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Parental leave and mothers' careers: The relative importance of job protection and cash benefits

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June 2011

Forschungsinstitut
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ABSTRACT

Parental Leave and Mothers' Careers: The Relative Importance of Job Protection and Cash Benefits*

Parental leave regulations in most OECD countries have two key policy instruments: job protection and cash benefits. This paper studies how mothers' return to work behavior and labor market outcomes are affected by alternative mixes of these key policy parameters. Exploiting a series of major parental leave policy changes in Austria, we find that longer cash benefits lead to a significant delay in return to work and that the magnitude of this effect depends on the relative length of job protection and cash benefits. However, despite their impact on time on leave, we do not find a significant effect on mothers' labor market outcomes in the medium run, neither of benefit duration nor of job-protection duration. To understand the relative importance (and interaction) of the two policy instruments in shaping mothers' return to work behavior, we set up a non-stationary job search model in which cash benefits and job protection determine decisions of when to return to work and whether or not to return to the pre-birth employer. Despite its lean structure, the model does surprisingly well in matching empirically observed return to work profiles. The simulation of alternative counterfactual regimes shows that a policy that combines both job protection and benefits payments succeeds to induce mothers to spend some time with the child after birth without jeopardizing their medium run labor market attachment.

JEL Classification: J13, J18, J22

Keywords: parental leave, family and work obligations, return to work, labor supply, earnings, family earnings gap

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1 Introduction

Parental leave regulations are a central element of family policies in most OECD countries. They help new parents in two complementary ways: by guaranteeing the pre-birth job and by offering financial support. A first main goal of parental leave mandates is to increase women's employment and earnings in the medium run by encouraging job continuity after birth. Yet, prolonged periods of absence from the workplace might lead to loss of human capital and weaker labor market prospects after returning to work. Hence previous employers, while obliged to re-employ mothers after the baby break, may either remunerate them worse than their colleagues or may dismiss them with a higher probability when job protection has run out. Moreover, the losses in human capital associated with long workplace absences may lead to lower pay and less stable employment for women that move to new employers.

A second main goal of parental leave mandates is to mitigate financial hardships associated with the increase in family size and with foregone earnings when the mother needs to stay home with the newborn child. In terms of labor market outcomes, cash benefits are expected to decrease incentives to return to work inducing women to return later after the baby break and worsen medium-run labor market outcomes. However, a longer duration of benefits payments might allow mothers to search for better jobs during the leave improving job stability and earnings. In addition, a longer period shared between mother and child during the first months after a birth might benefit health of the child and of the mother fostering her medium-run labor market performance.[1]

Parental leave systems differ strongly across countries. Some countries offer very short leaves without any benefits (like the 1993 Family and Medical Leave Act in the U.S.) whereas other countries offer long leaves associated with government-financed cash benefits (like Germany and France). Despite the widespread prevalence of parental leave policies and the huge cross-country differences of parental leave systems, their impact on women's labor market performance is not well understood. In particular, not much is known about the (isolated and interaction) effects of the two main policy instruments: the maximum duration of job protection and the maximum duration of cash benefits.

The aim of this paper is to shed light on the (isolated and joint) effects of these two policy parameters. Our aim is twofold. *First*, we estimate the causal impact of alternative parental leave systems (in terms of cash benefits and job protection) on return-to-work behavior and labor market outcomes in the medium-run. This is accomplished by exploiting three major changes to parental leave regulations in Austria. These successive policy changes allow us to identify the causal effect of alternative parental leave systems on short- and medium-run labor market outcomes. More precisely, we estimate the effects of (i) a system where cash benefits and job protection last equally long (but their maximum length varies over time); (ii) a system where cash benefits last shorter than job protection (so that part of the job-protected leave is

[1] Australia introduced a parental leave system as of January 1, 2011. The directive that introduces the system explicitly states that "The objective of the scheme is to provide financial support to primary carers (mostly birth mothers) in order to allow those carers to *take time of work to care* for the child after the child's birth, and encourage women to *continue to participate* in the workforce [...]." (Paid Parental Leave Guide Article 1.2.1.) This shows that parental leave aims to provide time for care without jeopardizing medium run labor force attachment.

unpaid); and (iii) a system where cash benefits last longer than job protection (so that part of the leave is paid but not job-protected).

