

# How Should We Design Parental Leave Policies?

## Evidence from Two Reforms in Italy

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### Abstract

I study the trade-off between benefit generosity and career stability in parental leave programs, leveraging a unique setting where mothers choose between parental leave with job protection and lower benefits, and unemployment insurance with higher benefits but no job protection. Using difference-in-differences around two reforms, I show that mothers respond strongly to benefit generosity and frequently forgo job protection, leading to large and persistent employment and earnings losses. A revealed-preference approach shows mothers place high welfare value on transfers, driven by liquidity and childcare constraints, but also exhibit present bias and inattention, implying policy must also account for behavioral frictions.

**Keywords:** parental leave, job protection, labor supply, valuation of welfare transfers

**JEL Codes:** J13, J18, I38, J22

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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 Sogaard, 2019). This fact has spurred increasing interest in how government interventions can mitigate the adverse effects of childbirth on women's labor market outcomes. One of the most direct policy levers available to governments for shaping mothers' labor supply decisions around childbirth are parental leave programs. These programs usually have the double objective of mitigating the financial hardships of parents when they are temporarily out of work and at the same time to keep them engaged in the labor force. Importantly, parental leave policies shape the incentives and constraints faced by mothers during a pivotal period of their life, when their decisions can have lasting consequences for their future labor market trajectories.

Designing these programs is, however, difficult. Parental leave programs operate along multiple dimensions (replacement rate, duration and job protection) and it is hard to find policy changes that help isolate the effects of these different parental leave parameters. Furthermore, we lack knowledge on the value that different parental leave parameters provide to mothers. This is partly a data problem since it is hard to find settings where mothers make explicit, observable choices between programs of different generosity, limiting the scope for revealed-preference welfare analysis. It is also a broader conceptual problem. Unlike other social programs, the benefits of parental leave extend beyond their liquidity value: for some mothers the ability to remain home with their child carries a direct value that is difficult to observe but central to understanding the welfare effects of these programs. Childbirth is also a pivotal period in life when decisions may be shaped by liquidity pressures, limited information, and behavioral biases and not necessarily by fully informed preferences. If mothers do not internalize the long-run costs of their choices, interventions calibrated to observed behavioral responses may not deliver the expected welfare gains (Mullainathan, Schwartzstein, and Congdon, 2012; Chetty, 2015). These challenges have constrained the ability to evaluate the welfare effects of parental leave and inform the optimal design of these programs.

This paper combines quasi-experimental evidence and theoretical insights to study how mothers make decisions after childbirth, what drives their valuations of different parental leave features, and what these findings imply for the design of parental leave policies. To do so, it exploits

a unique feature of the Italian social insurance system that addresses both challenges identified above. In Italy, mothers, after childbirth, face an explicit choice between programs of different generosity and with different characteristics. After taking a compulsory maternity leave, that ends three months after childbirth, mothers can choose between returning to work, taking up the standard parental leave program (*PL*) that provides them with benefits at a 30% replacement rate and job protection, or taking up unemployment insurance (*UI*), which provides them with more generous benefits, without job protection. The latter option is unique to the Italian social insurance system, which provides special unemployment insurance eligibility to mothers who *voluntarily resign* up to one year after childbirth, making the unemployment insurance program effectively equivalent to a parental leave program without job protection. Like parental leave, unemployment insurance provides mothers with income replacement after childbirth and, in practice, it can substitute or complement the standard parental leave program. Since this UI provision was reserved for mothers only (and not parents in general), mothers will be the main focus of the analysis.

I consider two 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% (*replacement rate reform*). The second reform, introduced in 2015, increased the duration of unemployment insurance from 8 months to a maximum of 24 months (*duration reform*). By varying benefit level and duration independently, while holding job protection fixed in both cases, the two reforms allow the effects of distinct parental leave parameters to be separately identified. This setting is rare in practice: the existence of two reforms that separately varied benefit level and duration allows the effects of distinct parental leave parameters to be cleanly identified and, at the same time, provides observable program choices needed for revealed-preference welfare analysis. Using administrative data on the universe of mothers working in the private sector before childbirth provided by the Italian Social Security Institute (INPS), I compare cohorts of mothers differentially exposed to the unemployment insurance reforms, before and after childbirth, within a difference-in-differences framework.

The first set of results documents how mothers respond to changes in benefit generosity. When benefits become more generous, mothers are more likely to choose programs with more generous benefits and to forgo job protection. After both reforms, the take up of UI by mothers after childbirth increases by around 10% relative to the pre-reform baseline. Mothers substitute away from PL and toward UI, forgoing job protection in exchange for higher benefits, which has immediate effects on their probability of returning to work. Interestingly, in the short-run, mothers seem

to respond similarly to an increase in the levels of benefits and to an increase in the duration of benefits.

Overall, a significant portion of mothers is willing to give up job protection for more generous benefits in the short-run. What are the implications of these choices in terms of labor market outcomes? I investigate the effects of the reforms on earnings up to four years after childbirth. Both reforms lead to long-lasting declines in earnings, most of which occur after the exhaustion of UI benefits, suggesting that mothers are unwilling or unable to return to work after the benefits expire. When decomposing the decrease in earnings along the extensive margin, intensive margin, and wage rate, I find that a sharp decrease in the probability of working is its primary driver. The results suggest that while taking up unemployment benefits brings mothers greater financial security in the short run, it costs them significant decreases in future earnings. The magnitudes are striking: marginal mothers induced to take up UI by the reforms forgo tens of thousands of euros in cumulative earnings over the four years following childbirth, a cost that far exceeds the value of the additional benefits received.

Building on these findings, I use the observed choices that mothers make after the reforms within a revealed-preferences framework to infer the within-motherhood willingness to pay for more generous benefits after childbirth (Chetty, 2008; Hendren, 2017; Fadlon and Nielsen, 2019). The extent to which mothers are willing to give up job protection and bear the associated long-run earnings costs in response to an increase in benefits reveals the implicit value of those benefits. I find a marginal benefit of 2.4 for the replacement rate reform and 0.7 for the duration reform, indicating that mothers place a high welfare value on additional parental leave transfers, particularly when transfers take the form of immediately higher benefit levels.

I find that both liquidity constraints and childcare constraints are important drivers of these high benefit valuations. Mothers in low-income households and in regions with limited childcare availability respond more strongly to benefit expansions, indicating that short-term financial needs and the cost of returning to work play a central role in shaping policy choices after childbirth. Together, these structural constraints make the immediate post-birth period one of high marginal utility of consumption, increasing the welfare value of transfers relative to job protection.

The revealed-preference approach assumes that mothers are forward-looking and make privately optimal decisions. While this is a standard assumption in revealed preference welfare analysis, it is not without loss of generality as it rules out the possibility of behavioral biases or information frictions. I directly consider the possibility that some of the choices might be driven by behavioral frictions (Gerard and Naritomi, 2021; Ganong and Noel, 2019). Information frictions

may play a role, as it may be difficult for mothers to internalize the losses associated with their leave-taking decisions (Kuziemko et al., 2018). In all these cases, within a revealed-preference framework, frictions would be wrongly attributed to mothers' valuations and bias the estimates of the MB. I directly test whether this concern is relevant in my setting by examining two behavioral patterns. First, I find that mothers' choices are largely insensitive to local labor market conditions, despite facing considerably higher long-run costs of job loss in depressed regions. Second, mothers are nearly three times more responsive to immediate transfers than to equivalent delayed benefits. These patterns are consistent with present bias, limited information and inattention. To isolate the welfare-relevant component of valuation, I focus on a subsample of mothers that are less likely to suffer from the behavioral biases mentioned above and calculate their marginal benefit for the duration reform, which is likely to be less susceptible to present-bias distortions. I find an implied marginal benefit of 0.29, considerably lower than the aggregate estimate of 0.7 for the duration reform but still meaningful, confirming that parental leave benefits retain welfare value even under conservative assumptions. Taken together, these findings imply that the aggregate MB estimates are best interpreted as upper bounds on welfare-relevant willingness to pay.

Finally, I embed these estimates in a welfare analysis following Hendren and Sprung-Keyser (2020) to assess the fiscal and welfare implications of the two reforms. The marginal value of public funds (MVPF), defined as the ratio of mothers' willingness to pay to the net fiscal cost of the policy, is 1.73 for the replacement rate reform and 0.55 for the duration reform. The difference reflects both the higher marginal benefit of immediate cash transfers and the larger fiscal externality generated by the duration reform, which induces longer spells of job displacement and greater tax revenue losses. These estimates imply that expanding the level of parental leave benefits is welfare-improving from a government perspective, while expanding benefit duration without job protection is not. Note that distinction would be lost without separately identifying the effects of the two parental leave parameters.

**Related Literature** This paper contributes to different strands of literature. It contributes to the rich literature on the effects of parental leave policies on parents' labor market outcomes (Dahl et al., 2016; Olivetti and Petrongolo, 2017; Kleven, Landais, and Sogaard, 2019; Raute, 2019; Kleven et al., 2024; Bailey et al., 2025). While many studies evaluate how the duration of parental leave affects child penalties, the evidence is mixed, often suggesting that leave extensions have a neutral or slightly negative impact on long-run outcomes (Baker and Milligan, 2008; Dahl et al., 2016; Kleven et al., 2024). This paper advances this discussion by focusing on the composition of leave

benefits. I show that when mothers are offered a choice between job-protected leave and higher-generosity unemployment insurance, a significant share opts for the latter, leading to permanent job displacement and exacerbated long-run earnings losses. The closest papers in this respect are [Lalive et al. \(2014\)](#) and [Schönberg and Ludsteck \(2014\)](#), who study the relative importance of job protection and benefit duration in Austria and Germany respectively. This paper complements their analysis by focusing more explicitly on benefit levels as a third dimension and by providing a welfare assessment of the trade-offs involved in mothers' decisions, rather than focusing solely on labor market effects. This paper also contributes to the nascent literature on the optimal design of parental leave systems. [Jørgensen and Søgård \(2024\)](#) estimate a structural household model of parents' joint willingness to pay for earmarked parental leave using Danish register data, simulating counterfactual reforms to study the intrahousehold division of leave. My paper offers a complementary but distinct approach: rather than relying on structural assumptions and counterfactual simulations, I exploit quasi-experimental reforms and observed program choices to directly identify the welfare value mothers place on benefit generosity relative to job protection. This allows me to separately quantify the welfare-relevant component of mothers' valuations from the component driven by behavioral frictions, a distinction that is central to evaluating whether expanding parental leave benefits actually improves welfare.

The paper also contributes to the welfare analysis of social insurance programs ([Baily, 1978](#); [Chetty, 2006](#); [Chetty and Finkelstein, 2013](#); [Finkelstein and Hendren, 2020](#)). A growing literature uses revealed-preference methods to estimate the welfare value of social insurance transfers in settings ranging from unemployment insurance ([Landais and Spinnewijn, 2021](#)) to survivor benefits ([Coyne et al., 2024](#); [Giupponi, 2024](#)) and disability insurance ([Haller and Staubli, 2023](#)). This paper extends this approach to the parental leave setting, a context in which choices are made at a uniquely salient and pivotal moment in the life cycle, when liquidity needs, time constraints, and uncertainty about future labor market prospects are particularly acute. This paper exploits explicit program choices to estimate mothers' willingness to pay for different benefit features. By focusing on the moment immediately after childbirth, the paper contributes to understanding how individuals make costly labor supply and program choices at pivotal life events, complementing recent work that studies maternal decision-making under limited attention and information constraints ([Costa-Ramón et al., 2024](#)).

A key contribution is to use the structure of two reforms, one that increases the value of benefits received immediately during the leave spell and one that extends benefits further into the future, to exploit variation in the timing of transfers and provide novel evidence on how present

bias and liquidity constraints shape mothers' program choices after childbirth. In this respect the paper connects to a growing literature on behavioral frictions in social insurance (Ganong and Noel, 2019; Gerard and Naritomi, 2021) and on the implications of present bias, inattention and misinformation for public policy (Mullainathan, Schwartzstein, and Congdon, 2012; Chetty, 2015; Costa-Ramón et al., 2024) providing direct evidence that behavioral frictions may inflate revealed valuations in the parental leave context and quantifying the wedge between observed willingness to pay and welfare-relevant preferences.

The paper is also related to Carta et al. (2024), who study how firms respond to the duration reform analyzed in this paper. While Carta et al. (2024) focus on the demand-side and document firm responses and statistical discrimination against young women following higher maternal quit rates, my paper focuses on the supply-side decision-making of mothers and on the welfare implications of these choices. Together, the two papers provide a complementary picture of how social insurance design around childbirth affects both maternal behavior and firms' hiring strategies.

The paper is structured as follows. Section 2 describes the institutional background. Section 3 describes the data and presents the empirical strategy. Results are presented in Section 4. Section 5 focuses on the welfare implications of the empirical findings. Section 6 discusses the mechanisms and drivers behind mothers' choices. Section 7 calculates the Marginal Value of Public Funds of the two policies. Section 8 concludes.

## 2 Institutional Background

### 2.1 Social Insurance for New Mothers in Italy

Social insurance for new working mothers in Italy comprises three main programs: compulsory maternity leave (ML), parental leave (PL), and unemployment insurance (UI).

