different bundles (higher benefits without job protection vs. lower benefits with job protection), we can approximate the numerator following the approached developed by Giupponi (2019) using the earnings losses associated with giving up job protection. Hence, to calculate MB we can use the results from Table 8, which imply: $MB_{RR} \approx 4.11$ and $MB_{Duration} \approx 1.42$. The results confirm the intuition that the implicit value of transfers after childbirth is substantial for marginal mothers relative to job protection.

The Role of Constraints A large implicit valuation of transfers might also reflect a high cost of work in the short run. I investigate how the behavioral and labor market responses correlate with the cost of working right after childbirth. Evidence of a negative correlation between the behavioral and earnings responses and such measure is consistent with the notion that the cost of working right after childbirth plays a significant role in this context. Table 9 shows heterogeneity earnings responses by childcare availability level. The Table shows the foregone future earnings are larger for lower levels of childcare availability. This is particularly true for the duration reform, suggesting that extending the duration of benefits is particularly appealing to mothers that are constrained by childcare availability.

The Role of Behavioral Frictions All revealed preference approaches rely on the optimization by workers and the absence of behavioral frictions. A growing literature, however, has documented the importance of behavioral frictions in several settings, such as insurance choices (Abaluck and Gruber, 2011; Handel, 2013; Handel, 2013), but also in the context of unemployment (Ganong and Noel, 2019; Gerard and Naritomi, 2021).

Mothers might not accurately make decisions about their leave choices. This could occur for several reasons, including lack of information and lack of optimization due to behavioral frictions. These frictions would be wrongly attributed to mothers' valuation of benefits and thus bias the estimates of the MB and driving a wedge between mothers' willingness to pay and their welfare-relevant valuation.

The specific behavior observed in this case may be consistent with different models of behavior and time preferences. In particular, consider a standard $\beta - \delta$ model. If mothers are rational forward-looking agents (with $\beta = 1$) and we maintain the exponential-discounting assumption, we can estimate the discount factor δ that rationalizes the estimated trade-off between benefits and

future earnings. The estimated monthly discount factor for the replacement rate reform is equal to $\hat{\delta}_{Replacement\ Rate} = 0.85$ and for the duration reform is equal to $\hat{\delta}_{Duration} = 0.87$. Therefore, rationalizing mothers' behavior using an exponential-discounting model requires a very high degree of impatience ("myopia"), unrealistically high relative to the prior literature[22]. A model with present-bias is more likely to help rationalize mother's choices. Assuming quasi-hyperbolic discounting and setting $\delta = 0.995$, then it is possible to estimate β from the data. The estimates are equal to $\beta_{Replacement\ Rate} = 0.45$ and $\beta_{Duration} = 0.47$ for the two reforms, suggesting that empirical patterns can be consistent with present-biased behavior. Additional data (or assumptions) are required to deal with this challenge.

Of course, in this study, I am unable to determine whether the willingness-to-pay I estimate represents mothers' true valuation of benefits of whether there is some alternative behavioral explanation underlying their decisions. In any case, the estimate of the value for increase benefits relative to the cost of increased benefits is important for determining the optimal design of parental leave policies because mothers' high valuation for short-term benefits makes clear that mothers would be willing to forgo future earnings in exchange for these benefits. Overall, the current estimates provide an upper bound for mothers' willingness to pay for benefits.

7 Welfare Effects and Policy Implications

7.1 Normative Implications: Benefits Level vs Duration

In this section, I take advantage of the empirical results described above to derive normative implications on how to optimally design parental leave policies. While estimating the welfare effects of these specific unemployment insurance reforms might have low external validity, it can be helpful to estimate the welfare effects of directional changes to different policy parameters while keeping the other relevant parameters fixed.

I adapt the standard Baily-Chetty formula to the parental leave context, following Schmieder and Von Wachter (2016) and present a simplified version of the model that allows thinking about the different roles of benefit level and benefit duration *without* offering job protection.

Setup The model centers on a worker who has a child at time $t = 0$. The model is set in continuous time and the horizon is assumed to last until time T. Each mother chooses how much time to spend on leave. While on leave she has a probability to returning to work of s_t at each point

[22] Carroll et al. (2017); Ganong and Noel (2019); Gerard and Naritomi (2021)

in time. The survival probability of remaining on leave at time t is given by $S_t = exp\left(-\int_0^t s_t dt\right)$. Returning to work implies a search cost $\psi_t(s_t)$. The cost can be interpreted in the standard way when job protection is not assumed but can more broadly include the leisure value of being on leave, the cost of childcare or human capital depreciation.

While on leave, the worker receives benefits b_t and consumes $c_{l,t} = b_t + y_l$ where y_l may be income from other sources such as home production. The corresponding flow utility is given by $u(c_{l,t})$. If she returns to work, the worker receives a fixed wage w and pays taxes τ, resulting in consumption $c_e = w - \tau$ and utility $v(c_e)$. Different utility functions when employed and when on leave capture the possible effort cost of working or the valuation of staying at home with the child.

The lifetime expected utility of a mother is given by:

$$W = \int_0^T \left\{S_t u(c_{l,t}) + \left[1 - S_t\right] v(c_e) - S_t \psi_t(s_t)\right\} dt \tag{3}$$

Note that this equation captures the basic trade-off in the mother's decision problem. Returning to work sooner by exerting higher search effort results in lower S_t and therefore higher utility if $v(c_e) > u(c_{l,t})$ but it comes at a higher cost $\psi_t(s_t)$.

Government Problem The government sets the parental leave benefit path to maximize social welfare while taking into account that the mother will adjust her decisions in response to the path of parental leave benefits (by returning to work later for example) and the tax level τ to finance PL benefits. I restrict the government choice set to benefit paths with constant benefit levels up to a finite horizon B so that $b_t = b$ for $t \leq B$ and $b_t = 0$ for $t > B$. Consumption during parental leave is then $c_{l,t} = b + y_l$ for $t \leq B$ and $c_{l,t} = y_l$ for $t > B$. In this case, equation 3 becomes:

$$W = \int_0^B S_t u(c_{l,t\leq B}) dt + \int_B^T S_t u(c_{l,t>B}) dt + \int_0^T \left[1 - S_t\right] v(c_e) dt - \int_0^T S_t \psi_t(s_t) dt \tag{4}$$

The government has the following budget constraint:

$$(T - D)\tau = Lb + E \tag{5}$$

where E is some level of exogenous per capita spending, $L = \int_0^B S_t dt$ is the expected duration of receiving parental leave benefits and $D = \int_0^T S_t dt$ is the expected duration of non-participation.

Appendix D shows that the optimal level of parental leave benefits is determined by

$$\frac{dW}{db}\frac{1}{Lv^{'}(c_e)} = \frac{u^{'}(c_{l,t\leq B}) - v^{'}(c_e)}{v^{'}(c_e)} - \left(\eta_{L,b} + \eta_{D,b}\frac{D}{L}\frac{\tau}{b}\right) \tag{6}$$

where $\eta_{L,b} = \frac{dL}{db}\frac{b}{L}$ is the elasticity of the duration of receiving PL benefits with respect to the monthly benefit level and $\eta_{D,b} = \frac{dD}{db}\frac{b}{D}$ is the elasticity of non-participation with respect to the monthly benefit level. The first term on the right hand side represents the value of increasing the transfer by 1 EUR which depends on the gap between the marginal utility of leave recipients relative to the marginal utility of the employed. The second term represents the behavioral cost of increasing the transfer by 1 EUR to the government budget.

The marginal effect of increasing transfers by 1EUR through a duration extension on welfare can be written as:

$$\frac{dW}{dB}\frac{1}{S_B b v^{'}(c_e)} = \frac{\tilde{u}^{'}(c_{l,t>B}) - v^{'}(c_e)}{v^{'}(c_e)} - \frac{1}{S_B}\left(\int_0^B \frac{dS_t}{dB}dt + \frac{dD}{dB}\frac{\tau}{b}\right) \tag{7}$$

where $\tilde{u}^{'}(c_{l,t>B}) = \frac{1}{b}\int_{y_l}^{y_l+b} u^{'}(c)dc$ is the average marginal utility for an individual with consumption between y_l and $y_l + b$. Again, the first term on the right hand side represents the value of increasing the transfer by 1 EUR, while the second term represents the behavioral cost of increasing benefit duration to the government.

Both formulas show that the welfare trade-off for parental leave policies is conceptually the same as unemployment insurance: it compares individuals' willingness to pay for the policy change to the net cost of additional benefits, inclusive of the fiscal externalities on government revenue generated by behavioral responses to the policy change. Note that, because of the convexity of $u(.)$, we have that $\tilde{u}^{'}(c_{l,t>B}) > u^{'}(c_{l,t\leq B})$ which implies that the first term on the right hand side of equation 4 is larger than the same term in equation 3. By comparing the second term on the right hand side of equation 3 and 4 allows to directly compare the behavioral cost of increasing transfers to mothers via benefits increases or via benefit extensions.

7.2 The Marginal Value of Public Funds of Increasing Benefits Without Job Protection

Using the framework and estimates derived above, I now follow Hendren and Sprung-Keyser (2020) and analyze the welfare effects of the two policy changes by estimating the Marginal Value of Public Funds (MVPF). The MVPF is the ratio of the marginal benefits of a policy to its marginal cost and it is defined as:

$$MVPF = \frac{WTP}{Net\ Costs}$$

The denominator of the MVPF is relatively straightforward to calculate as I can directly estimate the reduced-form estimates of the net costs of increasing benefits without job protection, which includes the mechanical cost and the behavioral cost (described as the second term on the right-hand side of equations 6 and 7). Estimating the WTP of mothers for different policy changes is more complicated. It entails estimating the first term on the right-hand side of equations 6 and 7. Note that the calculation of the WTP in the MVPF (as the derivation of equations 6 and 7) relies heavily on the envelope theorem, which implies that individuals who change their behavior in response to the policy change are making privately optimal decisions and are therefore indifferent to changing their behavior. Because of the envelope theorem, behavioral responses to policies have first-order effects on policy costs because of fiscal externalities, but only second-order effects on welfare. The two critical assumptions for the envelope theorem are that the policy change is small and that individuals are making privately optimal decisions.

Costs I start by assessing the effects of the reforms on the net costs for the government. I estimate the effects of the reforms on three components of government costs. The first component of the costs is the increase in unemployment insurance spending, which is partially mechanical (driven by the increased generosity of benefits for mothers who do not change behavior in response to the policy change) and partially behavioral (driven by the fiscal externalities on government revenue of behavioral responses to the policy change). The second component of the costs is parental leave benefits. In Section 4, I document significant program interactions between parental leave and unemployment insurance that need to be considered when calculating the net costs of the policy change. For example, the fact that more generous unemployment benefits lead to crowding out of parental leave benefits is a saving for the government that needs to be taken into account. The last component of the costs is the effect of the policy changes on labor force participation and earnings and, therefore, on tax revenues. Evidence from Section 5 shows that the behavioral responses to the increased generosity of unemployment benefits have negative and persistent income on labor force participation and earnings that need to be taken into account in calculating the net costs. Figure 10 shows the results of the estimation of equation 2 on individual-level monthly unemployment insurance benefits, individual-level monthly parental leave benefits, and monthly gross earnings.

Table 10 reports the net cost for the government of the reforms up to 48 months from the end of compulsory maternity leave. For the replacement rate reform, the net cost for the government of increasing the level of benefits on UI benefits corresponds is 2160 EUR, which is the cumulative increase in monthly UI spending between $t = 0$ and $t = 48$. This cost is comprehensive of the policy change's mechanical cost and policy change's behavioral cost. Because of program substitution, increasing unemployment benefits generate savings for the government in the form of lower parental leave spending, equal to 615 EUR. The reform generates long-term losses in tax revenue of 1229 EUR. Taken together, the total net costs of changing the level of benefits is equal to 2774 EUR.

I estimate the costs of the duration reform similarly. The increase in UI spending driven by the increase in benefit duration is equal to 6381 EUR, a much higher effect than the replacement rate reform given the higher generosity of the duration reform. Increasing the duration of benefits generates parental leave savings of 177 EUR. Finally, the reform generates long-term losses in tax revenue of 1241 EUR. Taken together, the total net costs of changing the duration of benefits is equal to 7445 EUR.

WTP The first term on the right-hand side of equation 3 and 4 shows individuals' willingness to pay for parental leave benefits. I estimate the WTP using two approaches. First, I use the revealed-preference approach presented in Section 6. Second, I use a consumption-based approach common to the optimal unemployment insurance literature and approximate individuals' WTP for 1 EUR of additional benefits by $1 + \gamma \frac{\Delta c}{c}$ where γ is a coefficient of risk aversion and Δc is the impact of unemployment on consumption. As I do not observe the impact of parental leave benefits on consumption, I use estimates of $\gamma \frac{\Delta c}{c}$ reported in Schmieder and Von Wachter (2016). Conveniently Schmieder and Von Wachter (2016) and Hendren and Sprung-Keyser (2020) provide estimates of $\gamma \frac{\Delta c}{c}$ for both changes in benefit levels and changes in benefit duration. Assuming $\gamma = 2$, the estimates for $1 + \gamma \frac{\Delta c}{c}$ are equal to 1.17 for benefit increases and to 1.30 for duration increases. I construct the WTP as the mechanical increase in benefits for inframarginal mothers (always-takers) multiplied by $1 + \gamma \frac{\Delta c}{c}$. Estimates using the two approaches are reported in Table 10.

While both approaches have downsides, they are helpful to provide bounds for the WTP for PL benefits. The consumption-based approach heavily relies on the assumption of state independence of preferences which might not hold in the case of PL benefits. Moreover, arguably the value of PL benefits after childbirth might go well beyond consumption-smoothing. On the other hand, the revealed preference approach might be biased in the presence of behavioral or information

frictions and might overestimate the willingness to pay for benefits in the short-run.

MVPF Estimates Table 10 reports the MVPF for the two reforms using the two approaches. The main takeaway that emerges is that the conservative estimates of the MVPF for both reforms is always less than 1, suggesting that supporting women after childbirth through increases in benefits is costly per euro provided if it does not come with job protection. This is true, regardless of the calculation of the WTP, for the duration reform: the costs of increasing the duration of benefits without providing job protection are higher than the associated benefits. On the other hand, the MVPF for the replacement rate reform when using revealed preferences to calculate the numerator is greater than 1 suggesting that the cost of increasing the level of parental leave benefits is lower than the mothers' willingness to pay for the policy change.