The *second* aim of the paper is to understand in more detail the way in which the two policy instruments affect mothers' return to work decisions. To accomplish this goal we set up a non-stationary search model that allows us to study how alternative parental leave systems affect the decision when to return to work and the decision whether to go back to the same employer. We calibrate this model to match mothers observed behavior in one of the parental leave regimes and undertake out-of-sample predictions. This procedure helps us to shed light on how alternative parental systems affect short- and medium-run labor market outcomes. Moreover, it also allows us to discuss the relative importance of cash benefits and job protection by simulating the impact of counterfactual systems in which only one of the two policy instruments is available.

To identify the causal effects of alternative parental leave regimes we exploit variation in parental leave regulations generated by three policy changes that took place in Austria during the 1990s. The first policy change, implemented on July 1, 1990, extended the maximum duration of both cash benefits and job protection from the child's first to the child's second birthday. The second policy change, implemented on July 1, 1996, reduced the maximum duration of cash benefits to the date when the child turns 18 months old, keeping job protection unchanged. The third policy change, implemented on July 1, 2000, increased the maximum duration of cash benefits to the date when the child turns 30 months old, again keeping job protection unchanged.

Each of the three policy changes was implemented on July 1 of the respective year. This yields a simple but powerful empirical research design that allows us to compare return to work behavior and labor market outcomes of mothers who gave birth in July or August to mothers who gave birth in May or June. A major advantage of this design is that endogenous selection into treatment and comparison groups is quite unlikely as policy changes were highly unpredictable for these mothers. Moreover, to rule out that our estimates are driven by seasonality, we include as an additional comparison group, mothers who gave birth between May and August of the years preceding the policy changes. Hence our econometric analysis combines a regression discontinuity design with a differences-in-difference approach.

We use a large and informative dataset, the Austrian Social Security Database (ASSD), which covers the universe of Austrian employees and contains information on individuals' earnings and employment histories and take-up of government transfers. We are therefore able to examine mothers' employment and earnings starting 2 years before they gave birth and track their post-birth labor market outcomes for a significant number of years.

Our main findings from the empirical analysis can be summarized as follows. Longer durations of parental leave induce a significant delay in return to work. Extending parental leave benefits and job protection by one year (the 1990 reform) increases the time between birth and the first post birth job (return-to-work) by about 8 months. Reducing the duration of benefit payments by 6 months while keeping job protection at 12 months (the 1996 reform) speeds up return-to-work by 3.4 months. Lastly, extending payment duration by 12 months while guaranteeing job protection for only half of that period

(the 2000 reform) delays return to work by 3 months. Nevertheless, despite the significant delays in return to work among mothers exposed to the more generous leave regimes, we find no detrimental effects on their labor market outcomes in the medium-run.

We then proceed by setting up a non-stationary search model to understand in more detail the relative importance of job protection and cash benefits for mothers' return to work decisions. To keep the model as simple as possible, we assume that the birth of a child leads to a permanent increase in the value of home production.[2] We also assume that women get job offers from new employers on a continuous basis. Provided a sufficiently attractive job offer from a new employer arrives, women stop the baby break and return to work. In this basic setting, we introduce the two interesting policy parameters: a maximum duration of job protection during which women can return to their pre-birth job at the same wage; and a maximum duration of a fixed amount of cash benefits.

Although neither the value of home production nor the wage offer distribution changes over time, the reservation wage falls as time approaches the date when job protection, cash benefits (or both) run out. The model predicts that an extension of benefit and job protection duration increases the reservation wage at each point of time. This means that mothers become more selective in accepting job offers during parental leave and delay returns to pre-birth jobs. As a result both the expected duration of parental leave and average accepted wages increase. An isolated reduction in benefit duration (so that part of the leave becomes unpaid) lowers the reservation wage inducing earlier return to work. An extension of benefit duration beyond the job protected period may induce those mothers whose present value of search, benefits, and home production at job protection end exceeds the value of the pre-birth job not to return to pre-birth employers.

We use this model to see how well it reproduces the empirical observed return-to-work profiles. In our simulation, we assume a population of mothers which is heterogenous with respect to the pre-birth wages but identical in all other dimensions. Taking the wage offer distribution and the interest rate as given, we calibrate the value of home production and the job-offer arrival rate such that the observed return to work profile of one of the policy regimes is matched by the data. It turns out that, that despite its lean set-up, our model generates a return to work profile that comes surprisingly close to the empirically observed one. In particular, the model produces a discrete upward shift in the return to work profile at the date when cash benefits or job protection runs out; whichever is shorter. When job protection runs out before benefits, a discrete fraction of mothers with high protected wages return to work while sacrificing further benefits. When cash benefits run out before job protection, returning to work becomes more attractive than staying on leave for a discrete share of mothers. The model also predicts that the bulk of these discrete shifts is driven mostly by mothers who return to the same employer. Interestingly, with respect to job continuity and returns to pre-birth jobs, the model generates quite precisely what we see in the data.