By law, every mother must take a period of *compulsory maternity leave* (ML), lasting five months, with benefits equal to 80%<sup>1</sup> of the average daily wage in the last month before the start of the leave. This leave, which is job-protected, typically begins two months before the expected due date and ends three months after childbirth<sup>2</sup>.

After the end of the compulsory ML, mothers, as illustrated in Figure 1, have three options: they can go back to work, they can take up *parental leave* (PL), or they can take up *unemployment*

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<sup>1</sup>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.

<sup>2</sup>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.

insurance (UI).

The *parental leave* program offers families a total of 10 months of leave, which can be shared between parents. Each parent can claim up to six months of leave. If the father uses at least three months of PL, the household earns an additional month of leave, extending the total to 11 months. While PL is job-protected for its entire duration, monetary benefits are available only for six months out of the total 10 months. The monetary benefits are equal to 30% of the average daily wage before childbirth. Any additional leave beyond six months is unpaid. Despite the stated aim of the policy of encouraging fathers' take-up of PL, mothers account for around 80%<sup>3</sup> of PL beneficiaries and usually exhaust their paid leave within six months of completing compulsory ML.

The Italian system also provides special *unemployment insurance* (UI) eligibility to mothers who decide to voluntarily resign between childbirth and the child's first birthday. This is a key exception to the standard UI system as, under ordinary circumstances, workers who resign voluntarily are not entitled to UI benefits. In this context, UI offers higher income replacement rates compared to PL and similar or longer duration, making it a competitive option. Effectively, this provision transforms UI into an alternative to the standard PL program, offering income replacement after childbirth without job protection. 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). Note that only mothers, not fathers, can benefit from this exception<sup>4</sup>. While the policy aims to safeguard mothers during a period of vulnerability, it also creates incentives for mothers to leave the workforce, potentially distorting the return-to-work decision.

The Italian system therefore provides a unique environment in which, after childbirth, mothers can *choose* between programs of different generosity and characteristics. This choice takes place in the *choice period*, as represented in Figure 1, specifically between three and twelve months after childbirth.

**The UI Reforms of 2013 and 2015** In recent years, two major reforms significantly reshaped Italy's unemployment insurance (UI) system. Although neither reform explicitly focused on mothers, the resulting changes effectively serve as policy experiments that mimic expansions of paid parental leave without job protection.

The first reform, which I will refer to as the *replacement rate reform* (RR), took effect on January

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<sup>3</sup>Source: INPS.

<sup>4</sup>In 2024, eligibility was extended to fathers; however, this extension falls outside the period examined in this analysis.

1, 2013. This reform increased the UI replacement rate from 60% to 75%, while keeping eligibility requirements unchanged. For workers under 50, including new mothers, the maximum benefit duration remained fixed at eight months<sup>5</sup>. Figure A2 illustrates the impact of the reform on benefit level (Panel (a)) and benefit duration (Panel (b)) for women under 50 with a permanent contract around the introduction of the reform. The figure shows how the reform raised benefit levels due to the higher replacement rate while leaving benefit duration unchanged.

The second reform, which I will refer to as the *duration reform*, took effect on May 1, 2015. This reform modified the potential benefit duration while keeping the replacement rate basically unchanged. Under the new rules, benefit duration became directly tied to an individual's contribution history over the four years preceding their unemployment spell. Specifically, the potential duration was set at half the number of weeks worked within that period, with a maximum cap of two years.

For workers with stable and extended contribution records, this reform led to a significant increase in potential benefit duration. Panel (c) of Figure A2 confirms that the benefit level for women under 50 with permanent contracts remained unchanged, while Panel (d) highlights a substantial increase in benefit duration. On average, the reform extended the potential UI duration for this group by approximately 250 days, doubling it to around 500 days. Figure A3 further illustrates the distribution of potential benefit duration of UI benefits for mothers after the reform. On average, the new potential benefit duration was 15 months, with a median of 16 months, an almost 100% increase from previous levels. Unlike the replacement rate reform, which increased monetary benefits, the duration reform extended the length of benefits.

## 2.2 The Availability of Childcare

In Italy, formal education is mandatory starting at the age of six, coinciding with the beginning of primary school. Prior to this, formal childcare is available through two main types of institutions: nurseries, which cater to children 0-2 year-old, and kindergartens, which serve children 3-5 year-old. Nurseries can be public or private and in both cases are managed at the municipal level, operating under regional regulations and overseen by the Ministry of Welfare (Carta and Rizzica, 2018). While kindergartens are virtually free of charge for families and largely available (and therefore often considered as the first step of formal education in Italy), nurseries, either private or public, are expensive and their availability is limited. Public and private nurseries accommodate

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<sup>5</sup>For workers aged 50 and older, the maximum benefit duration was also extended

only 22.5%<sup>6</sup> of 0–2 year-old children, with less than half of this share covered by public facilities. In terms of cost, the cost of public nurseries is shared between the municipality and users, and priority for slots is given based on family income. A family with three people and two working parents with median household income spend, on average, €300 per month. Private nurseries, on the other hand, cost on average €487 per month. There is large regional heterogeneity both in terms of provision (of both public and private nurseries) and in terms of cost.

### 3 Data and Empirical Strategy

#### 3.1 Data

I use confidential administrative data from the Italian Social Security Institute (INPS) on the universe of private-sector employees. My primary data source consists of matched employer-employee records at the monthly level for the period 2009-2019. These records provide rich, detailed information for each worker-firm pairing, including: beginning and end date of the contract, reason 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); monthly earnings, days worked, and a unique firm and worker identifier. I further 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. The data also capture monthly events triggering benefit entitlements, such as maternity leave, parental leave, and sick leave. I identify maternity and parental leave events by supplementing the employer-employee records with information from maternity and parental leave applications registries. 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 and 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 a spouse identifier. This level of detail allows me to pinpoint the exact leave periods and the exact beginning and end of job protection.

I link these records to information on unemployment insurance claims from the *Sistema Percettori* database (*SIP*), which collects information on unemployment insurance spells. I observe the unemployment insurance regime (e.g., before or after the *duration reform*), its start date, potential duration, actual duration, and total amount paid for every claim.

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<sup>6</sup>Source: ISTAT.

I construct a panel of mothers' working and benefit histories at a monthly frequency by integrating the administrative datasets described above. The final dataset is a balanced panel containing all mothers who gave birth to their first child 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. Focusing on first-time mothers provides several advantages. First, the labor 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.

Table A1 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, they are mainly employed with a permanent contract (94%), 63% employed are full-time, and 61% are employed in white-collar occupations. The average monthly earnings of these mothers are 1,536 EUR. Approximately 40% of them are employed in small firms with less than 15 employees.

**Linking Households** While the main focus of the analysis will be mothers, the parental leave problem is essentially a household-level one. It is therefore key to understand how the behavior of the household changes in response to these reform. In order to do this, parents need to be linked in the data. Unfortunately, at the moment, such linking is possible for a subset of households by using information from parental leave applications. Parents can be linked in one of two cases: if part of the parental leave is claimed by the father or if the application for parental leave submitted to the Social Security Institute includes information about both parents<sup>7</sup>. Because of this, the sample of mothers who can be linked to fathers is likely subject to positive selection. Table A2 compares mothers' characteristics before childbirth in the matched and unmatched sample. Mothers in the matched sample have higher earnings, are more likely to have a full time job and are more likely

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<sup>7</sup>Providing information about both parents is not mandatory. It is enough to provide information about the parent who takes up the leave.

to be white collar.

### 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 end 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.

My primary empirical strategy is a difference-in-differences approach that compares cohorts of mothers that were *fully eligible* for the more generous unemployment insurance regime, i.e. eligible for the more generous UI benefits for the entirety of their “choice period” (Month 3 and Month 12 in Figure 1), to cohorts of mothers that were *fully ineligible* for the more generous UI regime, i.e. not eligible for the more generous UI benefits at any point of their choice period, based on their end of compulsory ML date. The treatment and control groups correspond, respectively, to the fully treated and not treated cohorts in Figure A4. Note that the reforms also create a group of *partially treated* mothers (*partially treated* in Figure A4): since mothers can take up unemployment insurance at any point within the choice period, some cohorts of mothers were only partially eligible for the more generous UI regime. These cohorts of mothers are excluded from the baseline empirical analysis.

My main empirical strategy is a difference-in-differences approach similar to Kleven et al. (2024), that compares 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:

$$Y_{it} = \alpha + \sum_{k=-L}^R \delta_k D_{it}^k + \sum_{k=-L}^R \beta_k D_{it}^k \cdot T_i + \gamma T_i + \lambda_i^m + \mathbf{X}_i' \eta + \varepsilon_{it} \quad (1)$$

where  $t$  denotes event time (where  $t = 0$  corresponds to the month of end of compulsory maternity leave),  $D_{it}^k$  is an event study indicator for each month relative to the month before the end of compulsory maternity leave and  $T_i$  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 (Figure A4)<sup>8</sup>.  $\lambda_i^m$  are month of end of maternity leave fixed effects to control for the season-

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<sup>8</sup>All results are robust to both narrower and broader definitions of both reforms’ treatment and control groups.

ality of births and to ensure any seasonal difference in choices of programs, labor supply costs, or labor market conditions driven, for example, by holidays or childcare availability, is accounted for.  $X_i'$  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. 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  $\beta_k$  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.<sup>9</sup>

The causal interpretation of the results relies on the assumption that there is no confounding trend in outcomes by birth cohort. It is possible to evaluate whether the parallel trend assumption holds in the years leading up to the end of maternity leave by looking at the coefficients  $\beta_k$  for  $k < 0$ . When using UI take-up as outcome, pre-trends cannot be observed as mothers are, by definition, employed prior to giving birth. Therefore, I leverage a different set of over-identifying restrictions and show placebo results from specification 1 using a sample of mothers who gave birth in 2009 vs. 2010 and 2010 vs. 2011.

## 4 Results

### 4.1 Responses to Changes in Unemployment Insurance Benefits

#### 4.1.1 Replacement Rate Reform

Figure 3 Panel (a) reports the estimates of the effects of the replacement rate reform on mothers' take-up of social programs and work behavior after childbirth. The green triangle series reports the coefficients  $\beta_k$  from specification 1 where the dependent variable is the share of mothers on UI. An increase in the replacement rate of UI increases the share of mothers on UI in the treatment group relative to the control group after the end of compulsory maternity leave (ML). The evolution of the effect suggests that treatment mothers are more likely to take up UI right after the end of ML and after six months from the end of ML, the latter coinciding with the exhaustion of parental leave (PL) benefits. The increase in take-up of UI after the end of compulsory maternity leave reflects a

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<sup>9</sup>While using the preceding year of a reform as the control group is common in the literature (Schönberg and Ludsteck 2014; Kleven et al. 2024), 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.

decrease in one of two margins: the probability of taking up PL and the probability of returning to work. The pink diamond series in Figure 3 shows the impact of the reform on the probability of being on PL. Up until six months after the end of ML, the increase in take-up of UI is mirrored by a similar significant decrease in the take-up of PL with no significant change in the probability of returning to work. This finding suggests that mothers who took up UI after the reform would likely have opted for PL in its absence, indicating that the reform led to a substitution between the two programs in the months immediately following ML.

The last ingredient missing to characterize the responses to the changes in UI benefits is the effect of the increase in the generosity of UI benefits on the probability of returning to work. The blue square series in Figure 3 reports the results. In the first six months after the end of ML, no significant differences are observed in the likelihood of returning to work between the treatment and control group. During this period, the reform primarily redistributes mothers between social programs without affecting their probability of working. However, switching from PL to UI significantly decreases the probability of returning to work after six months from the end of ML. Note that part of the delay in returning to work in the treatment group relative to control group is mechanical, driven by the longer duration of UI benefits (8 months) compared to PL (6 months). However, the negative effect persists after the exhaustion of UI benefits, suggesting that mothers in the treatment group who take up UI instead of PL are unable or unwilling to go right back to work after UI benefits expire.

Table 1 helps understand the magnitudes of the effects by reporting the coefficients  $\beta_k$  from model 1 on the share of mothers on UI, the share of mothers on PL, and the share of mothers working, right after the end of ML ( $t = 0$ ), five months after the end of ML and nine months after the end of ML (at the end of the *choice period*, see Figure 1). Treatment mothers are more likely to take up UI by 1.1 p.p five months after the end of ML. This increase is mirrored by a decrease in take-up of PL. At the end of the choice period, the increase in take-up of UI for treatment mothers is equal to 1.7 p.p which corresponds to an 11% increase in UI take-up relative to the baseline mean.

#### 4.1.2 Duration Reform

The results so far have shown that increasing the generosity of the monetary benefits of UI increases its take-up by mothers, decreases the take-up of PL and delays the return to work in the first year after childbirth. I now consider the effects of the duration reform, which increased the duration of UI benefits from 8 months to, on average, 15 months, leaving the level of benefits unchanged.

Figure 3 Panel (b) reports the results for the duration reform. Mothers seem to respond to the increase in the duration of benefits in a similar way as to an increase in the level of benefits. Mothers in the treatment group are more likely to take up UI right after the end of ML relative to mothers in the control group. Also in this case, there is a corresponding decrease in the take-up of PL, although less stark than in the case of the replacement rate reform. The reform also delays the return to work of treatment mothers relative to control ones. The longer duration of UI benefits after the reform (averaging 15 months, compared to six months for PL) partially explains the delay in returning to work.