Note that the analysis in Section 4 reports evidence of significant interactions between programs and suggests that accounting for the consequent fiscal externalities is important in designing optimal social insurance policies. Table 10 reports the estimates of the MVPF of the two reforms without considering the effects of program interactions on the net cost of the reforms for the government. When program interactions are not considered, the MVPF of both reforms significantly decreases, suggesting that the savings for the government from substitution between UI and PL are an important part of the calculation of the denominator of the MVPF.

An extensive literature in behavioral economics suggests that individuals commonly make mistakes and do not make privately optimal decisions. Given the evidence from Section 5 that shows that mothers are willing to incur enormous losses in long-term earnings to get higher short-term benefits, it is not apparent that this assumption holds in this context. Mothers might not be able to perfectly forecast the effects of their leave decisions on labor market outcomes or may be myopic. If we do not assume that women are forward-looking and have rational expectations, we can no longer rely on the envelope theorem and assume that the welfare impact of the policy change for marginal recipients is zero. It is, therefore, necessary to take into account the private benefits of marginal individuals. Considering the extreme case in which marginal mothers fail to take into account the effects of the take-up of unemployment benefits on the future earnings losses, the total willingness to pay would be equal to: $WTP = WTP_{inframarginal} + WTP_{marginal}$. The results of this exercise are reported in Table 11. If mothers cannot fully take into account the private loss in future earnings derived by taking up unemployment benefits, we get a consistently negative MVPF.

7.3 The Role of Job Protection

The discussion above considered the welfare effects of increasing the level of benefits or the duration of benefits without providing job protection. For both reforms, I find an MVPF almost always lower than 1, reflecting the fact that providing parental leave benefits without job protection is very costly for the government per euro spent.

The estimates in Section 4 show that mothers who take up UI after the reform would have taken up PL in the absence of the reform and would have returned to work after the exhaustion of the PL benefits. The analysis above also shows that combinations of higher benefits without job protection and longer duration without job protection lead to worse outcomes in terms of labor force participation and tax revenue for the government than lower benefits and shorter duration with job protection. A key question for the design of parental leave policies relates to the role of job protection in avoiding long-lasting negative effects on mothers' post-birth careers. In particular, would it be welfare improving to increase the level and or duration of parental leave benefits while offering job protection?

A reform that increases the *level* of PL benefits (and therefore provides higher benefits while offering job protection) is welfare improving to the extent that the negative long term consequences estimated in Section 5 are due to the lack of job protection rather than to the higher benefits. While it could be possible that higher benefits are responsible for the negative consequences of the replacement rate reform on labor market outcomes, I believe this possibility is relatively unlikely. The heterogeneity by the level of search frictions on negative effects on labor market outcomes provide suggestive evidence that job protection is likely to play a key role in the negative effects on employment and earnings. If this is the case, an increase in PL benefits would incentivize a portion of marginal mothers to take up PL and return to work earlier than without the provision of job protection. We can then calculate the MVPF of this counterfactual reform which is the following (per euro spent): $MVPF = \frac{WTP}{1+FE}$, where $FE = savings\,from\,UI\,benefits + tax\,revenue < 0$. The MVPF of this reform is greater than 1 and hence increases the level of benefits with job protection is welfare improving. We can also perform the following back-of-envelope calculation: it would be enough to increase α_{PL} from 0.3 to 0.5 to "reverse" the effect of the replacement rate reform.

Note that it is less clear that a reform that increases the *duration* of PL benefits (and therefore provides longer benefits while offering job protection) is welfare improving. This is only the case if the negative long term consequences on labor market outcomes estimated after the duration reform are due to lack of job protection rather than to longer benefits duration. However, being

out of the labor force for an extended period of time may cause skill decay or some other shock with negative consequences for employment and earnings and therefore it is not clear that providing longer benefits with job protection is welfare enhancing.

7.4 Policy Implications and Discussion

By providing an assessment of the value that women assign to parental leave benefits after birth, this analysis shows that the value of benefits is extremely high for mothers and much higher than the value of job protection. At the same time, the incentive costs of providing benefits without job protection are high, as they result in considerable losses in terms of tax revenue for the government even beyond the exhaustion of the benefits.

The welfare analysis above has different implications. First, extending the *level* of benefits while at the same time extending job protection (and therefore reforming the standard PL system) is welfare improving for mothers by significantly decreasing lost tax revenue. Second, the results suggest that the high value of benefits partially reflects high cost of working after childbirth. This implies that relaxing constraints by increasing childcare availability is welfare improving, provided that the cost of doing so is not too high. Third, leave policies that push for more extended benefits should consider the high costs in terms of earnings losses that they potentially generate. Fourth, the evidence shows that mothers may not internalize the career costs of their leave choices when making decisions, and policy-makers should take this into account when designing leave policies. Finally, the analysis shows that program substitution is an important margin of adjustment for mothers, suggesting that analyzing social programs in isolation is not enough to evaluate their effectiveness.

8 Conclusions

This paper provides new estimates on the effects of different parental leave parameters on women's choices after childbirth, labor market outcomes, and welfare. I take advantage of a unique environment in which women, after childbirth, can choose between returning to work, less generous benefits with job protection (*parental leave*), and more generous benefits without job protection (*unemployment insurance*). Studying two policy experiments mimicking expansions of paid parental leave without job protection and changing the level and duration of benefits, I find that mothers choose to forgo job protection when benefits become more generous. The evidence shows that increasing the generosity of unemployment benefits increases UI take-up by 18 to 20% relative to the

pre-reform baseline. Voluntary separations drive the increase in UI take-up. Both reforms lead to a significant crowd-out of parental leave benefits and significantly delay women's return to work. Overall, a significant portion of mothers is willing to give up the possibility of returning to their employer for higher benefits in the short run. While this brings mothers greater financial security in the short run, it drives long-lasting declines in earnings, driven by participation, most of which occurred after the exhaustion of UI benefits.

Overall, the results show that taking up unemployment benefits has large negative effects on mothers' future earnings and show that marginal mothers are willing to forgo an enormous amount of future labor earnings to gain additional short-term benefits. Increasing the replacement rate of benefits yields an average net benefits increase of 5,040 EUR for mothers who take this up; the cost of this is 31,000 EUR in foregone future earnings. Increasing the length of benefits yields an extra 14,400 EUR per mother; the cost of this is 36,000 EUR in foregone future earnings.

I develop a revealed-preference approach to infer the value of the increased benefits for mothers, which is informative about the trade-off between higher short-term benefits and foregone future earnings that mothers are willing to make. Additional benefits after childbirth are of high utility value for marginal mothers. The high utility value of benefits partially reflects a high cost of working after childbirth, highlighting the importance of constraints in explaining the observed behavioral responses.

In order to assess the normative implications of my findings, I develop a conceptual framework to evaluate the welfare effects of changes to parental leave policies in terms of empirically measurable sufficient statistics. I derive the MVPF of changing the level or duration of benefits and assess how it changes if we assume that mothers do not privately optimize and that the envelope theorem does not hold.

I find that extending the *level* of benefits while at the same time extending job protection (and therefore reforming the standard PL system) is welfare improving for mothers by significantly decreasing the fiscal externality due to lost tax revenue. The results also suggest that relaxing constraints by increasing childcare availability is welfare improving, provided that the cost of doing so is not too high. Finally, the analysis shows that program substitution is an important margin of adjustment for mothers, suggesting that analyzing social programs in isolation is insufficient to evaluate their effectiveness.

While the specific reforms studied might have low external validity, the findings in this paper are highly relevant to understanding how to design parental leave policies. They are specifically informative of the effects of directional changes to different PL parameters while keeping the other

relevant parameters fixed. This is particularly relevant since benefits and job protection usually move together, making it difficult to disentangle the effects and mothers' valuations of each.

The normative assessment I draw in this paper is based on a partial equilibrium framework. A comprehensive evaluation of the welfare effects of increased parental leave benefits would require considering the effects on fertility and on children's outcomes. Moreover, it would be crucial to study this problem at the household level instead to grasp the spillover effects of mothers' decisions on fathers and the household as a whole.

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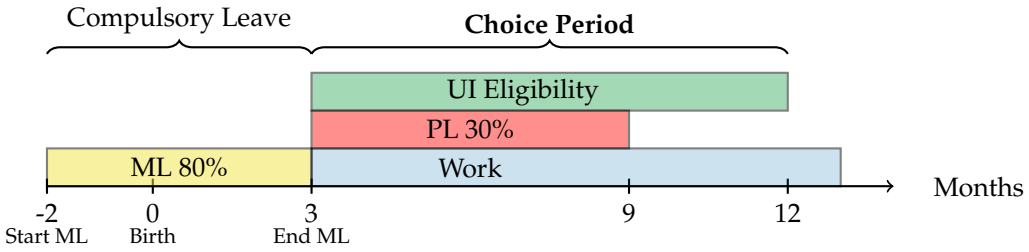
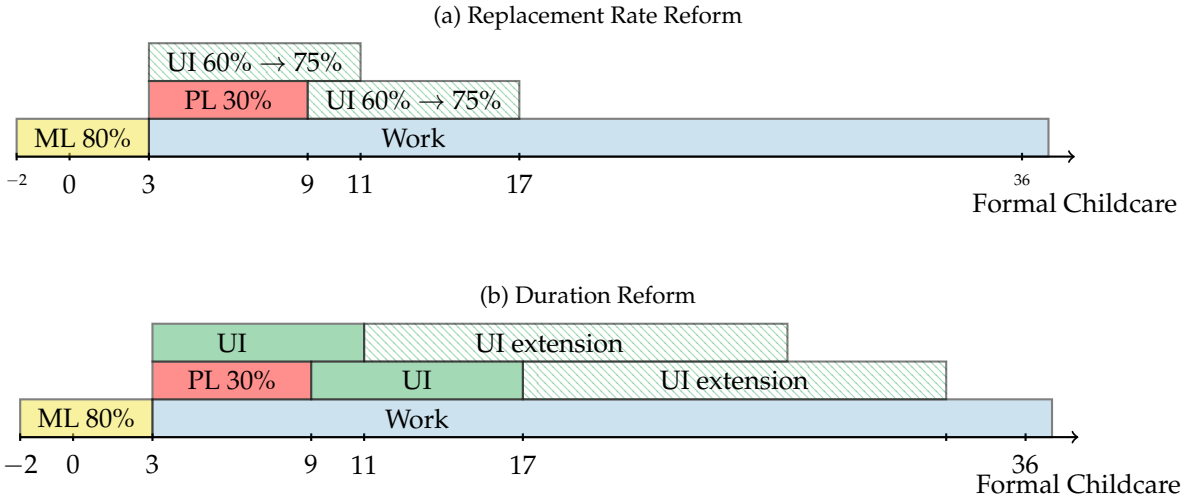
Figures

Figure 1: TIMELINE



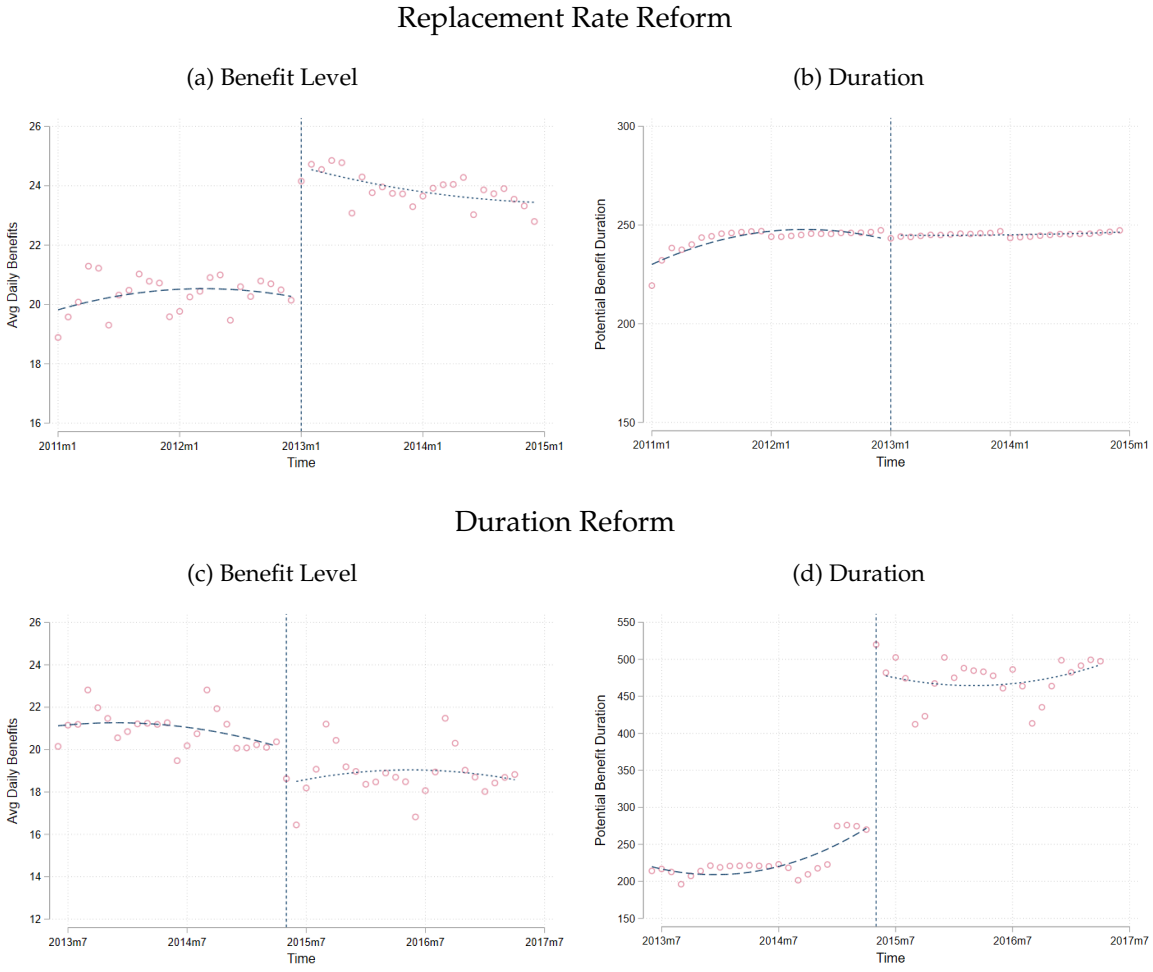
Notes: The figure shows the timeline of social programs available to mothers around childbirth. Denoting the time of childbirth with $t = 0$, mothers are compelled to use maternity leave between $t = -2$ and $t = 3$. Between $t = 3$ to $t = 12$ mothers can choose to return to work, to use parental leave, which lasts 6 months, or to take up unemployment insurance. Mothers can take up unemployment insurance at any time between $t = 3$ and $t = 12$ ("choice period"). See Section 2 for details.