Table 2 reports the coefficients  $\beta_k$  from model 1 on the share of mothers on UI, the share of mothers on PL, and the share of mothers working. Treatment mothers are more likely to take up UI by 1.4 p.p five months after the end of ML. At the end of the choice period, the increase in take-up of UI for treatment mothers is equal to 1.9 p.p, which corresponds to a 10% increase in UI take-up relative to the baseline mean.

Overall, the results indicate that when UI benefits become more generous, either in terms of *level* of benefits or in terms of *duration* of benefits, mothers choose to maximize short-term benefits, regardless of job protection. They do so by substituting the less generous PL program for the more generous UI program, which has immediate effects on their probability of returning to work.

### 4.1.3 Robustness

As mentioned in Section 3.2, the key identification assumption for the difference-in-differences model in 1 is the absence of confounding trends in outcomes by birth cohort. In a standard difference-in-differences model, this assumption is typically validated by looking at evolution of pre-trends. When using UI take-up as outcome, pre-trends cannot be observed because mothers are, by definition, not on UI before birth. Therefore, I leverage a different set of overidentifying restrictions and conduct placebo tests by estimating equation 1 comparing mothers who ended their maternity leave in 2010 with those who completed their leave in 2009, as well as mothers who ended their maternity leave in 2011 with those who ended their maternity leave in 2010. The results, reported in Figure A5, support the identification assumption by showing no significant trends in UI take-up across these placebo birth cohorts.

Additionally, the main results are robust to using broader and narrower time windows for the definitions of treatment and control groups, as shown in Figure A7. Results are also robust to adjusting for changes in macroeconomic conditions at the time of re-entry into the labor market by controlling for the local unemployment rate in the region of pre-birth employment before

childbirth.

Another potential concern is that the increase in UI take-up is not driven by active choices of mothers but rather by firings by firms. In particular, it could be that firms become more likely to fire women after the reforms. If this is the case, we would expect to see differences in separations that are not impacted by workers' decisions (layoffs, firm closures, separations for just cause<sup>10</sup>). Figure A6 shows this is not the case and provides suggestive evidence that choices by mothers drive the increase in UI take-up.

## 4.2 Effects on Labor Market Outcomes

The findings presented so far suggest that when the generosity of benefits increases, in terms of level or duration, many mothers choose to forgo job protection for higher benefits in the short run. What are the implications of making this choice in terms of labor market outcomes in the longer run? This is a key question to understand what type of trade-off mothers face when making decisions after childbirth, the effect of different parental leave policies on mothers' career trajectories, and the fiscal cost of the reforms for the government in terms of tax revenue.

I estimate specification 1 using monthly gross labor earnings as dependent variable, specified in levels in order to keep the zeros from non-participation. Figure 4 plots the coefficients  $\beta_k$  normalized by the predicted earnings in the treatment group in the absence of children:  $\frac{\beta_k}{E[\tilde{Y}_{ik}|k,T=1]}$ , where  $\tilde{Y}_{ik}$  is the predicted outcome when omitting the contribution of the event time dummies (Kleven, Landais, and Sogaard 2019, Kleven et al. 2024).

### 4.2.1 Replacement Rate Reform

Figure 4 Panel (a) reports the estimates of the effects of the replacement rate reform on earnings. The solid red line indicates the time of exhaustion of parental leave benefits, while "End of UI" indicates the time window of exhaustion of UI benefits if mothers resign during the choice period (between  $t = 0$  and  $t = 9$ ). The figure shows that the earnings of the treated cohorts are not significantly different from those of the control cohorts before the end of ML and up to six months after the end of ML. This is consistent with mothers in the treatment group moving from PL to UI, creating a *reshuffling* between social programs in the first six months from the end of compulsory ML but no significant differences in return to work patterns. After the first six months from the end of ML, the earnings of the treated cohorts significantly decrease relative to the control cohorts.

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<sup>10</sup>Note that these types of separations are exempt from the job protection rule mentioned above: mothers can be fired even during the protected period for one of these reasons.

The negative effect is persistent even after the exhaustion of UI benefits, though the earnings gap narrows somewhat as some mothers return to work. Despite this partial recovery, the gap remains, with a persistent negative effect observed up to four years after the end of compulsory maternity leave. Four years after the end of maternity leave, treated mothers' earnings are 2% lower than controls' mothers earnings relative to before the end of maternity leave.

What drives the negative and persistent effect on earnings? Figure 5 Panel (a) reports the results of the estimation of specification 1 using as dependent variable the probability of working.<sup>11</sup> The pattern of the impact of the reforms on participation closely mimics the results on earnings, suggesting that a decrease in labor force participation primarily drives the decrease in earnings.

Table 3 decomposes the effects on earnings into the extensive margin response, intensive margin response and wage rate. Since the administrative data do not provide information on hours worked, I use days worked conditional on employment to measure the intensive margin of employment. The wage rate is defined as earnings per day worked conditional on employment. The table reports the estimates of the  $\beta_k$  coefficients from equation 1 at  $k = 12$ ,  $k = 24$ , and  $k = 48$ . The table shows no effect on days worked one year and two years after the end of ML. Four years after the end of ML, there is a small negative effect on days worked in the treatment group relative to the control group. The table also reports the effects on the daily wage rate. While there is a slight negative effect at  $t = 12$ , there are no significant differences at  $t = 24$ . Four years after the end of ML, there is a small negative effect on the daily wage rate in the treatment group relative to the control group. Taken together, the decomposition confirms that the persistent earnings penalty is almost entirely an extensive margin phenomenon: treated mothers are less likely to be working at all, rather than working fewer days or at lower wages conditional on employment.

#### 4.2.2 Duration Reform

Figure 4 Panel (b) reports the result for the duration reform. The pattern broadly mirrors that of the replacement rate reform. Earnings of treated and control mothers evolve in parallel during the first six months after the end of ML, before diverging sharply as mothers in the treatment group delay their return to work. The negative effect persists well beyond the exhaustion of UI benefits. However, four years after the end of maternity leave, the gap almost closes. As for the replacement rate reform, the effect on earnings is closely mimicked by a decrease in participation. Table 4 reports the results on the intensive margin and the wage rate. The duration reform does

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<sup>11</sup>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  $t$ .

not seem to have any effect on the intensive margin, as measured by the days worked. In terms of the wage rate, while there is a negative effect  $t = 24$ , there are no significant differences four years after the end of ML.

Taken together, the results paint a consistent picture across both reforms. While taking up UI provides mothers with greater financial security in the short run, it comes at the cost of significant and persistent earnings losses driven almost entirely by reduced labor force participation. The bulk of these losses occur after the exhaustion of UI benefits, pointing to the loss of job protection, rather than the mechanical effect of being on leave longer, as the primary mechanism.

**Magnitude of Earnings Losses** After the reforms, mothers become more likely to choose policies providing more generous benefits in the short run, giving up job protection. While this brings them higher financial security in the short run, this comes at the cost of higher earnings losses in the longer run. Table 5 quantifies the magnitude of these losses by documenting the earnings foregone by marginal mothers in the four years following childbirth when they take up unemployment insurance and lose job protection. The first row of Table 5 uses the compact version of equation 1 to estimate the effect of the UI reforms on cumulative earnings up to four years after the end of compulsory maternity leave.

Following the replacement rate reform, mothers lose on average €494 in cumulative earnings, while the duration reforms reduce earnings by €662 on average. Scaling these estimates by the share of marginal mothers implies much larger losses at the individual level: mothers induced by the reforms to take up unemployment insurance forgo approximately €28,000 in earnings after the replacement-rate reform and about €35,000 after the duration reform over the four years following childbirth. Comparing these losses to the corresponding increase in benefits received by marginal mothers allows us to quantify the economic trade-off underlying their policy choices.

## 5 Welfare Implications

### 5.1 A Revealed-Preference Approach for Estimating the Value of Parental Leave Transfers

Building on the empirical evidence in Section 4, I now use a revealed-preference approach to infer the within-state value of more generous benefits along the lines of (Chetty, 2008; Hendren, 2017; Fadlon and Nielsen, 2019). The key insight is that mothers' decisions to give up their jobs following an increase in benefits' generosity can reveal the implicit valuation of the transfer in the mother-

hood state, as measured by the gap in the marginal utility between low and high benefit regimes. I exploit variation in benefit generosity to evaluate a mother's willingness to pay for more generous benefits relative to a counterfactual mother eligible for lower benefits. To do so, I develop a very simple model designed to capture the key trade-offs and intuitions underlying mothers' program choices<sup>12</sup>.

Let  $V = u(c) - 1\{p = 1\}\phi(\theta)$  represent the mother's utility, where  $p = 1$  if a mother chooses to take up UI after birth and give up her job (forgoing job protection) and  $p = 0$  if a mother chooses to take up PL and remain employed. Let  $\phi(\theta)$  be the net cost of giving up the job and losing job protection, which depends on the mother's type  $\theta \sim F(\theta)$ . Note that  $\phi(\theta)$  incorporates multiple components: the cost of searching for a new job, childcare savings from not returning to work, and preferences for spending time at home with the child. The budget constraint is  $c = y(p) + B + 1\{p = 1\}b$  where  $y(p)$  is the mother's income,  $B$  are the baseline benefits when  $p = 0$  and  $b$  are the additional UI benefit (relative to the baseline) when  $p = 1$ .

Let  $V(p)$  denote the indirect utility function. A mother will decide to take up UI and give up her job after childbirth if:

$$V(1) - V(0) \geq \phi(\theta)$$

So a mother decides to take up UI and give up her job when the value of additional consumption from UI benefits outweighs the cost of losing job protection. This is equivalent to a threshold rule where a mother decides to leave her job if and only if  $\phi(\theta) \leq \bar{\phi}$ .

Calling  $\Phi = F(\bar{\phi})$  the participation rate, Appendix A shows that the marginal benefit (MB) can be written as:

$$MB = \kappa \frac{\Phi^{high}}{\Phi^{low}} - 1 \quad (2)$$

where  $\kappa = \frac{|\varepsilon(\Phi^{low}, b^{low})|}{|\varepsilon(\Phi^{high}, b^{high})|} \frac{f(\bar{\phi}^{low})}{f(\bar{\phi}^{high})}$  captures the relative elasticities across benefit regimes, with  $\frac{\varepsilon(\Phi^s, b^s)}{b^s} = \frac{f(\bar{\phi}^s)}{\Phi^s} \frac{\delta \bar{\phi}^s}{\delta b}$  for  $s \in \{low, high\}$ <sup>13</sup>.

This expression shows that the value of benefits is proportional to the labor supply response

<sup>12</sup>The model is kept simple but can be extended and generalized to multiple periods, which may better fit the analysis of the duration reform. However, the main mechanisms and ideas behind the results are unchanged.

<sup>13</sup>Note that this is practically equivalent to following the approach of [Hendren \(2017\)](#) and [Giupponi \(2024\)](#) and estimating the MB using the following formula:  $MB = \frac{\partial \Phi}{\partial b} b$ , where  $\varepsilon$  is the semi-elasticity of labor force participation to labor earnings. I will show that the results I obtain using the two methods are very similar.

to increased benefit generosity after childbirth. Larger labor supply responses indicate higher valuation of additional benefits in the motherhood state. Intuitively, the extent to which mothers undertake costly action, such as forgoing job protection and bearing significant long-run earnings losses, to increase their consumption in the high-benefit state provides a measure of the utility gain from more generous transfers.

In the empirical implementation I follow [Fadlon, Nielsen et al. \(2015\)](#) and make the simplifying assumption that  $\kappa = 1$ . Using this assumption, it is possible to write:

$$MB \simeq \frac{b^{high} \Phi^{low}}{b^{low} \Phi^{high}} - 1 \quad (3)$$

Note that this approach holds the state of nature fixed (within motherhood) and therefore allows for welfare analysis of parental leave benefits that are robust to state-dependent preferences. This is particularly important as there is evidence that, for example, mothers may not fully internalize the costs of parenting after the childbirth shock occurs ([Kuziemko et al., 2018](#)).

**Empirical Implementation** For the empirical implementation, I use the moments estimated in Section 4 for labor force participation. Using formula 3, I estimate a marginal benefit if  $MB^{RR} = 2.4$ <sup>14</sup>. This implies that the additional value a marginal unit of transfer is valued at €2.4, suggesting that additional parental leave benefits provide a very high value to marginal mothers who take up the program.

In contrast, for the duration reform, I find a marginal benefit equal to  $MB^{Duration} = 0.7$ <sup>15</sup>. This suggests that the additional value of a marginal unit of transfer in terms of duration is valued at €0.7 for mothers. These results show that there is a clear discrepancy between the value mothers put on higher benefits and the value mothers put on longer benefits.

It is useful to compare these values to those found for other social insurance schemes. In the context of disability insurance [Haller and Staubli \(2023\)](#) find a MB between 2.2 and 3.4 in line with the MB I estimate for the replacement rate reform. In the context of survivor benefits [Coyne et al. \(2024\)](#) and [Giupponi \(2024\)](#) find a MB between 0.23 and 0.37. Compared to the literature, the estimates for the population of mothers are large, suggesting that motherhood is a state with high marginal utility of transfers compared to job protection. This suggests first, that increasing the level of parental leave programs would deliver considerable welfare gains. Second, the estimate

<sup>14</sup>If instead I calculate  $MB^{RR} = \frac{d\Phi}{d\epsilon} b$ , using  $\epsilon = 0.77$  from [Blundell et al. \(2016\)](#),  $MB^{RR} = 2.7$

<sup>15</sup>If instead I calculate  $MB^{Duration} = \frac{d\Phi}{d\epsilon} b$ , using  $\epsilon = 0.77$  from [Blundell et al. \(2016\)](#),  $MB^{Duration} = 0.8$

might also pick up the fact that the value of parental leave benefits might go beyond the pure liquidity value and capture also other preferences.

## 6 Interpreting Mothers' Choices: Mechanisms

### 6.1 The Role of Constraints

Having established the aggregate valuations, I now turn to understanding what drives them. I start by examining the roles of two potential drivers of mothers' choices: liquidity constraints and childcare availability.

**Liquidity Constraints** One primary explanation for the high valuation of short-run benefits is that mothers are liquidity constrained and unable to smooth consumption perfectly across the period of childbirth. In this context, UI benefits provide a critical increase in cash-on-hand when the marginal utility of consumption is highest. To test for the presence of these constraints, I proxy for a household's ability to smooth consumption using its position in the household income distribution.<sup>16</sup>

Figure 6 panel (a) shows the effect of the replacement rate reform on the take-up of UI by mothers in the first year after the end of ML, for each of the three terciles of the household income distribution. Mothers in the lowest income tercile are significantly more likely to take up UI in response to higher benefit levels than those in the top tercile. This steep gradient suggests that for low-income households, the liquidity effect is a primary determinant of their decisions.

Figure 6, panel (b) shows a flatter relationship for the duration reform. While low-income mothers remain more likely to take up UI, the differences across terciles are not statistically significant.

The divergence in behavioral responses across the two reforms provides a suggestive test for the importance of liquidity constraints. Mothers exhibit a significantly higher sensitivity to immediate transfers (the replacement rate reform), compared to the "deferred" liquidity provided by the duration reform. This suggests that, after childbirth, the demand for cash-on-hand is so high that mothers are willing to forgo the significant long-term value of job protection to secure immediate liquidity. Consistent with the theoretical framework, these results suggest that mothers prioritize short-term benefits, even when such a choice carries substantial future costs.

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<sup>16</sup>As explained in Section 3.1, due to the structure of the data, the sample of mothers which I can link to the corresponding fathers and for which I can calculate household income is likely to be positively selected.

**Childcare Availability** Beyond liquidity, the behavioral response to these reforms likely reflects the significant “cost of working” immediately following childbirth. If childcare is unavailable or expensive, the utility cost of returning to work increases. I investigate this mechanism by examining the correlation between UI take-up and local childcare availability. If childcare constraints are a primary driver of UI take-up, we would expect the treatment effects of the reforms to be larger in regions where formal childcare is scarce since the implicit cost of returning to work is higher in those regions.

Figure 7 reports the effect of the reforms on UI take-up for mothers by availability of formal childcare for children aged 0-2 year-old. Availability of formal childcare is measured as the percentage of 0–2 year-old children that both public and private nurseries can accommodate, by region.<sup>17</sup> Regions with availability of childcare above the median are categorized as *High* childcare regions and regions with availability of childcare below the median are categorized as *Low* childcare regions.

Figure 7 panel (a) reports the results for the replacement rate reform. The figure shows that the effect of the replacement rate reform on UI take-up is significantly higher in regions with low childcare than in regions with high childcare. Figure 7 panel (b) reports the results for the duration reform, where the decreasing relationship between UI take-up and availability of childcare is also pronounced. Because the duration reform extends the timeframe a mother can remain at home, it directly addresses the structural constraints created by a lack of nurseries. In regions where childcare is scarce, the implicit cost of returning to work is so high that the option to forgo job protection in exchange for extended benefits becomes particularly attractive. In regions with low provision, the UI system seems to function as a second-best childcare subsidy.

## 6.2 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 (Ganong and Noel, 2019; Gerard and Naritomi, 2021 specifically in the context of unemployment insurance). Mothers might lack information when making their choices, or they might not optimize 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. In this section, I explore the possibility that the observed responses by mothers might be affected by behavioral biases. I

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<sup>17</sup>Italy has 20 regions, which correspond to the NUTS2 level.

directly test whether this concern is relevant in my setting by examining two behavioral patterns.

**Inattention** I first examine whether the decision to forgo job protection varies with local labor market conditions. Theoretically, the cost of losing job protection  $\phi(\theta)$  should be significantly higher in depressed labor markets where the probability of re-employment is lower. One would expect that higher regional unemployment rates would lead to a lower take-up of UI, as mothers internalize the increased difficulty of finding a new job after benefits are exhausted.

Figure 8 shows the heterogeneity in the take-up of UI by levels of regional unemployment rate. The observations are divided in two groups: below and above the median regional unemployment rate. The figure shows that, for both reforms, the responses are strikingly similar across different labor market conditions (in fact that the take-up seems to be slightly higher where regional unemployment is higher). This provides suggestive evidence that mothers do not incorporate local re-employment probabilities into their leave decisions.

To further explore this, I test whether the realized costs, in terms of labor force participation and foregone earnings, are uniform across regions. Figure 9 shows that mothers in high-unemployment regions suffer significantly larger losses following the reforms. This contrasts the near-identical take-up responses shown in Figure 8 and provides suggestive evidence that mothers in depressed labor markets face a substantially higher “price” for the same benefit, in terms of long-run career costs. This disconnect between behavior and realized economic cost is difficult to reconcile with full information and rational optimization. It suggests instead that mothers fail to fully incorporate local re-employment risk into their leave decisions, whether due to inattention or limited information. This suggests that the valuations derived in Section 5 are likely inflated by optimization frictions and might be interpreted as upper bounds of the true welfare gains.

**Present Bias** In a rational model, mothers should respond to the total net present value of transfers, not their timing. In a standard  $\beta - \delta$  model, if mothers are exponential discounters ( $\beta = 1$ ), a mother should be equally responsive to €1 received immediately and €1 received later, after discounting. If instead mothers are present-biased ( $\beta < 1$ ), they will over-weight immediate transfers relative to deferred ones of equal present value, leading to excess sensitivity to the replacement rate reform, whose gains are realized immediately upon taking leave, relative to the deferred gains from the duration reform, which accrue only in the extended months of the spell.

I test this prediction by comparing behavioral responses to the two reforms after normalizing by their total net present value. Using a standard monthly discount rate of 0.995, I calculate the ra-

ratio of responses  $\frac{\frac{d\Phi^{RR}}{db_{NPVRR}}}{\frac{d\Phi^{Duration}}{db_{NPVDuration}}}$  and find a ratio of 3.6, with the response to the replacement rate reform being significantly larger. This suggests that mothers are more than three times more sensitive to benefits realized immediately than to those realized later in the leave period. This asymmetry is difficult to explain with rational discounting alone and constitutes suggestive evidence of present-biased behavior.

To quantify the degree of impatience required to rationalize mothers' behavior under a purely exponential discounting model, I calculate the implied monthly discount factor  $\delta$  consistent with the observed trade-off between current benefits and foregone future earnings. For the replacement rate reform, rationalizing the observed behavior would require  $\delta = 0.86$ . This means that mothers would need to value €100 received next month as worth only €86 today. For the duration reform, the implied  $\delta = 0.95$ , which while still somewhat low relative to standard estimates, is considerably closer to the range documented in the literature. The stark difference between the two implied discount factors is itself informative of the fact that a single exponential discount rate cannot simultaneously rationalize mothers' responses to both reforms, pointing directly to present bias as a more appropriate framework.

A quasi-hyperbolic  $\beta - \delta$  discounting model can reconcile these patterns. The gap between the two implied discount factors is consistent with a present-bias parameter  $\beta$  in the range documented in other social insurance settings (Ganong and Noel, 2019; Gerard and Naritomi, 2021), suggesting that it is present bias rather than extreme impatience that drives the differential responses to the two reforms. This suggests that the aggregate MB of 2.4 likely overstates the welfare-relevant value of immediate transfers.

**Rational and Behavioral Mothers** The evidence presented in this section suggests that the high aggregate valuations of parental leave benefits reflect both welfare-relevant and distortion-driven components. On the welfare-relevant side, liquidity constraints, childcare scarcity, and preferences for time at home all contribute to high marginal utility of parental leave benefits. Mothers facing liquidity and childcare constraints have high marginal utility of additional resources, and the high MB they exhibit reflects real welfare gains from the policy. Present bias and inattention to labor market risk, by contrast, represent optimization failures that inflate the aggregate MB beyond its welfare-relevant component. A conservative welfare-relevant benchmark should try to correct for the latter two distortions. To provide such a benchmark, I estimate MB for the subsample of mothers least likely to be affected by these two behavioral distortions. To address inattention to

labor market risk, I focus on mothers in regions with low unemployment rates, where the evidence above suggests that the gap between actual and perceived re-employment risk is smallest. To address present bias, I focus specifically on responses to the duration reform, which is likely to be considerably less susceptible to present-bias distortions than the replacement rate reform, since its gains accrue in future months of the spell rather than immediately. For this group, I find an implied  $MB^{Duration} = 0.29$ , considerably lower than the aggregate estimate of 0.7 for the duration reform, confirming that inattention to labor market risk and present bias together account for a meaningful share of the aggregate valuation.

Taken together, the evidence suggests that the high aggregate valuations of benefits reflects both welfare needs and, at least in part, optimization failures rather than true preferences. For this latter component, simply raising benefit levels risks exacerbating long-run career costs without delivering commensurate welfare gains. Effective policy design should therefore target the structural sources of constraint while accounting for the behavioral frictions that shape mothers' decisions after childbirth.

**Ruling Out Evolving Preferences** A potential concern is that mothers' taste for staying at home may be state-dependent, increasing with time spent with the child. If the act of taking leave endogenously strengthens the preference for staying home, the high MB estimates would partly reflect policy-induced preference changes rather than pre-existing welfare-relevant valuations, overstating the true welfare gains from more generous benefits. The institutional setting and the comparison between the two reforms provide strong evidence against this channel. First, mothers in both the treatment and control groups remain at home for five months of compulsory maternity leave and are therefore exposed to the same initial bonding shock before the UI choice is made. Any difference in subsequent program choices between the two groups cannot therefore be attributed to differential bonding during the initial leave period. Second, if evolving tastes for parenting were the primary driver, we would expect a significantly larger behavioral response to the duration reform, which extends the leave period by an average of seven additional months and therefore facilitates a substantially longer bonding period. Instead, mothers are three times more responsive to the replacement rate reform after NPV normalization. This suggests that immediate financial trade-offs and liquidity needs, rather than policy-induced changes in stay-at-home preferences, are the primary drivers of mothers' decisions to forgo job protection, at least for the margin of choices studied here.

## 7 Fiscal Externalities and the Marginal Value of Public Funds

In the last part of the paper, I follow the approach of [Hendren and Sprung-Keyser \(2020\)](#) to consider the welfare impact of the two reforms analyzed. To quantify the effect of the reforms on welfare, I use the Marginal Value of Public Funds (MVPF), which is defined as:

$$MVPF = \frac{Benefits}{Net\ Government\ Costs}$$

To estimate the denominator, I use reduced-form estimates (following the same strategy highlighted in Section 3.2) of the reforms on UI spending, tax revenues, and spending on other social programs (mostly PL), which quantify the cost/savings from program interactions ([Inderbitzin, Staubli, and Zweimüller, 2016](#)).

For the replacement rate reform, the estimates indicate that the reform leads to an increase in UI benefits of €291.96, while at the same time decreasing tax revenue in the four years after childbirth by €162.85. Importantly, some mothers after the reforms switch from PL to UI, and therefore the government saves around €43 in PL benefits. The estimates indicate an implied fiscal externality of  $(162.85 - 43)/291.96 = 0.41$  per euro of transfer. Given the estimated MB, this implies a MVPF of 1.73. Similarly, for the duration reform, I estimate an increase in UI benefits of €756.56, a decrease in tax revenue of €218.46, and a decrease in the use of PL of €20. The estimates imply a fiscal externality of 0.26 and an MVPF of 0.55, as reported Table 6. The difference between the reforms reflects both the higher marginal benefit of immediate cash transfers and the larger fiscal externality generated by the duration reform, which induces longer spells of job displacement and greater tax revenue losses.

These estimated MVPF are higher than most social programs targeting adults (unemployment insurance, disability insurance, survivors benefits). They are also higher than the estimated MVPF for maternity leave by [Paradisi \(2021\)](#). Note that the MVPF estimates presented here capture only the fiscal and welfare effects of the reforms for mothers. Note that a more complete evaluation would incorporate broader effects on fertility, child development, household-level outcomes and long-run family outcomes, which are beyond the scope of this paper.

## 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. Leveraging the unique institutional

setting of Italy, where mothers can opt for higher unemployment insurance (UI) benefits in exchange for forgoing the job protection of standard parental leave, I provide revealed-preference estimates of the value mothers place on parental leave parameters.