Figure 2: IMPACT OF REFORMS ON POLICY SPACE



Notes: The graphs illustrate how the unemployment reforms impacted the policy space for women after childbirth. $t = 0$ corresponds to the time of childbirth. From $t = 3$ onwards women can choose to go back to work, take up PL or take up UI. The graph shows the impact of the reforms under the assumption that women take up PL at $t = 3$ and UI either at $t = 3$ or at $t = 9$, after the exhaustion of PL benefits. Panel A shows the effect of the replacement rate reform, which increased the replacement rate of UI from 60 to 75% while leaving the length of UI unchanged. Panel B shows the effect of the duration reform, which extended UI duration from 8 to a maximum of 24 months. See Section 2 for details.

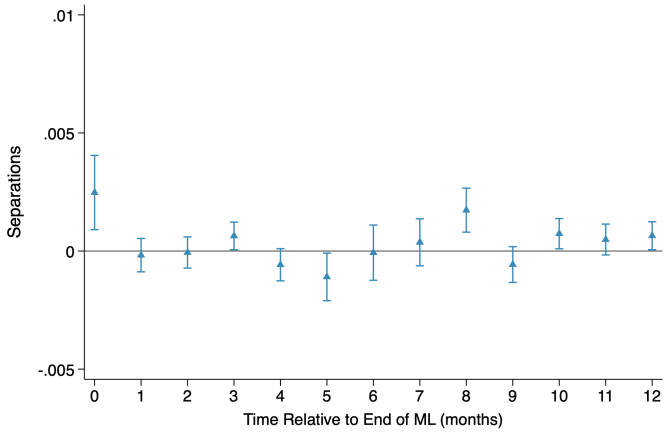
Figure 3: Changes in Unemployment Insurance Generosity



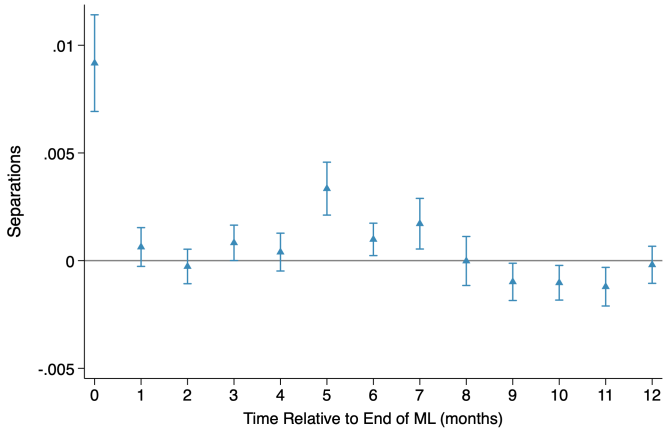
Notes: The graphs show the average daily unemployment insurance benefits and the average potential benefit duration (in days) by month-of-start of unemployment spell bin for women younger than 50 years old with a permanent contract. Panel A and B show the effects of the introduction of the replacement rate reform. Panel C and D show the effects of the introduction of the duration reform.

Figure 4: Effects of the Reforms on Separations from Pre-Birth Employer

(a) Replacement Rate Reform



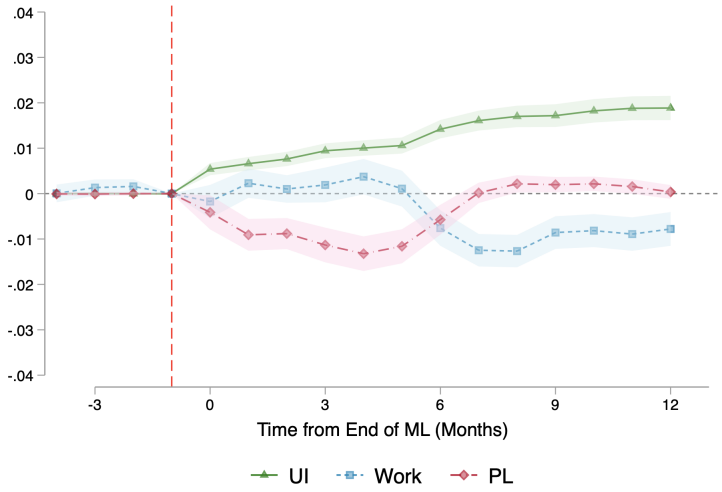
(b) Duration Reform



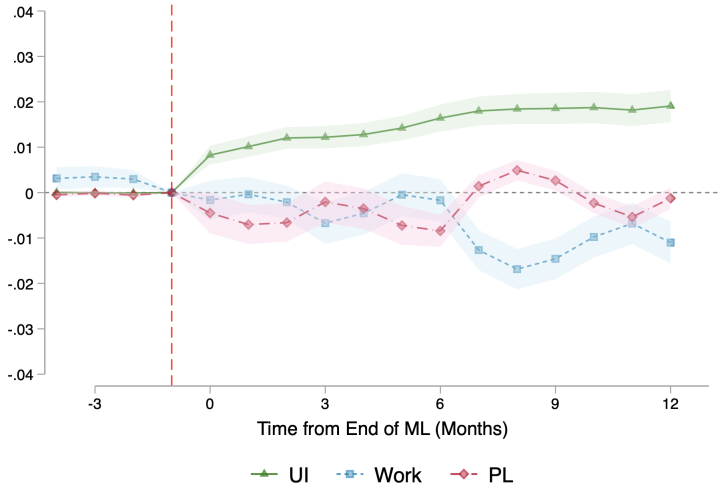
Notes: The figures report difference-in-differences estimates of the coefficients β_k from specification 2 where the dependent variable is the probability that a mother voluntarily separates from the pre-birth employer at relative time t (where $t = 0$ corresponds to the time of end of compulsory maternity leave). The figure reports the 95% confidence intervals. Standard errors are clustered at the individual level. Panel A reports results for the replacement rate reform while panel B reports results for the duration reform.

Figure 5: Effects of the Reforms on Choices

(a) Replacement Rate Reform



(b) Duration Reform

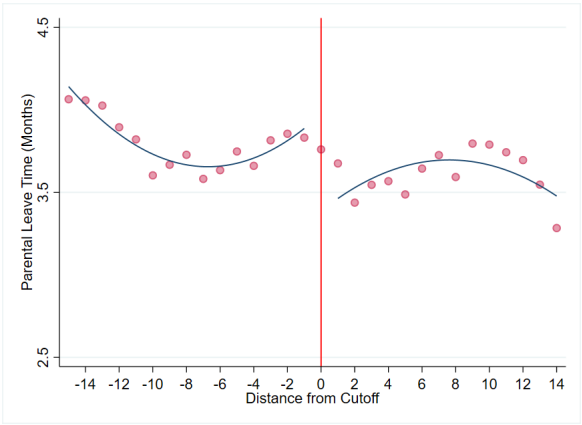


Notes: The figures report difference-in-differences estimates of the coefficients β_k from specification 2 estimated on three different dependent variables: the probability that a mother is on UI at relative time t (green series), the probability that a mother is working at relative time t (blue series) and the probability that a mother is on parental leave at relative time t (pink series). $t = 0$ corresponds to the time of end of compulsory maternity leave. Shaded areas correspond to 95% confidence intervals. Standard errors are clustered at the individual level. Panel A reports results for the replacement rate reform while panel B reports results for the duration reform.

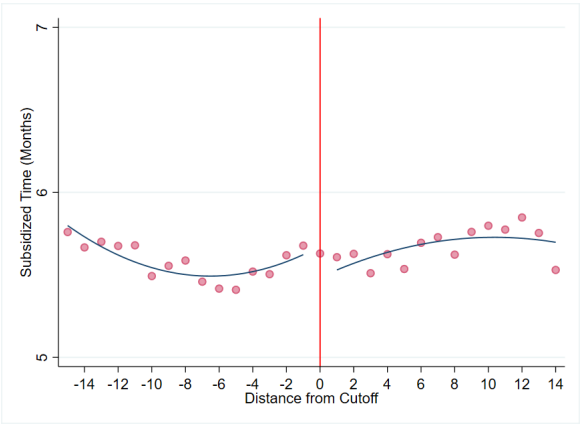
Figure 6: Effects of the Reforms on Insured Time

Replacement Rate Reform

(a) Non-Work Time Subsidized by Parental Leave

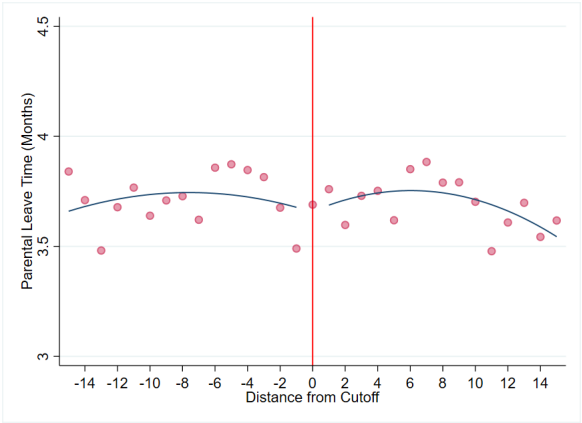


(b) Total Subsidized Time

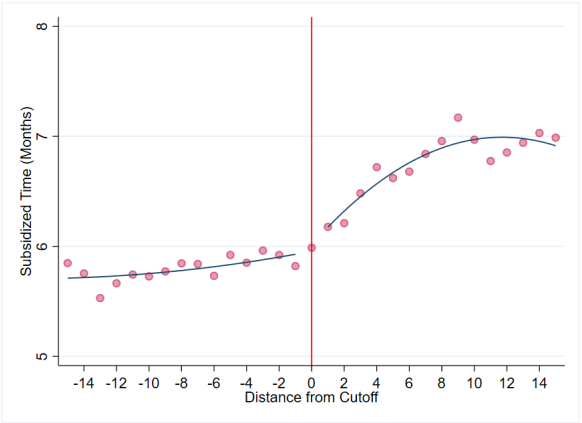


Duration Reform

(c) Non-Work Time Subsidized by Parental Leave



(d) Total Subsidized Time

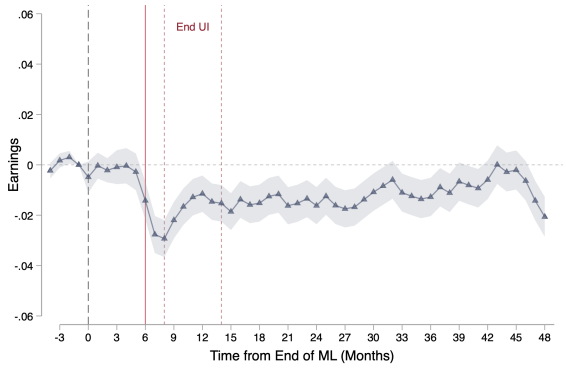


Notes: The graphs show the mean value of different outcome variables for the two reforms by month-of-end-of-compulsory-maternity-leave bin. Panel A and C refer to the time spent on parental leave during the first 9 months after the compulsory maternity leave. Panel B and D refer to the total *subsidized* time women spend out of the labor force (combining UI and PL benefits). The solid blue lines display quadratic spline estimates. The cutoffs refer to the cutoff date separating the *not treated* and the *partially treated* group as shown in Figure A4.

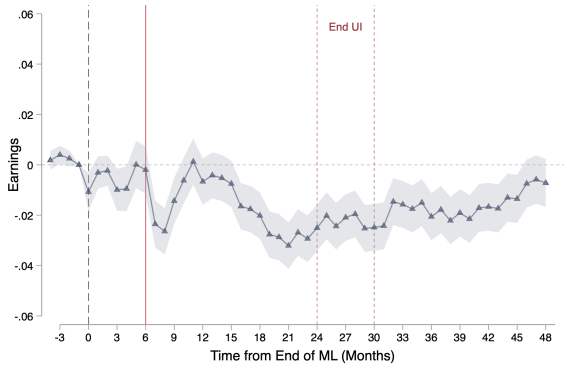
Figure 7: Effects of the Reforms on Labor Market Outcomes

Participation

(a) Replacement Rate Reform

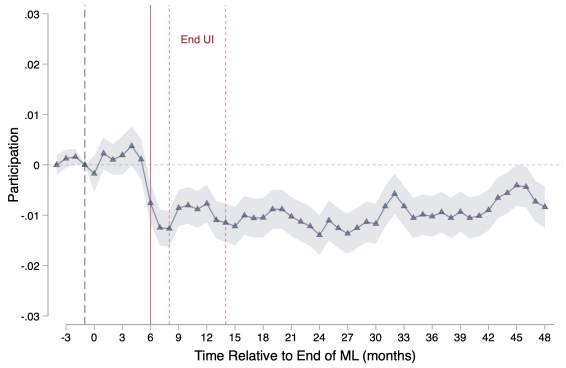


(b) Duration Reform

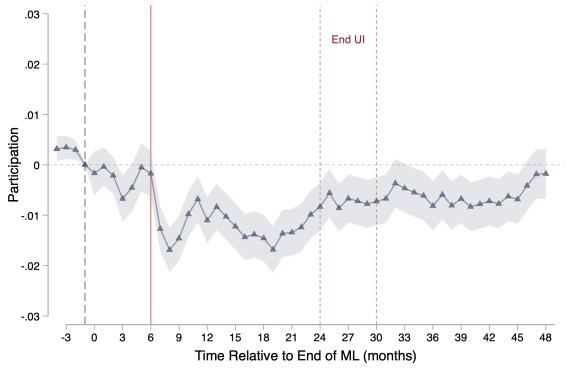


Earnings

(c) Replacement Rate Reform



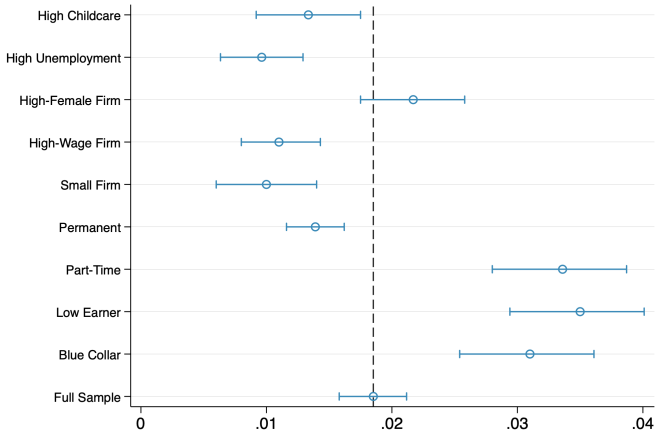
(d) Duration Reform



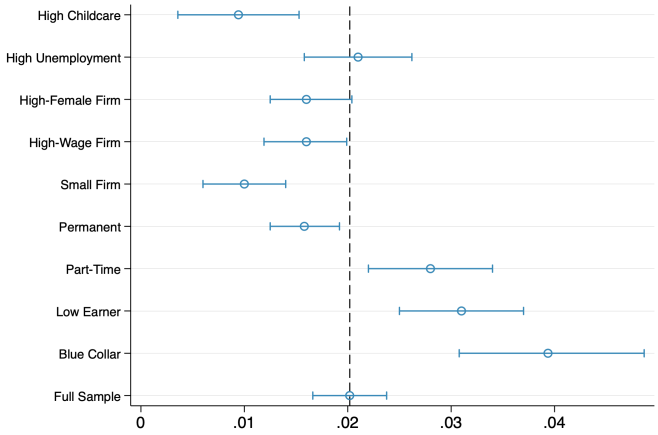
Notes: The figures show the estimated effects of increasing unemployment insurance generosity on the dynamics of female labor force participation and child penalties in gross labor earnings for both reforms. Panel A and B report the estimates of β_k coefficients from specification 2 on the probability of working, defined as being matched with an employer, having positive earnings and not being on leave or on unemployment at time t, for the replacement rate reform and the duration reform respectively. Panel C and D report the estimates of β_k coefficients from specification 2 on gross labor earnings in levels, normalized by the predicted earnings in the treatment group in the absence of children, $\frac{\hat{\beta}_k}{E\left[\bar{Y}_{ik}|k,T=1\right]}$. This allows to interpret the coefficients as the percentage-point change in the child penalty at time t for women exposed to the more generous UI regime. Panel C reports result for the replacement rate reform and Panel D reports results for the duration reform. Shaded areas correspond to 95% confidence intervals. the red dot-dashed vertical line corresponds to the time of exhaustion of parental leave benefits. The "End UI" range characterizes the relative time periods that correspond to the exhaustion of UI benefits if mothers take up UI between $t = 0$ and $t = 6$.

Figure 8: Treatment Effect Heterogeneity: UI Take-Up

(a) Replacement Rate Reform



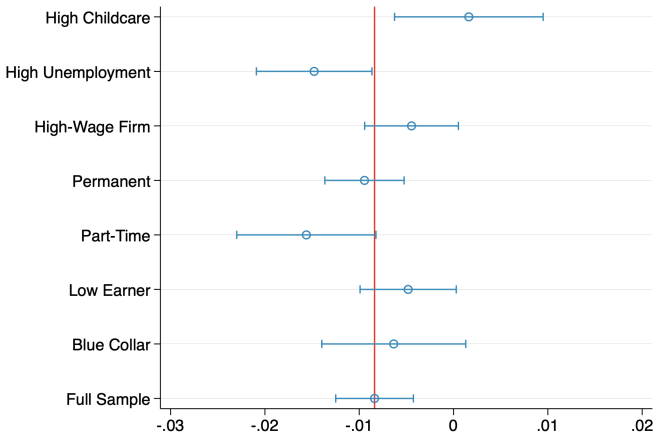
(b) Duration Reform



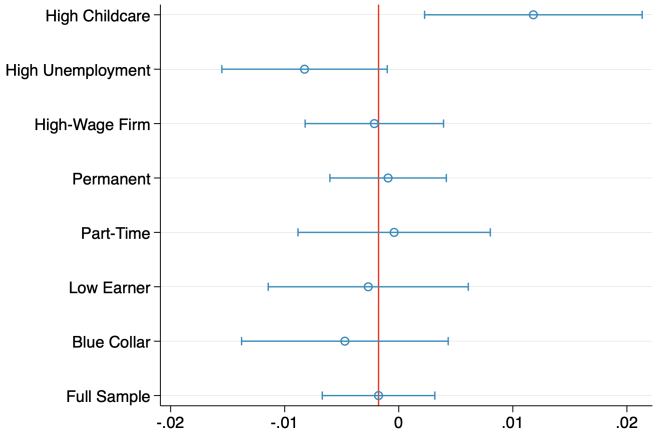
Notes: The figures show the heterogeneity in the treatment effect of UI reforms on UI take-up across different characteristics. I report the coefficient β_k for $k = 9$ from specification 2 using as dependent variable the share of people enrolled in UI 9 months after the end of compulsory maternity leave for different samples. For binary characteristics (e.g., Blue Collar), the treatment effect for the group is reported. For continuous variables (earnings, childcare availability, unemployment rate), I report the treatment effect on the sample above the median (e.g., High Unemployment). The estimated treatment effect on the full sample is reported at the bottom and coincides with the vertical dashed line.

Figure 9: Heterogeneity in Labor Market Outcomes: Participation

(a) Replacement Rate Reform



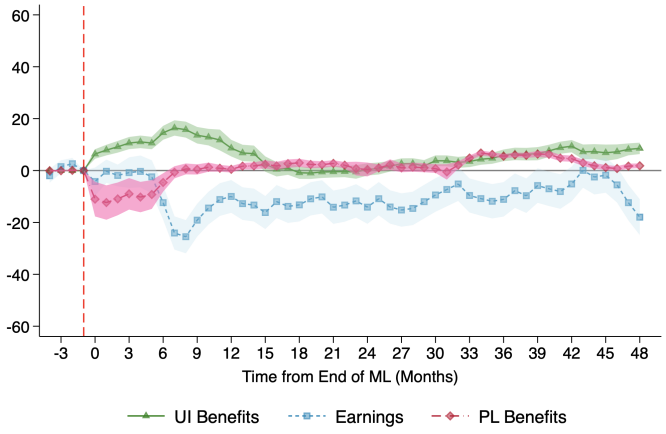
(b) Duration Reform



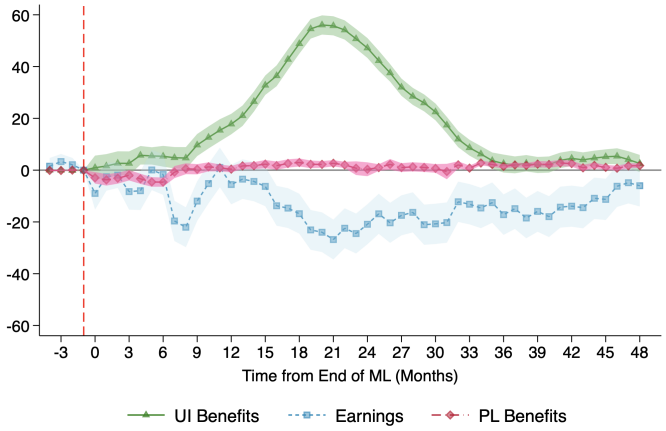
Notes: The figures show the heterogeneity in the effect of UI reforms on participation four years after compulsory maternity leave across different characteristics. I report the coefficient β_k for $k = 48$ from specification 2 using as dependent variable the share of people working for different samples. For binary characteristics (e.g., Blue Collar), the treatment effect for the group is reported. For continuous variables (earnings, childcare availability, unemployment rate), I report the treatment effect on the sample above the median (e.g., High Unemployment). The estimated treatment effect on the full sample is reported at the bottom and coincides with the vertical dashed line.

Figure 10: Effects of the Reforms on Fiscal Costs

(a) Replacement Rate Reform



(b) Duration Reform



Notes: The figures show the fiscal effects of expanding unemployment insurance through a benefit increase (Panel A) and of expanding unemployment insurance through a duration increase (Panel B). They report the estimated β_k-coefficients from specification 2 using as dependent variable the individual-level monthly UI benefits (green series), the individual level monthly PL benefits (pink series) and the gross labor earnings, as a proxy for tax revenue (blue series). Standard errors are clustered at the individual level. Shaded areas correspond to 95% confidence intervals.

Tables

Table 1: Pre-birth Characteristics: Replacement Rate Reform

Variable	(1) Control Mean/SE	(2) Treatment Mean/SE	Difference (1)-(2)
Age	33.425	33.432	-0.007
	(0.019)	(0.021)	
Tenure	22.497	22.471	0.025
	(0.022)	(0.024)	
Full Time	0.668	0.659	0.008
	(0.004)	(0.004)	
Permanent	0.936	0.934	0.001
	(0.001)	(0.001)	
White Collar	0.602	0.600	0.002
	(0.002)	(0.002)	
Blue Collar	0.316	0.315	0.001
	(0.002)	(0.002)	
Monthly Wage	1419.824	1424.736	-4.912
	(2.421)	(2.598)	
Monthly Earnings	1507.693	1510.473	-2.780
	(3.843)	(4.084)	
Days Worked	24.589	24.556	0.033
	(0.018)	(0.019)	
Small Firm	0.390	0.393	0.003
	(0.002)	(0.002)	
Observations	67,437	59,857	

Notes: The table reports summary statistics of pre-birth characteristics and labour market performance of mothers who gave birth for the first time between January and May 2012 (Control) and January and May 2013 (Treatment). Column (3) reports differences in means between treatment and control group mothers. All variables are measured before the start of compulsory maternity leave (t = –5). Monetary quantities are expressed in 2010 prices. ***, **, and * indicate significant at 1,5 and 10% level.

Table 2: Pre-birth Characteristics Duration Reform

Variable	(1) Control Mean/SE	(2) Treatment Mean/SE	Difference (1)-(2)
Age	33.497	33.490	-0.007
	(0.023)	(0.024)	
Tenure	22.613	22.552	0.059
	(0.028)	(0.030)	
Full Time	0.641	0.631	0.009*
	(0.003)	(0.003)	
Permanent	0.913	0.910	0.003*
	(0.001)	(0.001)	
White Collar	0.594	0.591	0.003
	(0.002)	(0.002)	
Blue Collar	0.308	0.308	0.000
	(0.002)	(0.002)	
Monthly Wage	1429.027	1425.064	3.962
	(3.003)	(3.083)	
Monthly Earnings	1468.003	1466.662	1.340
	(4.740)	(4.822)	
Days Worked	24.521	24.541	-0.019
	(0.022)	(0.022)	
Small Firm	0.409	0.414	-0.005
	(0.002)	(0.002)	
Observations	47,044	44,209	

Notes: The table reports summary statistics of pre-birth characteristics and labor market performance of mothers who gave birth for the first time between May and September 2014 (Control) and May and September 2015 (Treatment). Column (3) reports differences in means between treatment and control group mothers. All variables are measured before the start of compulsory maternity leave (t = −5). Monetary quantities are expressed in 2010 prices. ***, **, and * indicate significant at 1,5 and 10% level.

Table 3: UI Take-Up and Separations

Panel A	*Replacement Rate Reform*		
	Months since End of ML		
	t=0	t=6	t=12
UI take-up in t	0.005***	0.003***	-0.0001
	(0.0007)	(0.0006)	(0.0004)
Separations in t	0.0025***	-0.00006	0.0006**
	(0.0008)	(0.0005)	(0.0003)
Observations	127,294		
Panel B	*Duration Reform*		
	Months since End of ML		
	t=0	t=5	t=12
UI take-up in t	0.008***	0.003***	-0.002**
	(0.001)	(0.0007)	(0.001)
Separations in t	0.009***	0.003***	-0.0001
	(0.001)	(0.0006)	(0.0004)
Observations	91,253		

Notes: The table shows the estimated effects of increasing unemployment insurance generosity on the probability of taking up UI and separating from the pre-birth employer. Specifically, it reports the estimates of β_k coefficients from specification 2 for $k = 0$, $k = 6$ and $k = 12$. Standard errors clustered at the individual level are reported in parentheses.

Table 4: Sources of Increase in UI Take-Up

Panel A	*Replacement Rate Reform*		
	Months since End of ML		
	t=0	t=6	t=12
Share in UI	0.005***	0.014***	0.018***
	(0.0007)	(0.001)	(0.0013)
Share in PL	-0.004***	-0.006***	0.0003
	(0.0019)	(0.0016)	(0.0007)
Share Work	-0.0017	-0.0076**	-0.008***
	(0.0018)	(0.0019)	(0.0019)
Observations	127,294		
Panel B	*Duration Reform*		
	Months since End of ML		
	t=0	t=6	t=12
Share in UI	0.008***	0.016***	0.019***
	(0.0010)	(0.0015)	(0.0018)
Share in PL	-0.005***	-0.008***	-0.0012
	(0.0022)	(0.0018)	(0.0011)
Share Work	-0.0016	-0.012***	-0.011***
	(0.0022)	(0.0022)	(0.0023)
Observations	91,253		

Notes: The table shows the estimated effects of increasing unemployment insurance generosity on the share of mothers on unemployment insurance, share of mothers on parental leave and share of mothers working, over time. Specifically, it reports the estimates of β_k coefficients from specification 2 for $k = 0$, $k = 6$ and $k = 12$. Standard errors clustered at the individual level are reported in parentheses.

Table 5: Complier Analysis: Replacement Rate Reform

	Compliers C	Always-Takers AT	Never-Takers NT	Difference C-AT	Difference C-NT
Share	0.016	0.093	0.891		
Worker Characteristics					
Age	28.54	32.34	33.76	-3.85***	-5.28***
	(0.625)	(0.059)	(0.021)		
Permanent	0.917	0.903	0.966	0.0132	-0.049***
	(0.03)	(0.004)	(0.001)		
Full Time	0.426	0.611	0.676	-0.185***	-0.249***
	(0.054)	(0.006)	(0.002)		
Blue Collar	0.285	0.441	0.295	-0.161***	-0.011***
	(0.05)	(0.006)	(0.002)		
Pre-Birth Wage	1026	1227	1503	-200.9***	-476.5***
	(56.1)	(6.25)	(5.82)		
Firms Characteristics					
Small (<15)	0.80	0.64	0.36	0.15***	0.436***
	(0.05)	(0.006)	(0.002)		
High Quality Firm	0.344	0.609	0.678	-0.257***	-0.324***
	(0.059)	(0.006)	(0.0021)		
High Share Female Firm	0.658	0.596	0.479	0.062***	0.178***
	(0.055)	(0.006)	(0.002)		
Environment Characteristics					
High Childcare Availability	0.271	0.239	0.335	0.03***	-0.064***
	(0.044)	(0.005)	(0.002)		
High Unemployment Rate	0.531	0.718	0.47	-0.187***	0.061***
	(0.059)	(0.006)	(0.0022)		

Notes: This table reports characteristics of compliers, never-takers, always-takers as well as the difference between the groups based on the methodology described in Section C. Compliers are those mothers who take up UI when under the more generous regime but would not have taken up UI under the less generous regime. For each of the variables and groups, the table reports means as well as standard errors (in parentheses) based on 5,000 bootstrap replications. All variables are measured before childbirth ($t = -5$). Monetary quantities are expressed in 2010 prices. High quality firm is an indicator equal to 1 if the worker is employed in a firm whose AKM firm effect is above the median. High unemployment rate is an indicator equal to 1 if the worker is employed in a region with unemployment rate above the pre-birth year median. High childcare availability is an indicator equal to 1 if the worker lives in a region where the availability of formal childcare (for 0-3 years old children) is above the median.