My empirical findings demonstrate that mothers are highly responsive to the composition and generosity of benefits. Following reforms that increased UI replacement rates and duration, mothers significantly increased their take-up of UI, substituting away from protected parental leave. While this choice provides immediate financial security, it carries a substantial long-term cost. Marginal mothers induced to take up UI forgo tens of thousands of euros in cumulative earnings over the subsequent four years. This earnings loss is almost entirely driven by the extensive margin, as the loss of job protection leads to permanent labor market detachment and persistent non-employment after benefits expire.

Using a revealed-preference framework, I find that the aggregate welfare value mothers place on these benefits is high, with marginal benefits of 2.4 for replacement rate increases and 0.7 for duration extensions. These high valuations are not merely a matter of preference but are rooted in structural constraints: liquidity-constrained households and mothers in regions with scarce childcare are the most likely to forgo job protection for immediate cash. For these women, the UI system acts as a “second-best” childcare subsidy and a source of liquidity when the marginal utility of consumption is high.

The analysis also reveals that revealed preferences may overstate the true welfare-relevant value due to behavioral frictions. I document that mothers are nearly three times more responsive to immediate transfers than to equivalent delayed ones and appear to underweight local labor market risks when making leave decisions, patterns consistent with present bias and misinformation about the long-run costs of job loss. When focusing on forward-looking, unconstrained mothers, the implied marginal benefit drops to 0.29.

These results carry concrete policy implications. First, expanding the level of parental leave benefits, rather than their duration, delivers higher welfare returns, both because immediate transfers are more valuable to liquidity-constrained mothers and because benefit-level expansions generate smaller fiscal externalities. Second, because present bias and inattention inflate mothers’ revealed willingness to pay beyond its welfare-relevant component, simply raising benefit levels risks exacerbating long-run career costs for the mothers least equipped to bear them. Policies that address the underlying frictions, such as information provision at the point of birth, defaults that favor job-protected leave, or expanded childcare subsidies that reduce the cost of returning to work, may deliver welfare gains that are both larger and more durable than benefit expansions

alone.

Finally, note that the paper does not take into account the effects of parental leave policies on, for example, fertility decisions and children's outcome, nor analyzes the problem at the household-level. These are important limitations that lie beyond the scope of this paper.

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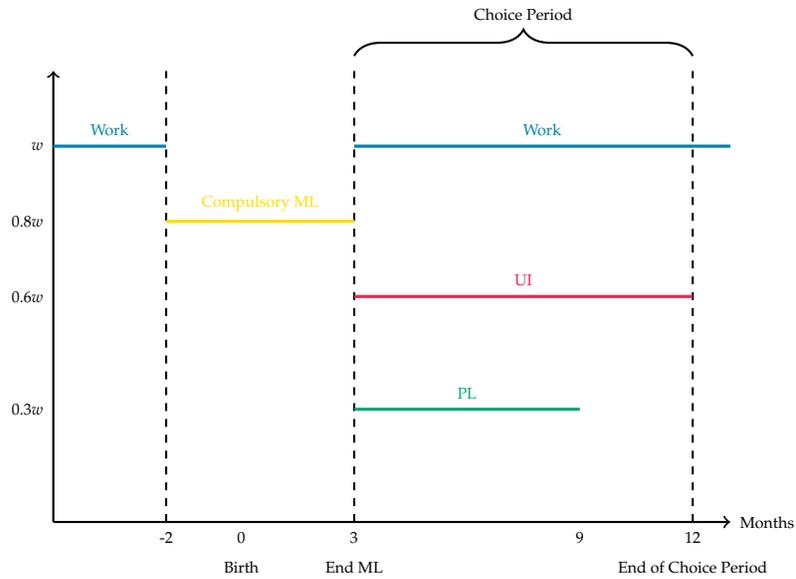
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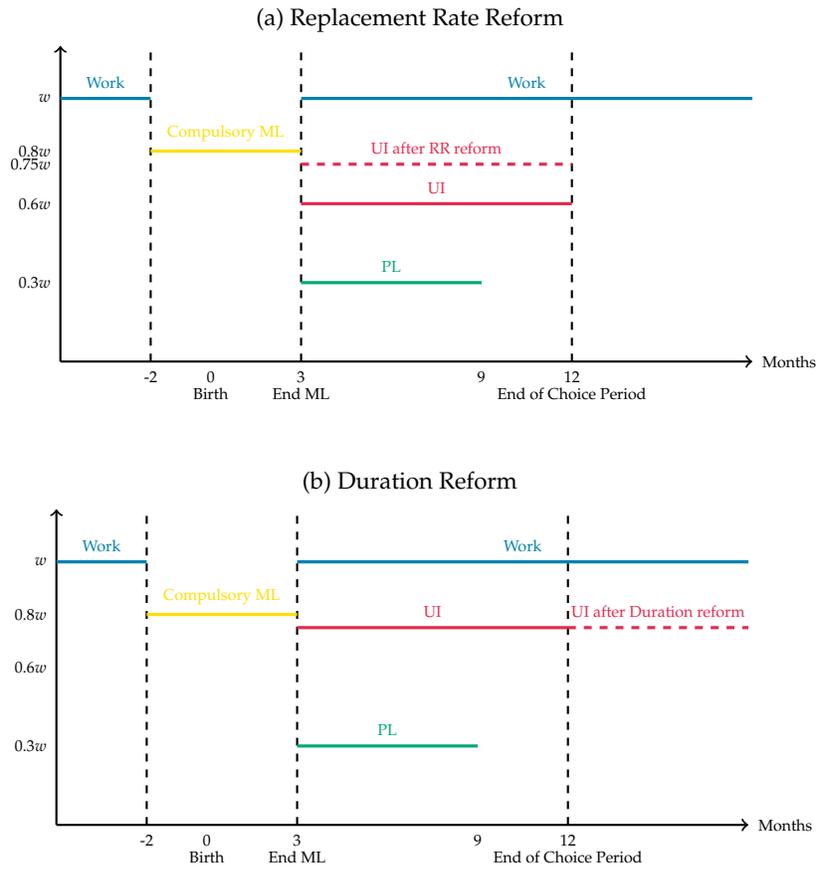
# Figures

Figure 1: TIMELINE



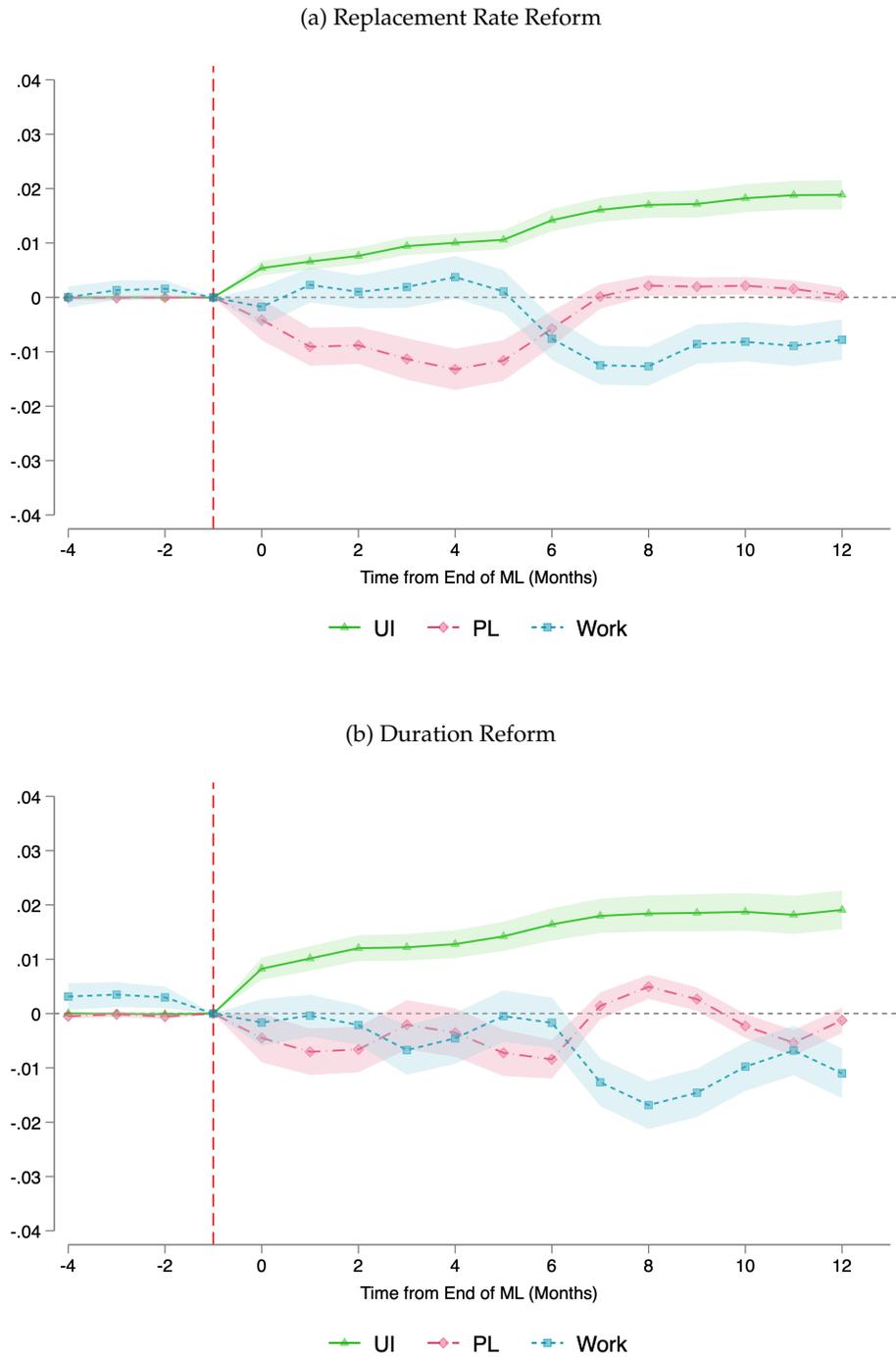
*Notes:* The figure shows the timeline of programs and options available to mothers around childbirth. Denoting the time of childbirth with  $t = 0$ , mothers are compelled to use maternity leave between  $t = -2$  and  $t = 3$ . Between  $t = 3$  to  $t = 12$  mothers can choose to return to work, to use parental leave, which lasts 6 months, or to take up unemployment insurance. Mothers can choose to resign and take up unemployment insurance at any time up to  $t = 12$  (“choice period”). The y-axis indicates the benefit level as a share of the wage  $w$  for each option. See Section 2 for details.

Figure 2: EFFECTS OF THE REFORMS ON OPTIONS FOR MOTHERS



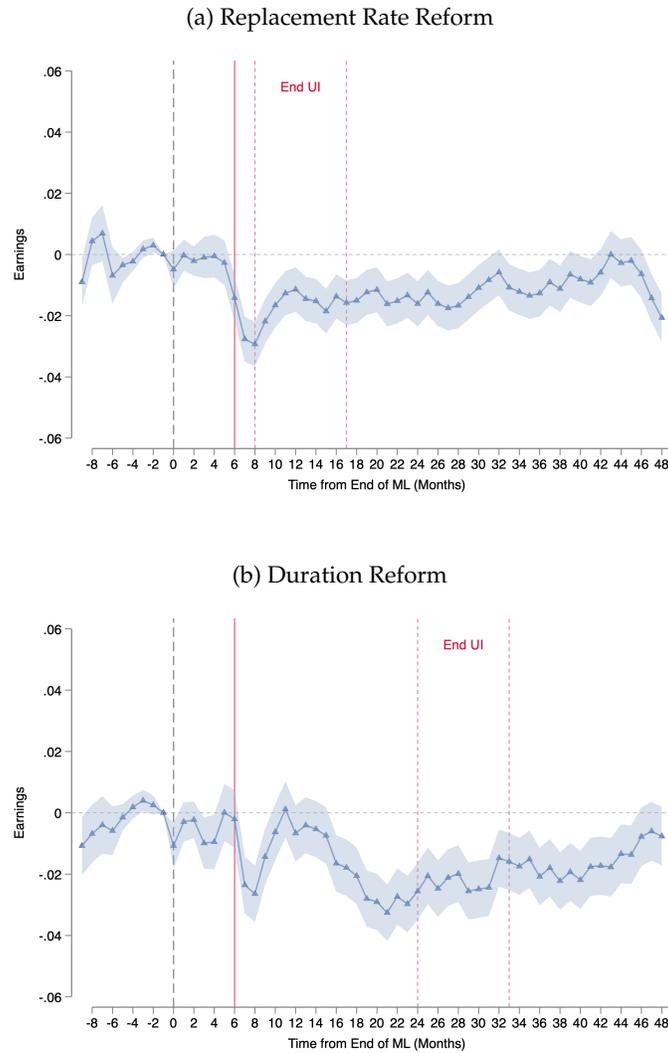
Notes: The graphs illustrate how the unemployment insurance reforms impacted the policy space for mothers after childbirth.  $t = 0$  corresponds to the time of childbirth. From  $t = 3$  onwards women can choose to go back to work, take up PL or take up UI. Panel (a) shows the effect of the replacement rate reform, which increased the replacement rate of UI from 60 to 75% 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. The y-axis indicates the benefit level as a share of the wage  $w$  for each option. See Section 2 for details.