Table 6: Complier Analysis: Duration Reform

	Compliers C	Always-Takers AT	Never-Takers NT	Difference C-AT	Difference C-NT
Share	0.018	0.123	0.859		
Worker Characteristics					
Age	31.941	31.541	33.963	0.401***	-2.021***
	(1.099)	(0.068)	(0.025)		
Permanent	0.981	0.914	0.966	0.085***	0.015***
	(0.059)	(0.004)	(0.001)		
Full-Time	0.364	0.560	0.654	-0.195***	-0.290***
	(0.11)	(0.006)	(0.002)		
Blue Collar	0.628	0.401	0.283	0.226***	0.344***
	(0.114)	(0.007)	(0.002)		
Pre-Birth Wage	1425	1253	1696	171.64***	-270.9***
	(192.5)	(10.8)	(6.24)		
Firms Characteristics					
Small (<15)	0.46	0.68	0.36	-0.216***	0.096**
	(0.11)	(0.006)	(0.002)		
High Quality Firm	0.499	0.552	0.671	-0.052***	-0.171***
	(0.095)	(0.007)	(0.003)		
High Share Female Firm	0.306	0.631	0.479	-0.325***	-0.181***
	(0.124)	(0.006)	(0.003)		
Environment Characteristics					
High Childcare Availability	0.188	0.260	0.281	-0.072***	-0.094***
	(0.09)	(0.006)	(0.003)		
High Unemployment Rate	0.551	0.621	0.473	-0.074***	0.078***
	(0.09)	(0.006)	(0.003)		

Notes: This table reports characteristics of compliers, never-takers, always-takers as well as the difference between the groups based on the methodology described in Section C. Compliers are those mothers who take up UI when under the more generous regime but would not have taken up UI under the less generous regime. For each of the variables and groups, the table reports means as well as standard errors (in parentheses) based on 5,000 bootstrap replications. All variables are measured before childbirth ($t = -5$). Monetary quantities are expressed in 2010 prices. High quality firm is an indicator equal to 1 if the worker is employed in a firm whose AKM firm effect is above the median. High unemployment rate is an indicator equal to 1 if the worker is employed in a region with unemployment rate above the pre-birth year median. High childcare availability is an indicator equal to 1 if the worker lives in a region where the availability of formal childcare (for 0-3 years old children) is above the median.

Table 7: Effects on Labor Market Outcomes

Panel A	*Replacement Rate Reform*		
	Months since End of ML		
	t=12	t=24	t=48
Share Working	-0.008***	-0.014***	-0.008**
	(0.0019)	(0.002)	(0.0021)
Share Working for Pre-Birth Employer	0.0003	-0.005*	-0.005*
	(0.0026)	(0.0028)	(0.0027)
Gross Labor Earnings	-7.98***	-10.87**	-14.27***
	(2.94)	(4.55)	(4.55)
Days Worked	0.10***	0.18***	0.05
	(0.038)	(0.035)	(0.031)
Daily Wage Rate	-1.48***	-0.60	-0.09
	(0.51)	(0.41)	(0.344)
Observations	125,469		
Panel B	*Duration Reform*		
	Months since End of ML		
	t=12	t=24	t=48
Share Working	-0.011***	-0.008***	-0.0017
	(0.0023)	(0.0024)	(0.0026)
Share Working for Pre-Birth Employer	-0.014***	-0.016***	-0.013***
	(0.003)	(0.003)	(0.003)
Gross Labor Earnings	-8.35	-23.78***	-8.38
	(5.31)	(5.35)	(5.44)
Days Worked	0.11***	-0.032	-0.009
	(0.044)	(0.041)	(0.041)
Daily Wage Rate	-0.165	-1.68***	-0.53
	(0.482)	(0.411)	(0.401)
Observations	91,312		

Notes: The table shows the estimated effects of increasing unemployment insurance generosity on labor market outcomes. Specifically, it reports the estimates of β_k coefficients from specification 2 for $k = 12$, $k = 24$ and $k = 48$. Standard errors clustered at the individual level are reported in parentheses. Monetary quantities are expressed in 2010 values. Days worked are defined as number of days worked conditional on employment. Daily wage rate is defined as earnings per day worked conditional on employment.

Table 8: MAGNITUDES OF EARNINGS LOSSES

	Replacement Rate Reform	*Duration Reform*
UI Take-up $\hat{\alpha}$	0.016***	0.018***
	(0.0012)	(0.0017)
Cumulative Earnings $\hat{\lambda}$	-493.5***	-662***
	(125.18)	(167.84)
Foregone Earnings $\hat{\gamma}_{DD-IV} = \frac{\hat{\lambda}}{\hat{\alpha}}$	-30,843	-36,777
Net Increase in Benefits	5,040	14,400
Observations	127,294	91,253

Notes: The table reports difference-in-difference estimates for the effect of the expansions in unemployment insurance on mothers' cumulative earnings through month 48 after the end of maternity leave ($\hat{\lambda}$). It also reports the difference-in-difference estimates for the effect of the expansions in unemployment insurance on UI take-up ($\hat{\alpha}$) and the IV-scaled coefficients for cumulative earnings $\hat{\gamma}_{IV} = \frac{\hat{\lambda}}{\hat{\alpha}}$. Standard errors are clustered at the individual level are reported in parentheses. Net increase in benefits corresponds to the average net benefit increase for compliers when they switch to UI relative to what they would have had in the counterfactual case.

Table 9: THE ROLE OF CONSTRAINTS: CHILDCARE

Replacement Rate Reform		
	High Childcare	*Low Childcare*
Foregone Earnings	-22,615	-31,833
Duration Reform		
	High Childcare	*Low Childcare*
Foregone Earnings	-12,300	-40,950

Notes: The table reports the the IV-scaled coefficients for cumulative earnings $\hat{\gamma}_{IV} = \frac{\hat{\lambda}}{\hat{\alpha}}$ (Table 8) for regions with high and low childcare (defined as above or below the median childcare level) for both reforms.

Table 10: CONSTRUCTION OF THE MVPF

	Replacement Rate Reform	Duration Reform
Costs		
UI Benefits	2160 EUR	6381 EUR
PL Benefits	-615 EUR	-177 EUR
Tax Revenue	1229 EUR	1241 EUR
Total Net Costs	2774 EUR	7445 EUR
Willingness to Pay		
WTP CB	1722 EUR	6840 EUR
WTP RP	8393 EUR	7577 EUR
MVPF		
MVPF CB	**0.62**	**0.91**
MVPF RP	**3.02**	**1.02**
MVPF no program interactions		
MVPF CB	**0.51**	**0.89**
MVPF RP	**2.48**	**0.99**

Notes: The table reports the different components used to calculate the MVPF for the replacement rate reform and for the duration reform in Section 7. WTP RP refers to the willingness to pay calculated using the revealed preference approach. WTP CB refers to the willingness to pay calculated using the consumption-based approach

Table 11: Construction of The MVPF Relaxing Optimization Assumption

	Replacement Rate Reform	Duration Reform
Costs		
UI Benefits	2160 EUR	6381 EUR
PL Benefits	-615 EUR	-177 EUR
Tax Revenue	1229 EUR	1241 EUR
Total Net Costs	2774 EUR	7445 EUR
Willingness to Pay		
$\text{WTP}_{inframarginal} + WTP_{marginal}$	-19254 EUR	-17946 EUR
MVPF no optimization		
MVPF	**-6.9**	**-2.4**

Notes: The table reports the different components used to calculate the MVPF for the replacement rate reform and for the duration reform in Section 7. WTP refers to the willingness to pay calculated using the consumption-based approach relaxing the assumption of perfect optimization.

Appendix

A Data Construction

A.1 Construction of the Dataset

I build my dataset using three primary sources of data: matched employer-employee records, maternity and parental leave registers, and unemployment insurance registers.

The unit of observation of the employer-employee matched data is the calendar month. This time aggregation poses an empirical challenge because maternity leave periods, parental leave periods, and UI benefits may be exhausted in the beginning, middle, or end of the calendar month. From the information available from the maternity and parental leave application registers, and the unemployment registers, I know the exact start and end date of each leave period. I assign each event to months in the following way:

- If I observe individuals working and on leave or unemployment insurance within the same month, I assign individuals to leave or unemployment insurance within that month if the start date of the leave period or unemployment insurance spell is before the 15th of the month
- If I observe individuals on two types of leave within the same month, I assign individuals the month to the type of leave that occupied the majority of the month

The definition of the month of the end of maternity leave is particularly important for my analysis which uses relative time from the end of maternity leave as the main time variation in the empirical strategy. Following the description above, I build the relative time variable in which $t = 0$ corresponds to the end of maternity leave in the following way:

- $t = 0$ corresponds to the last month in which I observe a maternity leave event in the matched employer-employee data if the day of the end of maternity leave reported in the maternity leave applications registered is before the 15th of the month
- $t = 0$ correspond to the month following the last month in which I observe a maternity leave event in the matched employer-employee data if the day of the end of maternity leave reported in the maternity leave applications register is after the 15th of the month

In the few cases in which I do not observe the exact date of the end of maternity leave, because I cannot match the employer-employee data with the maternity leave applications register, I assign

$t = 0$ in the following way. If I observe either parental leave events or unemployment insurance events following the end of maternity leave, I assign $t = 0$ based on information on the start date of these events. If women start working right after the end of maternity leave, I assign $t = 0$ as the last month in which I observe maternity leave. All the results are robust to the specification in which I assign $t = 0$ to the last month in which I observe maternity leave in the matched employer-employee datasets[23].

A.2 Sample Selection

My primary analysis sample imposes two main sample restrictions. First, I restrict to first births as explained in Section 3.1. The results are robust to the inclusions of higher-parity births[24]. The second sample restriction I impose is that I exclude mothers whose temporary contract expires around the end of their maternity leave. In particular, I exclude mothers whose contract expires *before* the end of maternity leave reported in the register for applications. This is because this particular set of contract terminations is not an active choice of mothers, but it is mechanical and driven by the end of the contract. Therefore, these mothers are not entitled to job protection and face different incentives than other mothers. One potential concern is that part of the results shown in Figure 5 is mechanically driven by temporary contracts ending. I believe this is unlikely because there is no reason to believe that the reforms impacted the timing of ending and duration of temporary contracts, usually set to one or two years. Second, given the restriction explained above, temporary contracts represent a small portion of my sample. Finally, in Figure A11, I report a robustness check restricting to mothers who had a permanent contract before birth.

The final dataset is a balanced panel containing all mothers who gave birth to their first child (parity one) between 2012 and 2016. The panel spans from 2 years before the end of their compulsory maternity leave to 4 years after and comprises approximately 640,000 mothers employed in the private sector before giving birth. Note that with *balanced* panel I mean that I follow a mother from 2 years before birth to 4 year after birth by observing whether she is in one of this four categories:

1. Employed in the private sector
2. On any type of leave
3. On unemployment insurance

[23] Results available upon request.
[24] Results available upon request.

4. Not employed, on leave or unemployed. Not that in this case I cannot distinguish whether a mother exited the labor force or moved to the public sector or became self-employed.

Importantly, when I refer to non-participation, except for the periods of unemployment insurance, I specifically refer to non-participation to the private sector as I cannot exclude the possibility that the mother became self-employed or moved to public employment.

B Alternative Empirical Strategy: Regression Discontinuity Design

In addition to the difference-in-differences design introduced in Section 3.2, I can use a regression discontinuity design using as cutoff the end of maternity leave date dividing fully untreated mothers to partially treated mothers (Figure A4). Following Deshpande 2016, I estimate the RD parametrically. The estimating equation is:

$$Y_i = \alpha + \beta \mathbb{1}[\tau_i \geq 0] + \sum_{k=1}^{K} \alpha_k \tau_i^k + \sum_{k=1}^{K} \alpha_k \tau_i^k \mathbb{1}[\tau_i \geq 0] + X_i' \delta + \varepsilon_i \tag{8}$$

where τ_i is the end of maternity leave date of mother i normalized so that $\tau = 0$ at the cutoff date (May 1, 2012 for the replacement rate reform and September 1, 2014 for the duration reform). τ_i^k is a polynomial of order k in the mother's end of compulsory maternity leave date. X_i is a matrix of covariates. The coefficient of interest is β, which gives the effect on Y of ending the compulsory maternity leave right before or right after the cutoff.

The key assumption for identification in an RD design is that treatment is as good as randomly assigned in a neighborhood of the cutoff and that counterfactual outcomes are smooth at the cutoff. A potential threat to the RD design is strategic manipulation of the running variable. This is unlikely in this institutional setting for different reasons. First, the unemployment insurance reforms were unexpected and hard to anticipate. Second, the possibility of UI take up within the "choice period", allowed mothers ending their maternity leave even before the actual introduction of the reform to be eligible for the more generous UI regime making threshold manipulation not necessary. Finally, the end of compulsory maternity leave date is overall hard to manipulate since it is strictly related to the exact date of birth. Unless mothers reacted to the unemployment insurance reforms by manipulating the timing of births, manipulation of the threshold is unlikely. Appendix Figure A6 shows the distribution of end of maternity leave dates around the cutoff dates (solid blue lines) and around the actual implementation of the reforms dates (dashed blue lines). On average, while there is expected seasonality across different months driven by seasonality in the number of births and an overall decrease in number of births over time, the sample of mothers ending their maternity leave around the introduction of the two reforms are balanced. I formally test for a discontinuity in the density function at the cutoff using the test proposed by McCrary (2008). As shown in Figure **??**, the McCrary test do not reject the null hypothesis of no discontinuity at the threshold. I also check for whether covariates are balanced around the cutoff. I perform a test for a number of pre-birth demographic and labor market characteristics and find that covariates are overall balanced.

C Complier Characteristics

Consider a binary variable $Z \in \{0,1\}$ that captures whether mothers are eligible for the more generous UI regime. Z effectively shifts a component of the mother's outside option $b + Z\Delta b$, by either increasing UI replacement rate or by increasing UI duration. Let $D \in \{0,1\}$ indicate if a mother takes up UI, whether she was treated or not. Let D_0 and D_1 denote the potential values that D takes from $Z = 0$ and $Z = 1$ respectively. We can characterize the three groups of mothers described above by their potential outcomes: always-takers (AT) with potential outcomes $(D_0 = 1, D_1 = 1)$ and share π^{AT}, never-takers (NT) with potential outcomes $(D_0 = 0, D_1 = 0)$ and share $\pi^{NT}$and compliers (C) with potential outcomes $(D_0 = 0, D_1 = 1)$ and share π^{C}.

In my setting, I compare eligible (c_1) and ineligible (c_0) cohorts, before and after childbirth (t_0 and t_1) respectively. Therefore, $Z = 1$ for c_1 and 0 otherwise.

I first estimate the share of always-takers, compliers and never-takers. This is easily done by running the following simple regression: $Y_i = \alpha + \gamma T_i + \varepsilon_i$, where $T_i = 1$ if i is eligible for the more generous UI regime and 0 otherwise and Y_i is an indicator equal to 1 if individual i took up UI during the *"choice period"*, namely at any $t \in [0,9]$ from the end of compulsory maternity leave. We have that $\pi^C = \hat{\gamma}, \pi^{AT} = \hat{\alpha}, \pi^{NT} = 1 - \hat{\alpha} - \hat{\gamma}$.

Next, I estimate expected value of a characteristics $x$for the three groups. Estimating the expected value of a characteristic x for *never-takers* is straightforward. All individuals in c_1 who do not take up UI in the "choice period" are never-takers if we assume that the standard monotonicity assumption in the instrumental variable literature, $(D_1 - D_0 \geq 0)$, holds. We can estimate the characteristic x of a never-taker by the corresponding sample mean $\frac{1}{N_{c_1}^{nt}} \sum_{i \in c_1} x_i 1(D_i = 0)$.

Estimating the expected value of a characteristic for always-takers and compliers is more challenging. The expected value of a characteristic x for mothers in cohort c_1 who do take up UI is a weighted average weighted average of the expected value of x for compliers and always-takers, where the weights represent the share of compliers and always-takers. Therefore the expected value of x for compliers is:

$$E^C[x] = E\left[x|D_0 = 0, D_1 = 1, c_1\right] = \frac{\pi^C + \pi^{AT}}{\pi^C} E\left[x|D_1 = 1, c_1\right] - \frac{\pi^{AT}}{\pi^C} E\left[x|D_0 = 1, c_1\right] \tag{9}$$

We can estimate the RHS of equation 9 empirically. $E\left[x|D_1 = 1, c_1\right]$ is the expected value of x for all-takers, namely all mothers taking up UI after the reform. It is possible to estimate this using

the corresponding sample mean: $\left(\frac{1}{N_{c_1}^{all-takers}}\right)\sum_{i\in c_1} x_i 1(D_i = 1)$. Calculating $E\left[x|D_0 = 1, c_1\right]$ is more difficult, because we cannot know whether a worker who takes up UI after the reform would have taken up UI before the reform. Because of monotonicity we know that individuals who take up UI before the reform, also take up UI after the reform. Therefore, if trends in x are parallel across cohorts and Z is independent from D and x, we have that $E\left[x|D_0 = 1, c_1\right] = E\left[x|D_0 = 1, c_0\right]$. This can be estimated by the corresponding sample mean $\left(\frac{1}{N_{c_0}^{always-takers}}\right)\sum_{i\in c_0} x_i 1(D_i = 1)$.

D Welfare Effects Derivation

Welfare Effect of Changes in Benefits

The government maximizes equation 4 subject to the budget constraint 5 and to the condition that the individual chooses her behavior optimally. Individual behavior is a function of PL benefits and durations, b and B, so we can write: $\tau(b, B) = \frac{L(b,B)}{T-D(b,B)}b + \frac{E}{T-D(b,B)}$.

The government problem is $max_{b,B}W(b, B, \tau(b, B))$. The marginal effect of increasing b on welfare is given by:

$$\frac{dW}{db} = \int_0^B S_t dt u^{'}(c_{l,t\leq B}) - \int_0^T [1 - S_t]\, dt v^{'}(c_e)\frac{d\tau}{db}$$

$$\frac{dW}{db} = Lu^{'}(b) - (T - D)v^{'}\frac{d\tau}{db}$$

where we use the envelope theorem. With some rearrangements we get:

$$\frac{dW}{db}\frac{1}{v^{'}(c_e)} = L \times \frac{u^{'}(c_{l,t\leq B}) - v^{'}(c_e)}{v^{'}(c_e)} - \left(\frac{dL}{db}b + \frac{dD}{db}\tau\right)$$

Normalizing by L, which is how much more it is transferred to women on leave, we get:

$$\frac{dW}{db}\frac{1}{Lv^{'}(c_e)} = \frac{u^{'}(c_{l,t\leq B}) - v^{'}(c_e)}{v^{'}(c_e)} - \left(\eta_{L,b} + \eta_{D,b}\frac{D}{L}\frac{\tau}{b}\right)$$

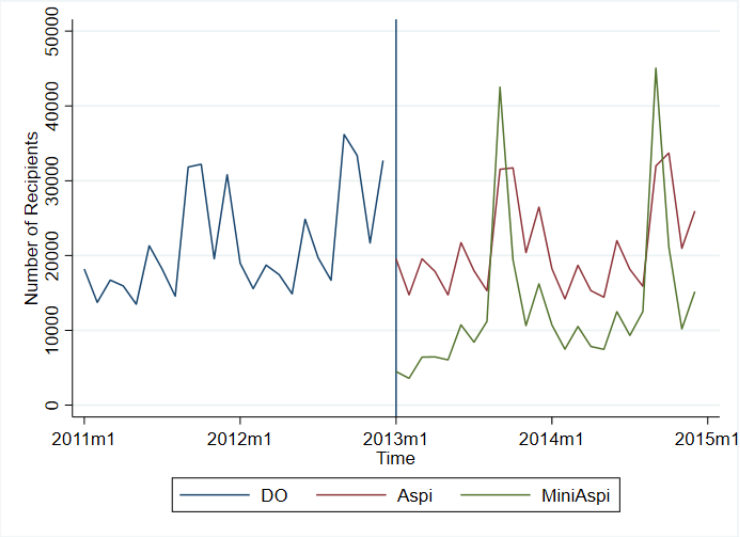
which corresponds to equation 6.

E Additional Figures

Figure A1: Example of Use of Unemployment Insurance as Alternative to Parental Leave

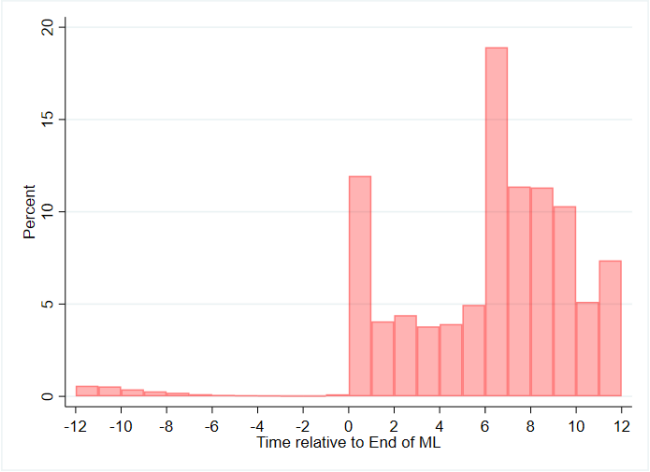
Notes: The figure shows an example of a website advertising the possibility of using unemployment insurance as an alternative to parental leave benefits.

Figure A2: Changes in UI Eligibility: Replacement Rate Reform



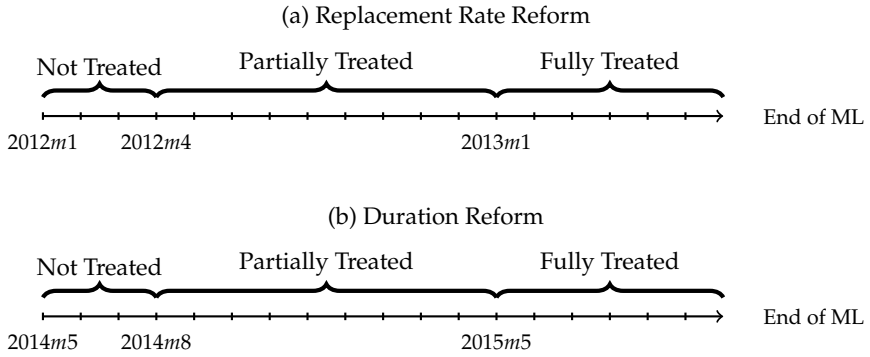
Notes: The figure reports the number of UI claims over time by women under the age of 50 before and after the replacement rate reform s distinguishing between *Aspi* and *MiniAspi.* Details on the characteristics of the subsidies are presented in Section 2.

Figure A3: Distribution of UI Take Up by Time Relative to End of ML



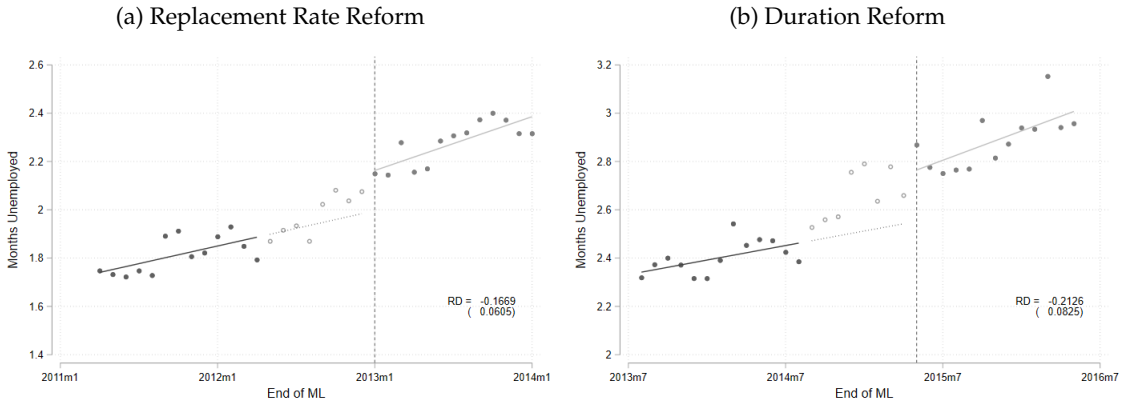
Notes: The figures reports the distribution of UI take-up by time relative to the end of compulsory maternity leave in 2012.

Figure A4: Eligibility for UI Regimes by End of Maternity Leave Date



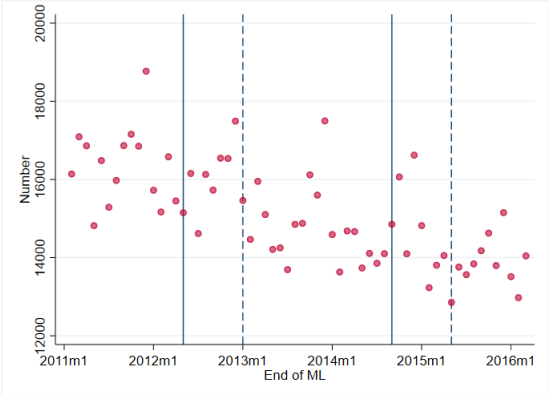
Notes: The figure illustrates for which dates the mothers were eligible for different unemployment insurance regimens, depending on the end of their maternity leave. Panel A shows the dates for the replacement rate reform. Panel B shows the dates for the duration reform.

Figure A5: Effect of the Reforms on UI Take-Up After Childbirth



Notes: The plots illustrate the share of mothers taking up unemployment insurance before their child's first birthday by month-of-end-of-ML bin for different UI regimes. The solid blue lines display quadratic spline estimates. The grey dots on the right of the cutoffs represent partially treated mothers (as shown in Figure A4). Panel A presents results for the replacement rate reform while Panel B presents results for the duration reform. The cutoffs refer to the cutoff date separating the *not treated* and the *partially treated* group as shown in Figure A4.

Figure A6: Frequency of End of Maternity Leave Dates

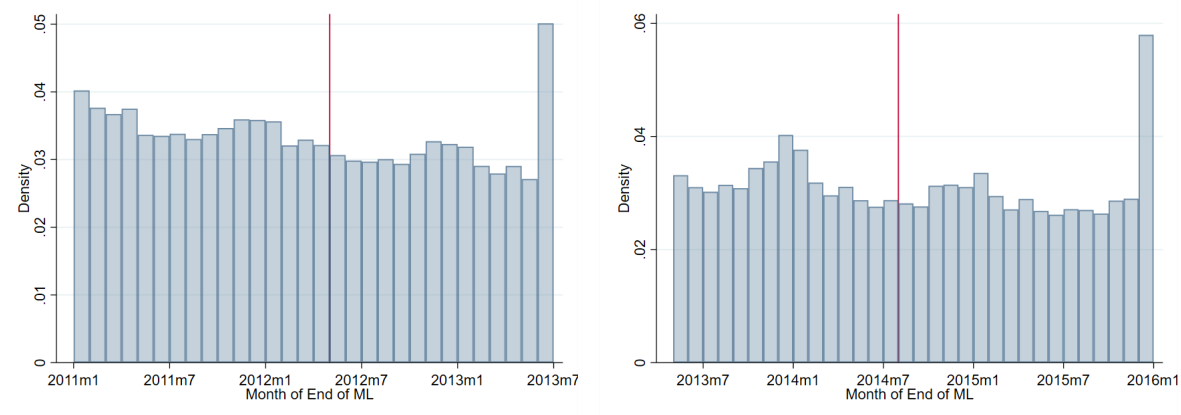


Notes: The figure reports the number of observations in each month-of-end-of-maternity-leave bin for the entire sample. The solid blue lines correspond to the cutoff dates using in the RD design specified in equation 8 (specifically to the cutoff date separating the *not treated* and the *partially treated* group in Figure A4). The dashed blue lines correspond to the actual time of introduction of the reforms (specifically to the cutoff date separating the *partially treated* and the *fully treated* group in Figure A4) for both reforms.

Figure A7: Density of End of Maternity Leave Dates and McCrary Test

(a) Replacement Rate Reform

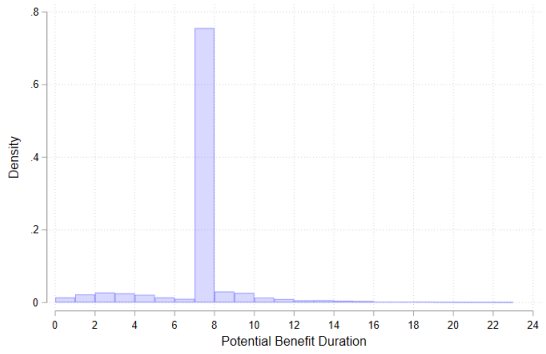
(b) Duration Reform



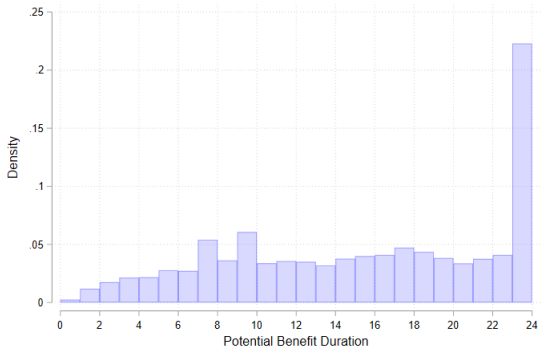
Notes: The graphs plot the density function of mothers by end-of-compulsory-maternity-leave date for the replacement rate reform (Panel A) and for the duration reform (Panel B). The test statistics (and associated p-value in parentheses) for the McCrary test of the discontinuity in the probability density function of the running variable at threshold is 0.639 (0.552) for the replacement rate reform and -0.564 (0.572) for the duration reform.