Figure 3: RESPONSES TO CHANGES IN UI BENEFITS



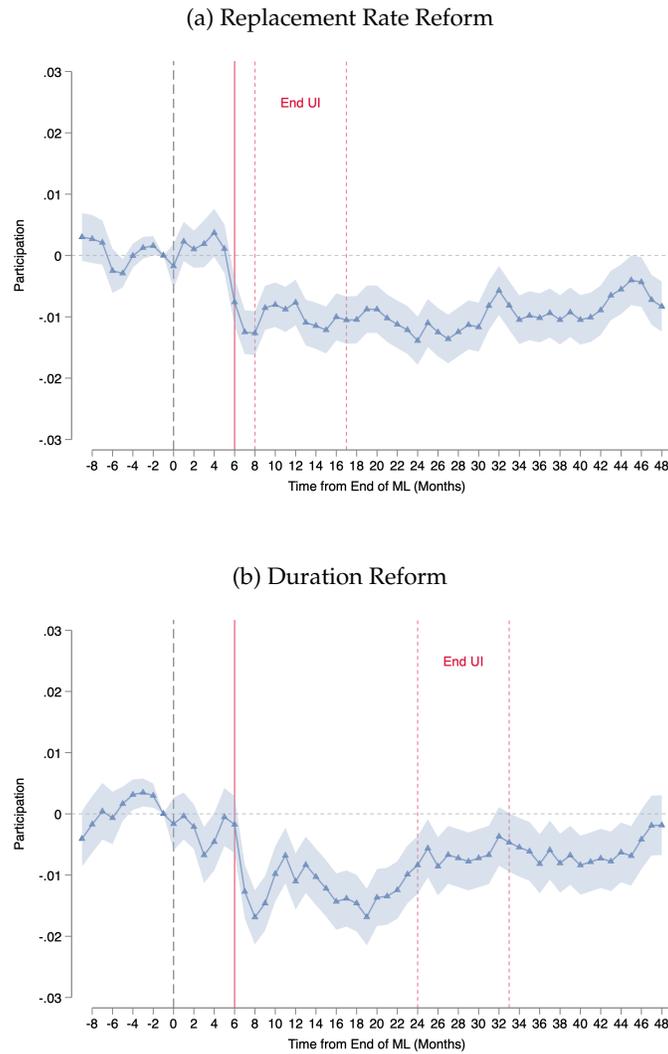
Notes: The figures report difference-in-differences estimates of the coefficients  $\beta_k$  from specification 1 estimated on three different dependent variables: the probability that a mother is on UI at relative time  $t$  (green series), the probability that a mother is working at relative time  $t$  (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 4: EFFECTS OF THE REFORMS ON EARNINGS



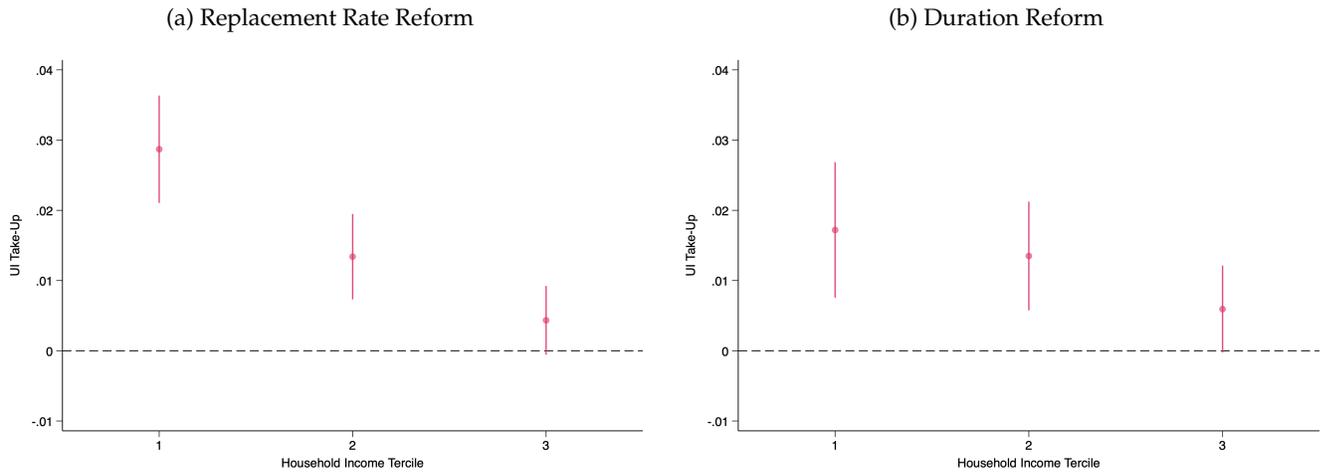
Notes: The figures report the estimates of  $\beta_k$  coefficients from specification 1 on gross labor earnings in levels, normalized in the following way:  $\frac{\hat{\beta}_k}{E[\bar{Y}_{ik}|k,T=1]}$ . This allows to interpret the coefficients as the percentage change in the earnings at time  $t$  for mothers exposed to the more generous UI regime. Shaded areas correspond to 95% confidence intervals. The red solid vertical line corresponds to the time of exhaustion of parental leave benefits if taken at  $t = 0$ . The “End UI” range characterizes the relative time periods that correspond to the exhaustion of UI benefits if mothers take up UI at any point during the “choice period”. Panel (a) reports the results for the replacement rate reform, Panel (b) for the duration reform.

Figure 5: EFFECTS OF THE REFORMS ON EMPLOYMENT



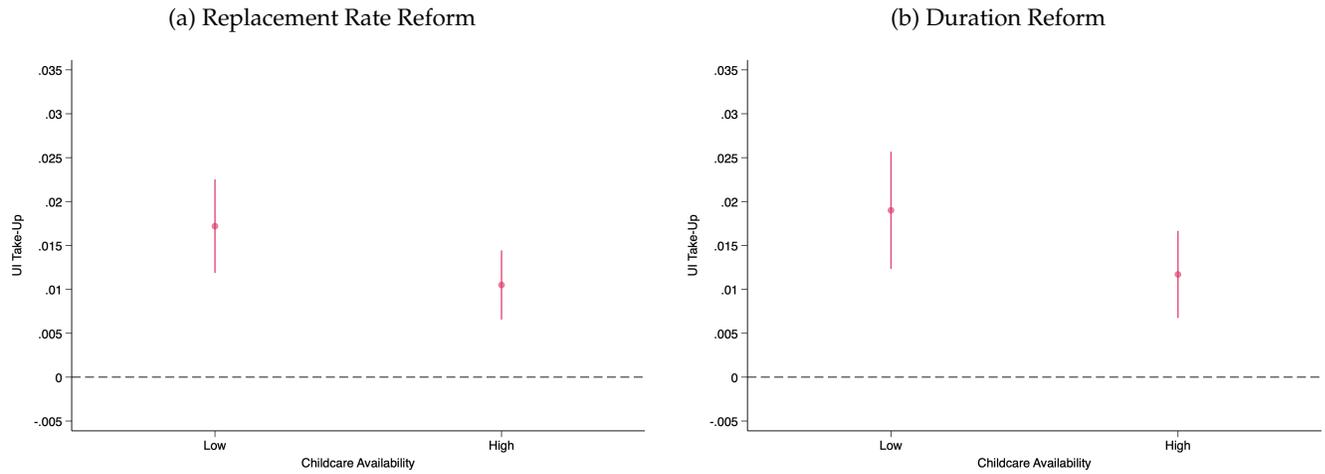
Notes: The figures report the estimates of  $\beta_k$  coefficients from specification 1 on participation. Shaded areas correspond to 95% confidence intervals. The red solid vertical line corresponds to the time of exhaustion of parental leave benefits if taken at  $t = 0$ . The “End UI” range characterizes the relative time periods that correspond to the exhaustion of UI benefits if mothers take up UI at any point during the “choice period”. Panel (a) reports the results for the replacement rate reform, Panel (b) for the duration reform.

Figure 6: THE ROLE OF LIQUIDITY CONSTRAINTS



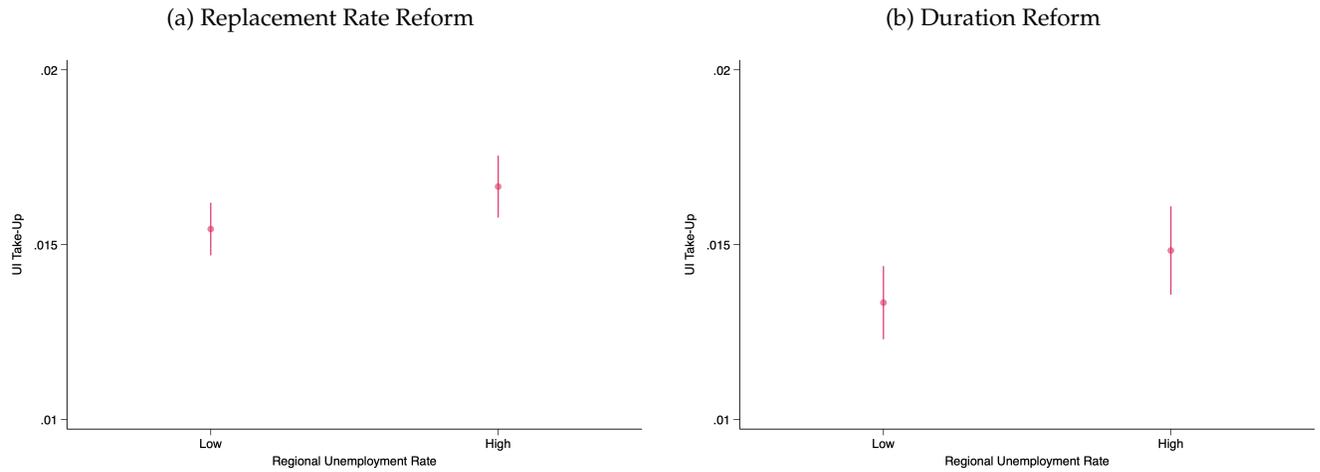
*Notes:* The figure shows the effect of increasing the generosity of unemployment insurance on the take-up of UI in the four years after the end of ML by tercile of household income. The graphs report the estimates of the compact version of specification 1, that collapses the relative time dummies into a single indicator for the post-end of ML period, on the probability of taking up UI after the end of compulsory maternity leave by tercile of household income. Panel (a) reports the results for the replacement rate reform, Panel (b) for the duration reform.

Figure 7: THE ROLE OF CHILDCARE AVAILABILITY



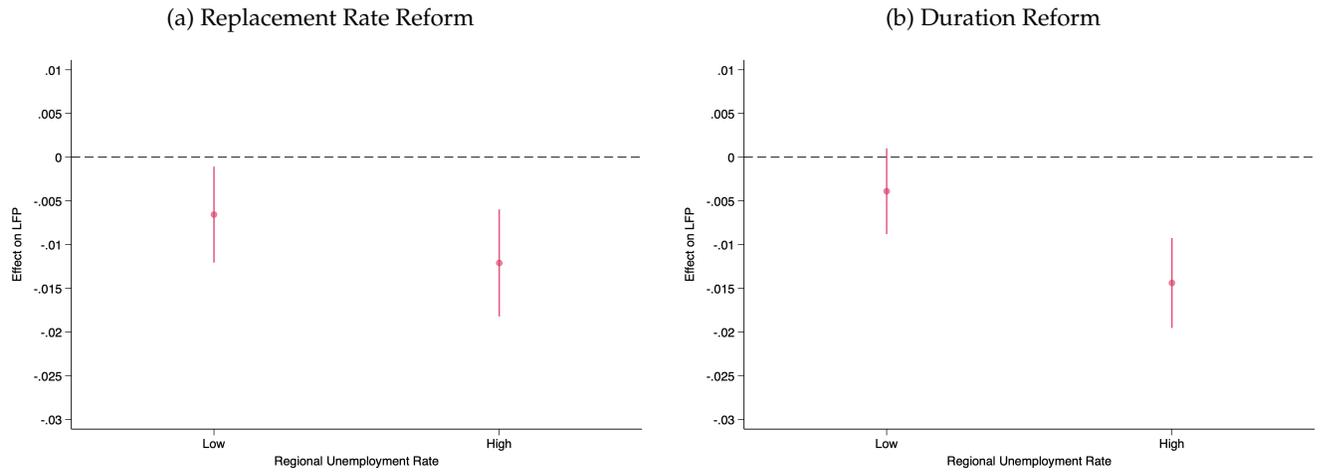
Notes: The figure shows the effect of increasing the generosity of unemployment insurance on the take-up of UI in the 4 years after the end of ML by availability of formal childcare for children aged 0-2 year-old. Availability of formal childcare is based on data from ISTAT and measured as the percentage of 0-2 year-old children that both public and private nurseries can accommodate, by region. Regions with availability of childcare above the median are categorized as *High* childcare regions and regions with availability of childcare below the median are categorized as *Low*. The graphs report the estimates of the compact version of specification 1 that collapses the relative time dummies into a single indicator for the post-end of ML period, on the probability of taking up UI. Panel (a) reports the results for the replacement rate reform, Panel (b) for the duration reform.