Figure A8: Distribution of UI Potential Benefit Duration

(a) Replacement Rate Reform



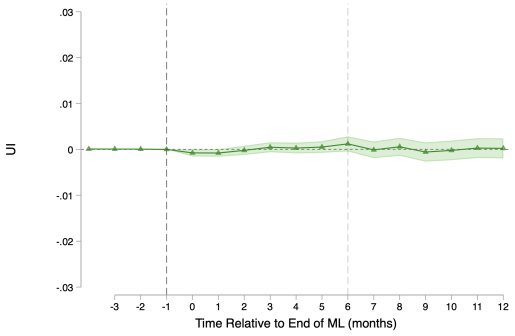
(b) Duration Reform



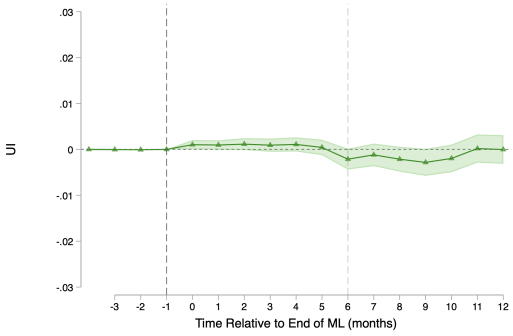
Notes: The figure shows the distribution of potential benefit duration for mothers taking up UI after the duration reform.

Figure A9: Placebo Specifications

(a) 2009-2010



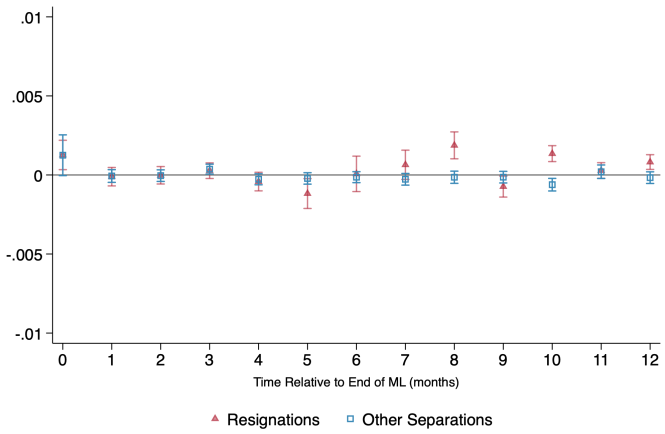
(b) 2010-2011



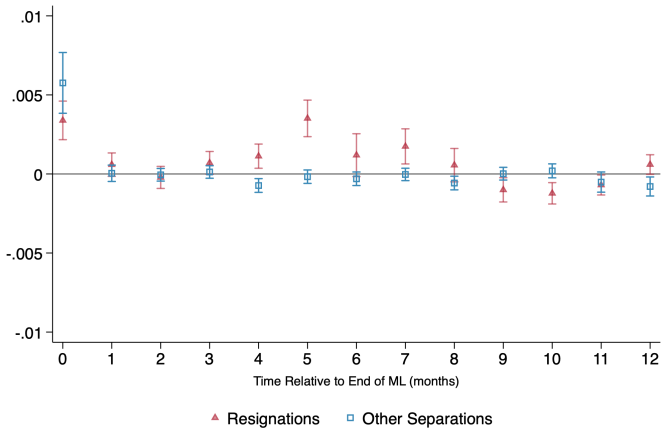
Notes: The figures report difference-in-differences estimates of the coefficients β_k from 2 where the dependent variable is the probability that a mother is on unemployment insurance at relative time t (where $t = 0$ corresponds to the time of end of compulsory maternity leave) for different placebo cohorts. The figure reports the 95% confidence intervals. Standard errors are clustered at the individual level.

Figure A10: Effects of the Reforms on Separations from Pre-Birth Employer: Decomposition

(a) Replacement Rate Reform



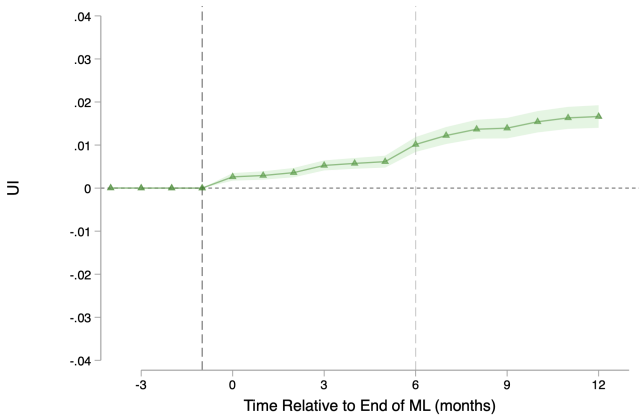
(b) Duration Reform



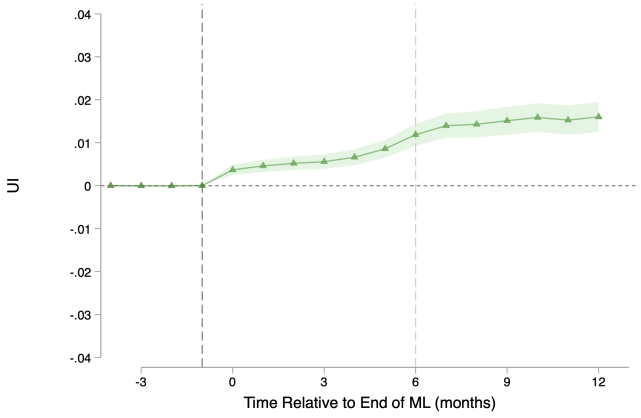
Notes: The figures report difference-in-differences estimates of the coefficients β_k from 2 where the dependent variable is the probability that a mother resigns from the pre-birth employer (triangle) or the probability that a mother separates voluntarily through other types of separations (square) at relative time t (where $t = 0$ corresponds to the time of end of compulsory maternity leave). The figure reports the 95% confidence intervals. Standard errors are clustered at the individual level. Panel A reports results for the replacement rate reform while panel B reports results for the duration reform.

Figure A11: Effects of the Reforms on UI Take-Up: Restricting to Permanent Workers

(a) Replacement Rate Reform

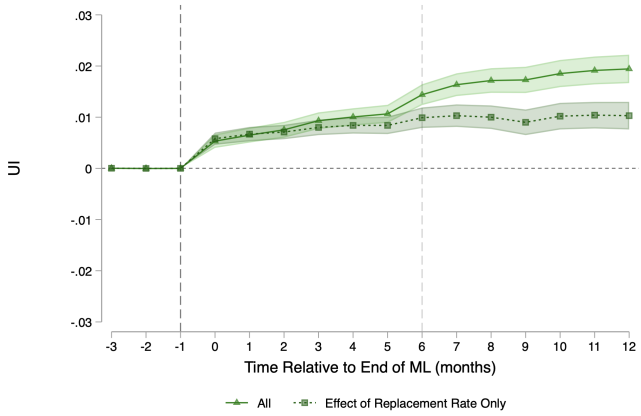


(b) Duration Reform



Notes: The figures report difference-in-differences estimates of the coefficients β_k from 2 estimated on the probability that a mother is on UI at relative time t restricting the sample to mothers with a permanent contract before childbirth. $t = 0$ corresponds to the time of end of compulsory maternity leave. Shaded areas correspond to 95% confidence intervals. Standard errors are clustered at the individual level. Panel A reports results for the replacement rate reform while panel B reports results for the duration reform.

Figure A13: Replacement Rate Reform Decomposition: Eligibility vs Replacement Rate

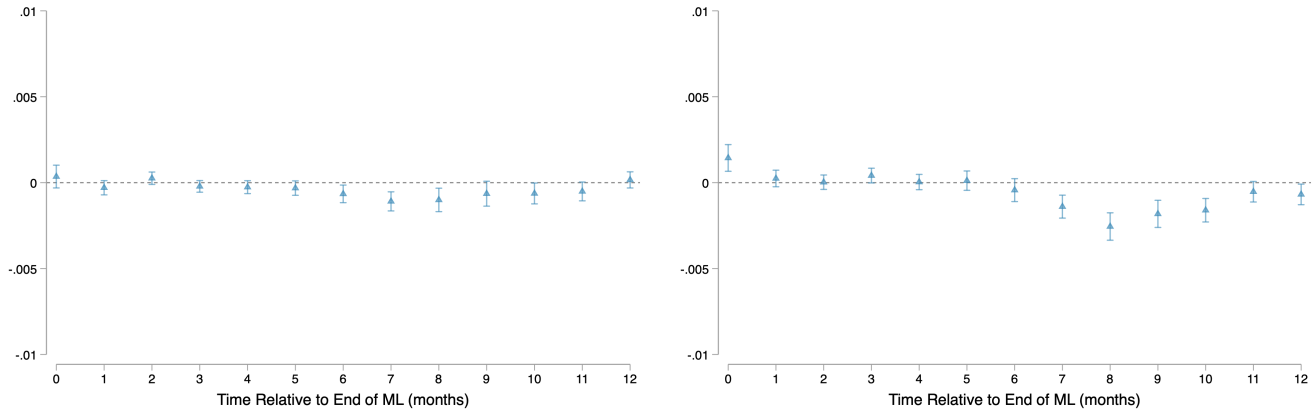


Notes: The graphs show the results of the estimation of specification 2 on take-up of unemployment insurance after the replacement rate reform. The light green series (triangle) reports the results using as dependent variable the overall unemployment insurance take-up while the dark green series (square) reports the results using as dependent variable unemployment insurance take-up excluding the take-up of *Miniaspi*. See Section 2 for details.

Figure A12: Robustness: Effect on Layoffs

(a) Replacement Rate Reform

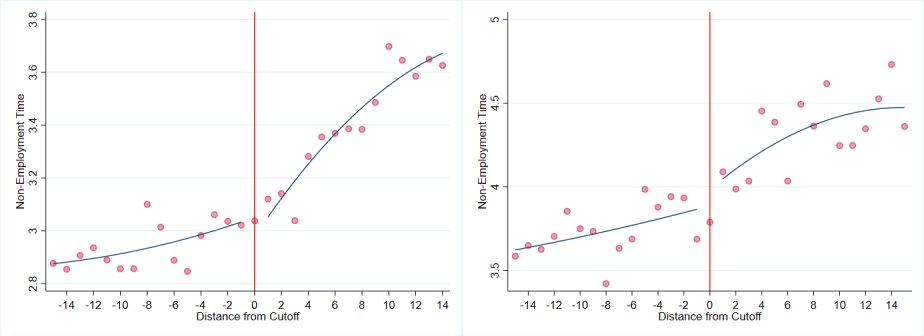
(b) Duration Reform



Notes: The figures report difference-in-differences estimates of the coefficients β_k from 2 where the dependent variable is the probability that a mother resigns or separates from the pre-birth employer through a layoff, firm closure or due to just cause at relative time t (where $t = 0$ corresponds to the time of end of compulsory maternity leave). The figure reports the 95% confidence intervals. Standard errors are clustered at the individual level. Panel A reports results for the replacement rate reform while panel B reports results for the duration reform.

Figure A14: Effect of the Reforms on Non-Participation Time

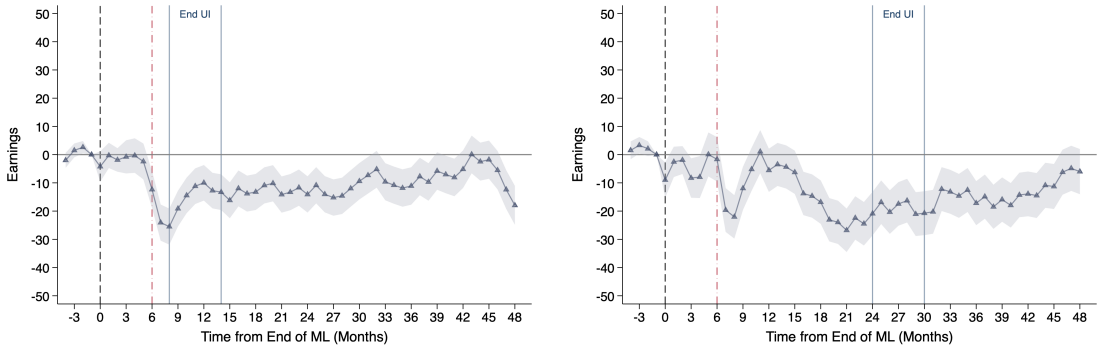
(a) Replacement Rate Reform (b) Duration Reform



Notes: The graphs show the mean value of the total time spent out of the labor force and not on parental leave after childbirth for the two reforms by month-of-end-of-compulsory-maternity-leave bin. Panel A refers to the replacement rate reform while Panel B refers to the duration reform. The solid blue lines display quadratic spline estimates. The cutoffs refer to the cutoff date separating the *not treated* and the *partially treated* group as shown in Figure A4.

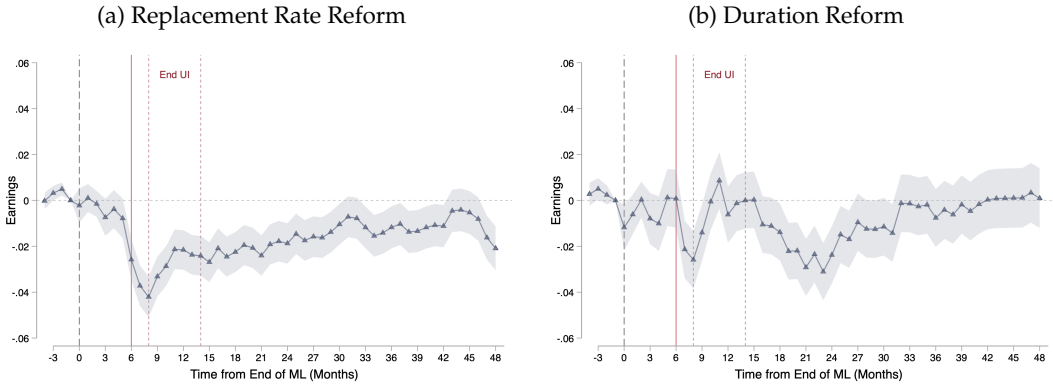
Figure A15: Effects of the Reforms on Earnings Levels

(a) Replacement Rate Reform (b) Duration Reform



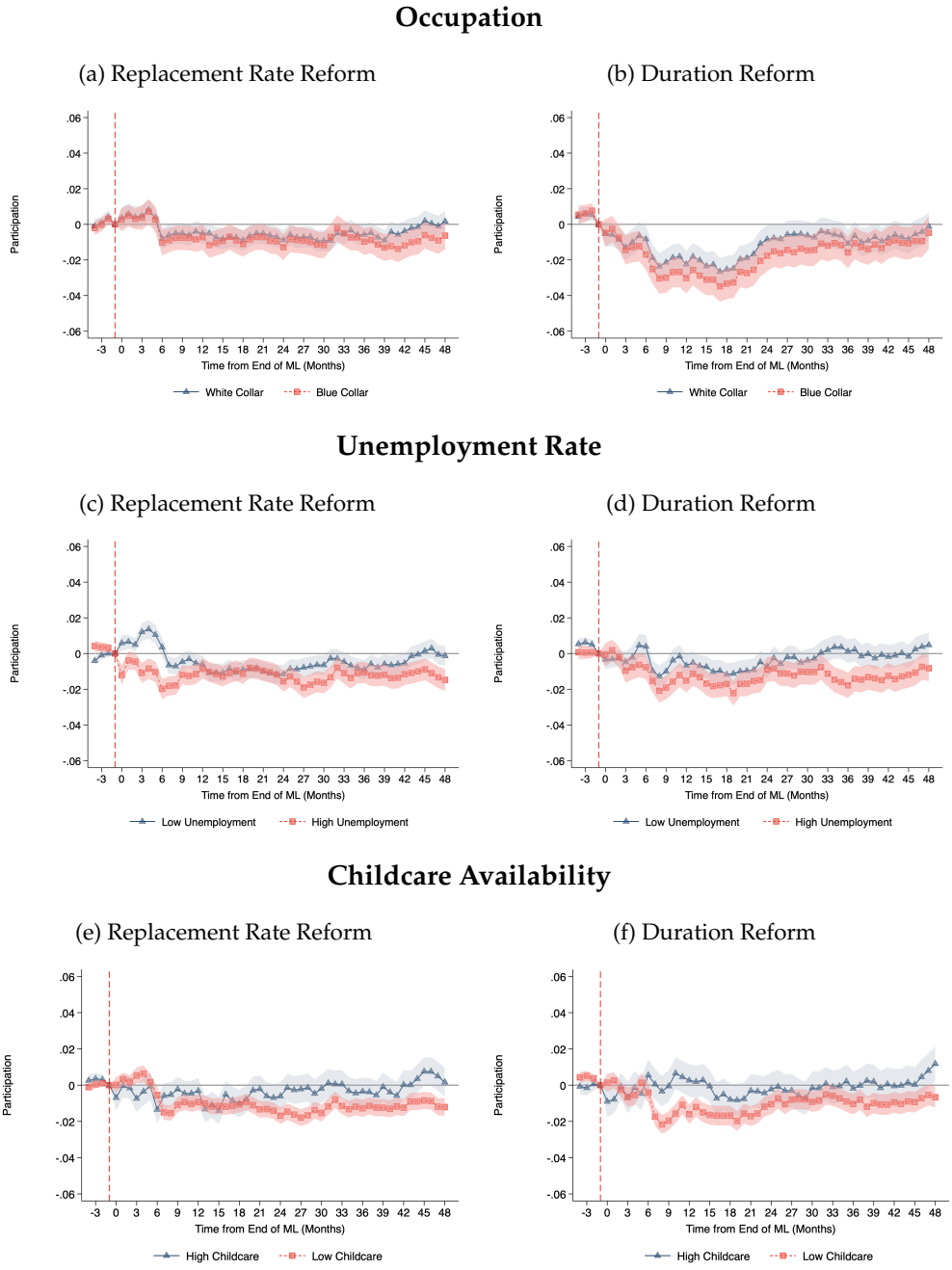
Notes: The figures show the estimated effects of increasing unemployment insurance generosity on the dynamics of female earnings for both reforms. Each panel reports estimates of β_k coefficients from specification 2, using as dependent variable gross labor earnings in levels (to include zeros from non-participation). Panel A reports the results for the replacement rate reform while Panel B reports the results for the duration reform. Shaded areas correspond to 95% confidence intervals.

Figure A16: Effects of the Reforms on Child Penalties: Fertility



Notes: The figures show the estimated effects of increasing unemployment insurance generosity on the dynamics of female earnings for both reforms. Each panel reports estimates of β_k coefficients from specification 2, normalized by the predicted earnings in the treatment group in the absence of children, $\frac{\hat{\beta}_k}{E\left[\tilde{Y}_{ik}|k,T=1\right]}$, which correspond to the percentage-point change in the child penalty at time t for women exposed to the more generous UI regime. The sample is restricted to mothers with only one child (completed fertility of one). Panel A reports the results for the replacement rate reform while Panel B reports the results for the duration reform. Shaded areas correspond to 95% confidence intervals.

Figure A17: Effects of the Reforms on Participation: Heterogeneity

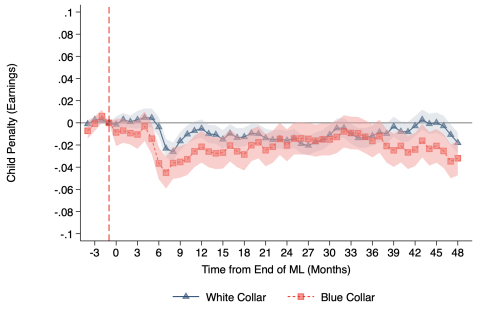


Notes: The figures show the estimated effects of increasing unemployment insurance generosity on the dynamics of female labor force participation for both reforms. Each panel reports estimates of β_k coefficients from specification 2 on the probability of working (defined as being matched with an employer, having positive earnings and not being on leave or on unemployment at time t) for different subgroups of workers. Panel A and B report the results splitting the sample by occupation. Panel C and D report the results by the pre-birth unemployment rate in the region of residence. Panel E and F report the results by childcare availability. Shaded areas correspond to 95% confidence intervals.

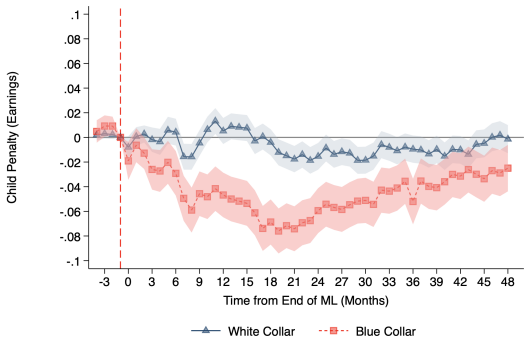
Figure A18: Effects of the Reforms on Child Penalty In Earnings: Heterogeneity

Occupation

(a) Replacement Rate Reform



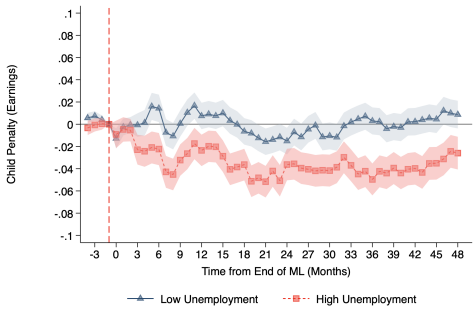
(b) Duration Reform



Unemployment Rate

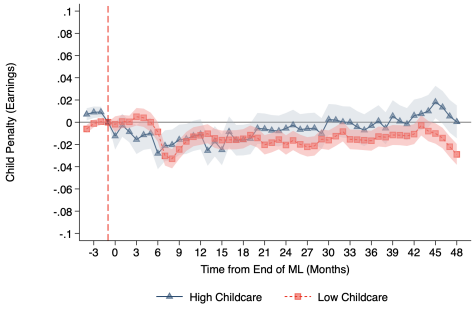
(c) Replacement Rate Reform

(d) Duration Reform

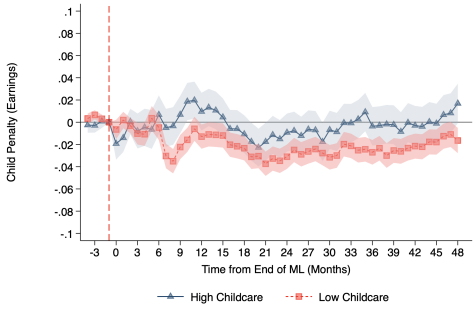


Childcare Availability

(e) Replacement Rate Reform



(f) Duration Reform



Notes: The figures show the estimated effects of increasing unemployment insurance generosity on the dynamics of female gross labor earnings for both reforms. Each panel reports estimates of β_k coefficients from specification 2 normalized by the predicted earnings in the treatment group in the absence of children, $\frac{\hat{\beta_k}}{E\left[\hat{Y_{ik}}|k,T=1\right]}$, which correspond to the percentage-point change in the child penalty at time t for women exposed to the more generous UI regime. Panel A and B report the results splitting the sample by occupation. Panel C and D report the results by unemployment rate in the region of residence. Panel E and F report the results by childcare availability. Shaded areas correspond to 95% confidence intervals.

F Additional Tables

Table A1: ILLUSTRATION OF PARTIALLY TREATED MOTHERS: REPLACEMENT RATE REFORM

	Timing of Resignations									
Date of End of ML	$t=3$	$t=4$	$t=5$	$t=6$	$t=7$	$t=8$	$t=9$	$t=10$	$t=11$	$t=12$
up to 2012m3	Old	Old	Old	Old	Old	Old	Old	Old	Old	Old
2012m4	Old	Old	Old	Old	Old	Old	Old	Old	Old	New
2012m5	Old	Old	Old	Old	Old	Old	Old	Old	New	New
2012m6	Old	Old	Old	Old	Old	Old	Old	New	New	New
2012m7	Old	Old	Old	Old	Old	Old	New	New	New	New
2012m8	Old	Old	Old	Old	Old	New	New	New	New	New
2012m9	Old	Old	Old	Old	New	New	New	New	New	New
2012m10	Old	Old	Old	New	New	New	New	New	New	New
2012m11	Old	Old	New	New	New	New	New	New	New	New
2012m12	Old	New	New	New	New	New	New	New	New	New
2013m1 onwards	New	New	New	New	New	New	New	New	New	New

Notes: The table shows how the eligibility for more generous unemployment insurance benefits changes with the end of maternity leave date and with the timing of resignations for the replacement rate reform. The new regime was effective from January 2013 onwards, implying that mothers ending their maternity leave from January 2013 were fully eligible for the reform, no matter the timing of their resignations. Mothers ending their maternity leave before April 2012 were fully ineligible for the reform. Mothers ending their maternity leave between April 2012 and December 2012 were partially eligible: they could access the more generous benefits only if they decided to resign at particular time periods. For example women ending their maternity leave in September 2012 would not be eligible for the more generous leave if they decided to resign right after the end of maternity leave but they would if they decided to resign from $t = 7$ to $t = 12$.

Table A2: ILLUSTRATION OF PARTIALLY TREATED MOTHERS: DURATION REFORM

	Timing of Resignations									
Date of End of ML	$t=3$	$t=4$	$t=5$	$t=6$	$t=7$	$t=8$	$t=9$	$t=10$	$t=11$	$t=12$
up to 2014m7	Old	Old	Old	Old	Old	Old	Old	Old	Old	Old
2014m8	Old	Old	Old	Old	Old	Old	Old	Old	Old	New
2014m9	Old	Old	Old	Old	Old	Old	Old	Old	New	New
2014m10	Old	Old	Old	Old	Old	Old	Old	New	New	New
2014m11	Old	Old	Old	Old	Old	Old	New	New	New	New
2014m12	Old	Old	Old	Old	Old	New	New	New	New	New
2015m1	Old	Old	Old	Old	New	New	New	New	New	New
2015m2	Old	Old	Old	New	New	New	New	New	New	New
2015m3	Old	Old	New	New	New	New	New	New	New	New
2015m4	Old	New	New	New	New	New	New	New	New	New
2015m5 onwards	New	New	New	New	New	New	New	New	New	New

Notes: The table shows how the eligibility for more generous unemployment insurance benefits changes with the end of maternity leave date and with the timing of resignations for the duration. The new regime was effective from May 2015 onwards, implying that mothers ending their maternity leave from May 2015 were fully eligible for the reform, no matter the timing of their resignations. Mothers ending their maternity leave before August 2014 were fully ineligible for the reform. Mothers ending their maternity leave between August 2014 and April 2015 were partially eligible: they could access the more generous benefits only if they decided to resign at particular time periods. For example women ending their maternity leave in January 2015 would not be eligible for the more generous leave if they decided to resign right after the end of maternity leave but they would if they decided to resign from $t = 7$ to $t = 12$.

Table A3: Summary Statistics for the Full Sample of Mothers

	Full Sample
Age	33.51
	(5.012)
Tenure	22.49
	(5.944)
Full Time	0.65
	(0.477)
Permanent	0.93
	(0.257)
White Collar	0.60
	(0.490)
Blue Collar	0.31
	(0.463)
Monthly Wage	1417.99
	(2970.3)
Monthly Earnings	1521.19
	(1280.4)
Small Firm (< 15)	0.39
	(0.488)
High Female Share Establishment	0.50
	(0.500)
High Quality Establishment	0.65
	(0.477)
Observations	641607

Notes: The table reports summary statistics for the full balanced sample of mothers giving birth between 2012 and 2016. All variables are measured before the start of compulsory maternity leave ($t = -5$). Monetary quantities are expressed in 2010 prices. High quality establishment is an indicator equal to 1 if the worker is employed in a firm whose AKM firm effect is above the median.

Table A4: Magnitudes of Increase in Separations

Replacement Rate Reform	
Cumulative Separations	0.03**
	(0.016)
Elasticity	0.4
Observations	127,294
Duration Reform	
Cumulative Separations	0.2***
	(0.07)
Elasticity	0.16
Observations	91,253

Notes: The table reports the pooled results of the effects of the reforms on cumulative separations up to 9 months from compulsory maternity leave. It also reports the elasticity of the level of benefits with respect to separations as well as the elasticity of the duration of benefits with respect to separations.