Figure 8: THE ROLE OF REGIONAL UNEMPLOYMENT RATE: UI TAKE-UP



Notes: The figure shows the effect of increasing the generosity of unemployment insurance on the take-up of UI in the 4 years after the end of ML by levels of unemployment rate in the region of residence. Regions with levels of unemployment rate above the median are categorized as *High* and regions with levels of unemployment rate below the median are categorized as *Low*. The data on regional unemployment rate are taken from ISTAT. The graphs report the estimates of the compact version of specification 1, that collapses the relative time dummies into a single indicator for the post-end of ML period, on the probability of taking up UI. Panel (a) reports the results for the replacement rate reform, Panel (b) for the duration reform.

Figure 9: THE ROLE OF REGIONAL UNEMPLOYMENT RATE: LABOR MARKET OUTCOMES



Notes: The figure shows the effect of increasing the generosity of unemployment insurance on labor force participation 4 years after the end of ML by levels of unemployment rate in the region of residence. Regions with levels of unemployment rate above the median are categorized as *High* and regions with levels of unemployment rate below the median are categorized as *Low*. The data on regional unemployment rate are taken from ISTAT. The graphs report the estimates of the compact version of specification 1, that collapses the relative time dummies into a single indicator for the post-end of ML period. Panel (a) reports the results for the replacement rate reform, Panel (b) for the duration reform.

## Tables

Table 1: RESPONSES TO CHANGES IN UI BENEFITS: REPLACEMENT RATE REFORM

<i>Months from End of ML</i>	(1) <b>UI</b>	(2) <b>PL</b>	(3) <b>Work</b>
0	0.0054*** (0.0010)	-0.0041 (0.0028)	-0.0017 (0.0028)
5	0.0106*** (0.0014)	-0.0116*** (0.0028)	0.0011 (0.0030)
9	0.0172*** (0.0019)	0.0020 (0.0013)	-0.0086*** (0.0027)
N	2,061,605	2,061,605	2,061,605

*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  $\beta_k$  coefficients from specification 1 for  $k = 0, k = 5$  and  $k = 9$ . Standard errors clustered at the individual level are reported in parentheses.

Table 2: RESPONSES TO CHANGES IN UI BENEFITS: DURATION REFORM

<i>Months from End of ML</i>	(1) <b>UI</b>	(2) <b>PL</b>	(3) <b>Work</b>
0	0.0083*** (0.0016)	-0.0045 (0.0033)	-0.0016 (0.0031)
5	0.0142*** (0.0020)	-0.0072** (0.0031)	-0.0005 (0.0036)
9	0.0185*** (0.0025)	0.0027* (0.0016)	-0.0146*** (0.0032)
N	1,509,700	1,509,700	1,509,700

*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  $\beta_k$  coefficients from specification 1 for  $k = 0, k = 5$  and  $k = 9$ . Standard errors clustered at the individual level are reported in parentheses.

Table 3: EFFECTS ON LABOR MARKET OUTCOMES: REPLACEMENT RATE REFORM

<i>Months from End of ML</i>	(1) Gross Labor Earnings	(2) Share Working	(3) Days Worked	(4) Daily Wage Rate
12	-9.932** (4.748)	-0.0077*** (0.0028)	0.0279 (0.0545)	-1.415*** (0.538)
24	-14.02*** (4.853)	-0.0139*** (0.0029)	-0.0425 (0.0585)	-0.556 (0.435)
48	-17.97*** (4.997)	-0.0084** (0.0029)	-0.0988* (0.0530)	-1.324*** (0.375)
N	125,469			

*Notes:* The table shows the estimated effects of increasing unemployment insurance generosity on labor market outcomes. Specifically, it reports the estimates of  $\beta_k$  coefficients from specification 1 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 4: EFFECTS ON LABOR MARKET OUTCOMES: DURATION REFORM

<i>Months from End of ML</i>	(1) Gross Labor Earnings	(2) Share Working	(3) Days Worked	(4) Daily Wage Rate
12	-5.590 (5.651)	-0.011*** (0.0033)	0.0907 (0.0659)	-0.0352 (0.499)
24	-21.37*** (5.678)	-0.008*** (0.0034)	-0.0331 (0.0722)	-1.409*** (0.432)
48	-6.417 (5.795)	-0.0018 (0.0034)	0.0607 (0.0677)	0.493 (0.428)
N	91,253			

*Notes:* The table shows the estimated effects of increasing unemployment insurance generosity on labor market outcomes. Specifically, it reports the estimates of  $\beta_k$  coefficients from specification 1 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 5: MAGNITUDES OF EARNINGS LOSSES

	<i>Replacement Rate Reform</i>	<i>Duration Reform</i>
Cumulative Earnings	-494*** (125.18)	-662*** (167.84)
UI Take-up	0.017*** (0.0013)	0.019*** (0.0017)
Foregone Earnings	-28,727.08	-35,686.76
Net Increase in Benefits	9,240	13,720
N	7,528,140	5,475,180

*Notes:* The table shows the estimated effects of increasing unemployment insurance generosity on cumulative earnings four years after the end of compulsory ML and UI take-up at the end of the choice period, estimated using the compact version of equation 1. Standard errors clustered at the individual level are reported in parentheses. Foregone earnings refer to the effects of cumulative earnings for compliers and are calculated as the ratio between the coefficient on cumulative earnings and the coefficient on UI take-up. The net increase in benefits is the average net benefit increase for compliers when they switch to UI relative to what they would have had in the counterfactual case. Monetary quantities are expressed in 2010 values.

Table 6: CONSTRUCTION OF THE MVPF

	Replacement Rate Reform	Duration Reform
<b>Costs</b>		
UI Benefits	291.96 EUR	756.56 EUR
PL Benefits	-43.17 EUR	-20 EUR
Tax Revenue	162.85 EUR	218.46 EUR
<b>Total Net Costs</b>	411.63 EUR	955.02 EUR
<b>1+FE</b>	1.41	1.26
<b>MB</b>	2.4	0.7
<b>MVPF</b>	<b>1.73</b>	<b>0.55</b>

*Notes:* The table reports the different components used to calculate the MVPF for the replacement rate reform and for the duration reform. The details of the construction of the table are reported in Section 7.



# Appendix

## A Derivation of Marginal Benefit

Let  $V = u(c) - 1\{p = 1\}\phi(\theta)$  represent the mother's utility, where  $p = 1$  if a mother chooses to take up UI after birth and give up her job (and therefore forgo job protection) and  $p = 0$  if a mother chooses to take up PL and remain employed.  $\phi(\theta)$  is the net cost associated with giving up the job and losing job protection (which includes the cost of searching for a new job, the savings for not having to pay for childcare, preferences for staying at home, ...) which depends on the mother's type  $\theta$ , with  $\theta \sim F(\theta)$ . The budget constraint is  $c = y(p) + B + 1\{p = 1\}b$  where  $y$  is the mother's income,  $B$  are the baseline benefits when  $p = 0$  and  $b$  are the additional UI benefit (relative to the baseline) when  $p = 1$ .

Let  $V(p)$  denote the indirect utility function. A mother will decide to take up UI and give up her job after childbirth if:

$$V(1) - V(0) \geq \phi(\theta)$$

So a mother decides to take up UI and give up her job when the value of additional consumption from UI benefits outweighs the cost of losing job protection. This is equivalent to a threshold rule where a mother decides to leave her job if and only if  $\phi(\theta) \leq \bar{\phi}$ .

Taking the derivative of the decision rule with respect to  $b$  we have that  $V'(1) = u'(c(1)) = \frac{\delta \bar{\phi}}{\delta b}$ , which implies that the mothers' consumption of an additional dollar is revealed through the change in the disutility threshold. This allows to write:

$$MB = \frac{\left| \frac{\delta \bar{\phi}^{high}}{\delta b} \right| - \left| \frac{\delta \bar{\phi}^{low}}{\delta b} \right|}{\left| \frac{\delta \bar{\phi}^{low}}{\delta b} \right|} \quad (4)$$

Calling  $\Phi = F(\bar{\phi})$  the labor force participation rate, following [Fadlon and Nielsen \(2019\)](#), the MB can be written as:

$$MB = \kappa \frac{\Phi^{high}}{\Phi^{low}} - 1$$

where  $\kappa = \frac{\frac{|\varepsilon(\Phi^{low}, b^{low})|}{b^{low} f(\bar{\phi}^{low})}}{\frac{|\varepsilon(\Phi^{high}, b^{high})|}{b^{high} f(\bar{\phi}^{high})}}$  and  $\frac{\varepsilon(\Phi^s, b^s)}{b^s} = \frac{f(\bar{\phi}^s)}{\Phi^s} \frac{\delta \bar{\phi}^s}{\delta b}$  where  $s \in \{low, high\}$ .

Note that this is practically equivalent to following the approach of [Hendren \(2017\)](#); [Giupponi](#)

(2024) and estimating  $MB = \frac{\frac{d\Phi}{db}b}{\epsilon}$ , where  $\epsilon$  is the semi-elasticity of labor force participation to labor earnings.

## B Additional Figures

Figure A1: EXAMPLE OF USE OF UNEMPLOYMENT INSURANCE AS ALTERNATIVE TO PARENTAL LEAVE

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1 [Aggiungi al carrello](#)

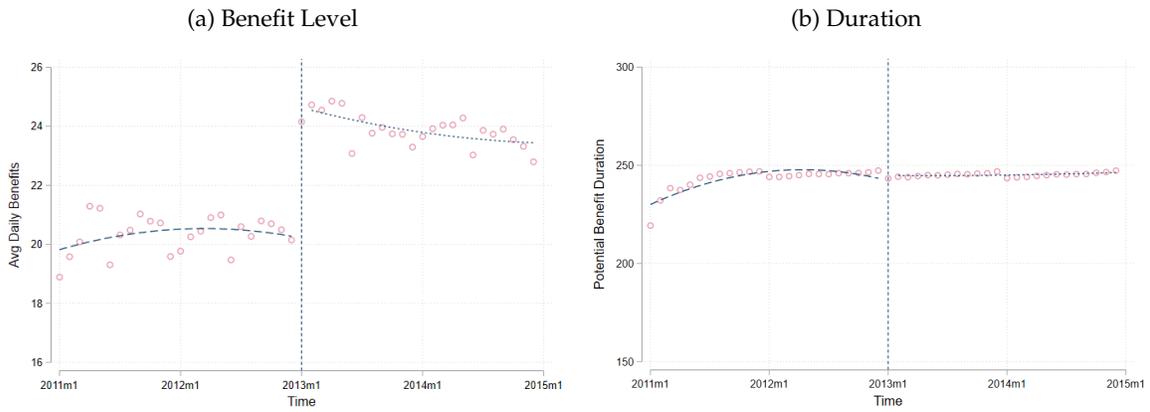
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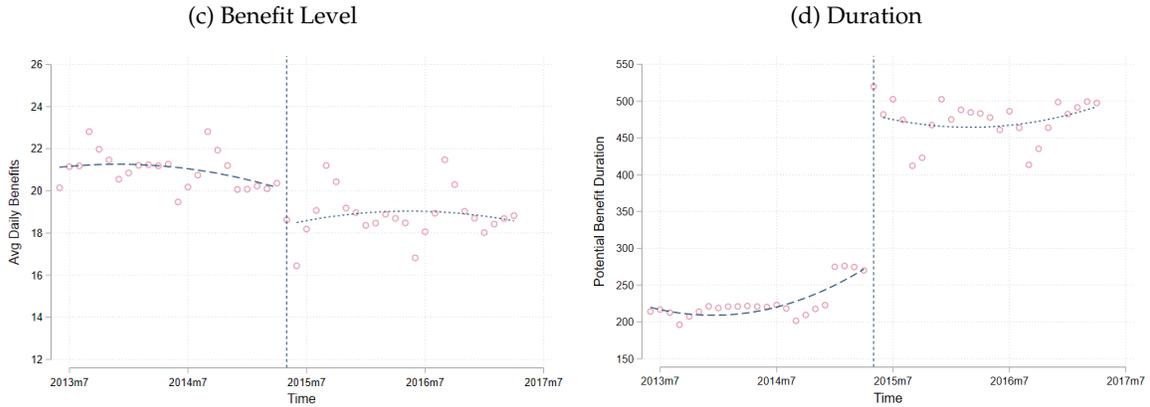
*Notes:* The figure shows an example of a website advertising the possibility of using unemployment insurance as an alternative to parental leave benefits.

Figure A2: CHANGES IN UNEMPLOYMENT INSURANCE GENEROSITY

Replacement Rate Reform

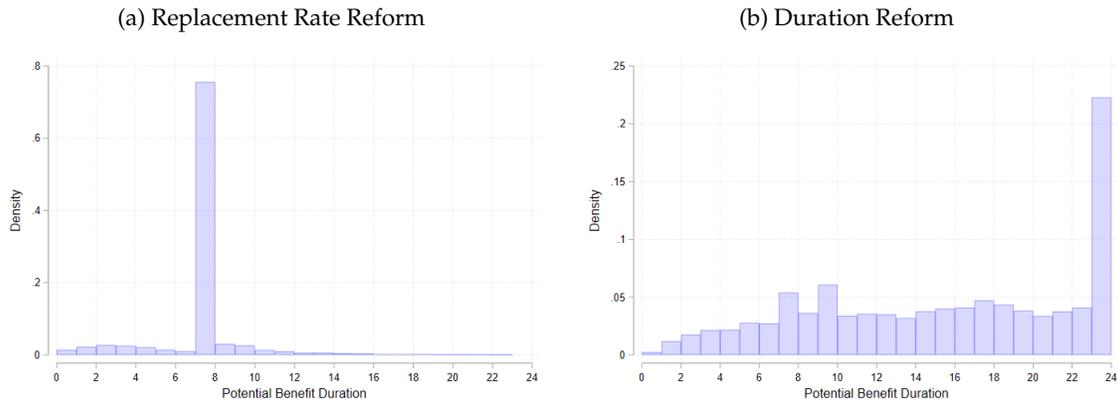


Duration Reform



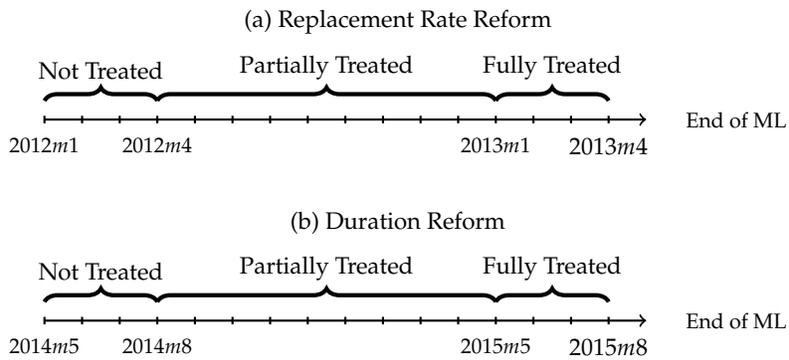
Notes: The graphs show the average daily unemployment insurance benefits and the average potential benefit duration (in days) by month-of-start of unemployment spell bin for women younger than 50 years old with a permanent contract. Panel (a) and (b) show the effects of the introduction of the replacement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

Figure A3: DISTRIBUTION OF UI POTENTIAL BENEFIT DURATION AFTER THE REFORMS



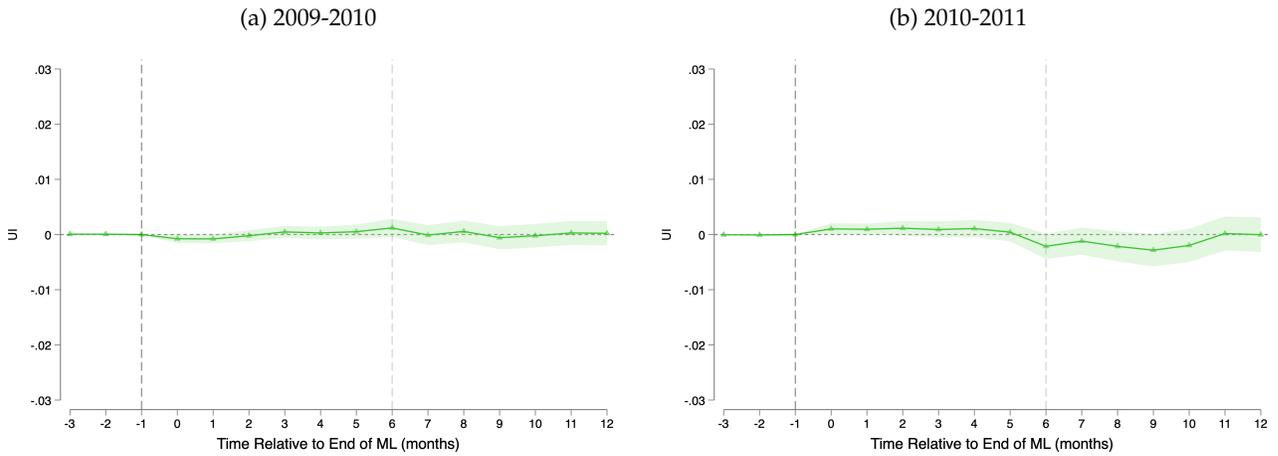
Notes: The figure shows the distribution of potential benefit duration of unemployment insurance after the replacement rate reform (Panel (a)) and after the duration reform (Panel (b)).

Figure A4: ELIGIBILITY FOR UI REGIMES BY END OF MATERNITY LEAVE DATE



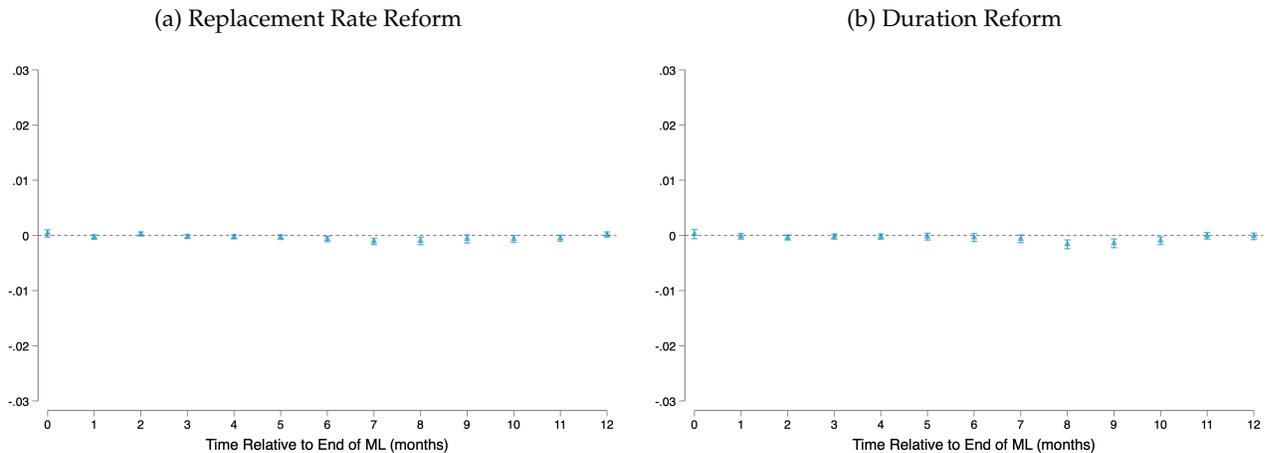
Notes: The figure illustrates for which dates the mothers were eligible for different unemployment insurance regimes, depending on the end of their maternity leave. Panel (a) shows the dates for the replacement rate reform. Panel (b) shows the dates for the duration reform.

Figure A5: PLACEBO SPECIFICATIONS



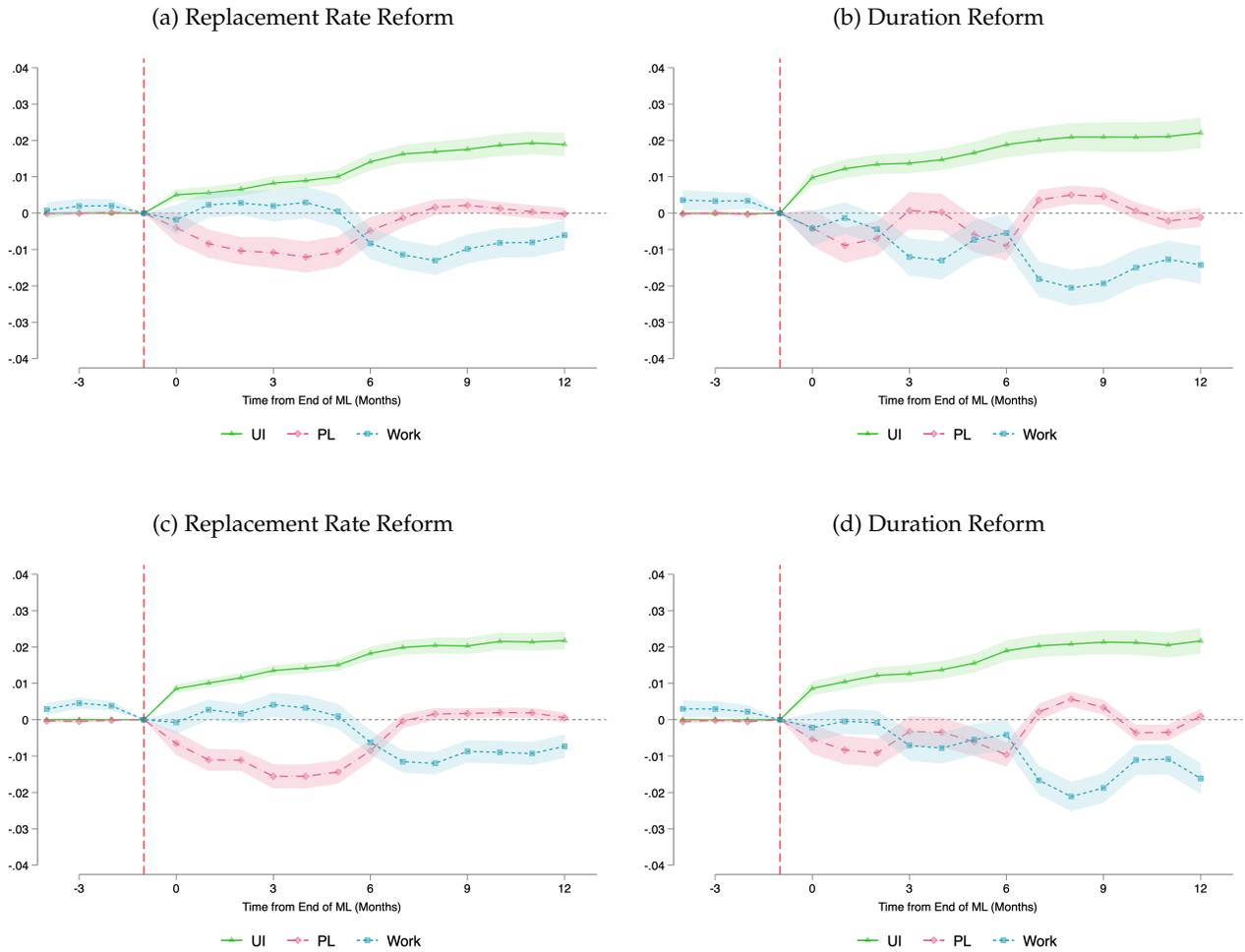
Notes: The figures report difference-in-differences estimates of the coefficients  $\beta_k$  from 1 where the dependent variable is the probability that a mother is on unemployment insurance at relative time  $t$  (where  $t = 0$  corresponds to the time of end of compulsory maternity leave) for different placebo cohorts. The figure reports the 95% confidence intervals. Standard errors are clustered at the individual level. Panel (a) compares cohorts of mothers who gave birth in 2010 vs 2009. Panel (b) compares cohorts of mothers who gave birth in 2011 vs 2010.

Figure A6: EFFECT OF THE REFORMS ON INVOLUNTARY SEPARATIONS



Notes: The figures report difference-in-differences estimates of the coefficients  $\beta_k$  from 1 where the dependent variable is the probability that a mother involuntarily 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 A7: RESPONSES TO CHANGES IN UI BENEFITS: ROBUSTNESS TO DIFFERENT DEFINITIONS OF TREATMENT AND CONTROL



Notes: The figures report difference-in-differences estimates of the coefficients  $\beta_k$  from specification 1 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) and (c) reports results for the replacement rate reform while Panel (b) and (d) reports results for the duration reform. Panel (a) and (b) reports results using narrower definitions of the treatment and control groups. Panel (c) and (d) reports results using broader definitions of the treatment and control groups.

## C Additional Tables

Table A1: SUMMARY STATISTICS FOR THE FULL SAMPLE OF MOTHERS

	Mean	Std. Dev
Age	33.42	4.87
Permanent	0.94	0.24
Full Time	0.63	0.48
White Collar	0.61	0.49
Monthly Earnings	1536.34	1093.90
Small Firm (< 15)	0.39	0.49
<i>N</i>	641,607	

*Notes:* The table reports summary statistics for the full sample of mothers giving birth for the first time between 2012 and 2016. All variables are measured the month before the start of compulsory maternity leave. Monetary quantities are expressed in 2010 prices.

Table A2: HOUSEHOLD SAMPLE: CHARACTERISTICS

Variable	(1) Not Matched Mean/SE	(2) Matched Mean/SE	T-test Difference (1)-(2)
Age	33.295 (0.015)	33.500 (0.015)	-0.206***
Permanent	0.894 (0.001)	0.976 (0.000)	-0.082***
Full Time	0.574 (0.001)	0.653 (0.002)	-0.079***
White Collar	0.583 (0.001)	0.638 (0.002)	-0.054***
Monthly Earnings	1441.232 (2.897)	1661.040 (3.439)	-219.808***
Small Firm (<15)	0.473 (0.001)	0.318 (0.002)	0.155***
N	354,957	286,650	

*Notes:* The table reports summary statistics for the sample of mothers in the data who cannot be linked to their partners (Column 1) and the sample of mothers who can be linked to their partners (Column 2), as explained in Section 3.1. Column 3 reports the t-test of the difference between the two groups. All variables are measured the month before the start of compulsory maternity leave. Monetary quantities are expressed in 2010 prices.