We also use the model to make out-of-sample predictions by simulating mothers' behavior in other

[2] We also experiment with an extension of the simple model that allows for decreasing values in home production in appendix A.3.

policy regimes and we undertake some counterfactual experiments. These simulations suggest that a system that offers benefits without job protection clearly offers more time for parental care but this comes at a cost in terms of labor market attachment. A system that offers extended job protection without parental leave benefits does not generate much additional care by parents nor does it increase medium-run labor market attachment compared to a benchmark regime that offers no job protection or benefits. The system offering a combination of benefits and job protection generates substantial additional time for care in the protected period after giving birth at little cost in terms of long-run labor market attachment. This means that the two policies interact to subsidize time for parental care immediately after birth while maintaining medium run labor market attachment.

Most of the previous literature has found that more generous parental leave mandates tends to delay women's return to work. However, evidence of the relationship between duration of leave and women's labor market outcomes is mixed. A key empirical challenge has been finding exogenous variation in leave-taking by mothers. Many studies use variation in leave availability across employers or leave-taking by employees. However, most of these studies suffer from several sorts of biases due to unobserved differences between mothers who had access to maternity leave and mothers who do not and between mothers taking longer and shorter leaves. The use of more plausibly exogenous variation in the length of parental leave has been limited.

Studies that focus on the U.S. have examined the impact of the 1993 U.S. Family and Medical Leave Act (FMLA), which guarantees a job-protected unpaid maternity leave of 12 weeks to women working for companies with 50 or more employees. These studies find only modest or no effects of mandated protected leave on the length of parental leave and subsequent employment, although they do find some positive impacts on job continuity (see, e.g., Klerman and Leibowitz, 1997; Klerman and Leibowitz, 1999; Baum 2003; and Waldfogel 1999). In addition, most of these studies found no significant effects on wages (see, Waldfogel, 1999; Hashimoto et al., 2004; and Baum, 2003). Nevertheless, these results are difficult to generalize to other contexts given the relatively short length of job-protected leave guaranteed by FMLA and the fact that, in most cases, this policy does not have a significant impact on duration of maternity leave taken by mothers. Moreover, the population affected by FMLA accounts for less than 50 percent of the private sector workers in the US (see Waldfogel, 1999).

Parental leave rules in Canada and Europe are more generous and hence more likely to have an impact on women's labor supply and career prospects. Baker and Milligan (2005) exploit variation in parental leave provisions over time and across Canadian provinces and find that both short and long mandates increase job continuity. However, only long leaves appear to increase the amount of time that mothers spend away from work. Ruhm (1998) compares employment rates and wages of men and women using panel data of European countries, and finds that longer leave mandates are associated with higher female employment but lower relative wages. Ejrnaes and Kunze (2006) investigate the role of PL on the family wage gap exploiting exogenous variation in the length of PL generated by policy changes in the German system. They find that longer PL duration leads to detrimental effects on employment and wages for women. In contrast, Schönberg and Ludsteck (2008) study the same German reforms and find only

minor effects on employment rates and mixed effects on wages. Lalive and Zweimüller (2009) study the effects of the 1990 and 1996 Austrian reforms and find that extensions of PL increase fertility. They also examine the impacts on earnings and employment but do not analyze the separate effects of benefits and job protection and do not examine additional labor market outcomes, such as experience, tenure, and unemployment.

This paper complements existing literature in two main dimensions. First, we examine the relative importance of duration of job protection and cash benefits by studying alternative parental leave policy mixes exploiting a series of major policy changes in Austria since the early 1990s. Our empirical analysis sheds light on mother's behavior in the short run, and it also generates evidence on their medium run labor market outcomes through a comprehensive analysis of mother's outcomes over time since the child's birth. Second, using a simple theoretical search framework, our analysis illustrates how the two parental leave policy instruments shape return to work behavior and job continuity. In particular, our model sheds light on how the two instruments work, both in isolation and in interaction with each other. The model also turns out to be a simple but powerful tool to undertake out of sample predictions to examine the impacts of alternative parental leave regimes.

Austria provides an attractive experimental environment to study the effects of parental leave policies. First, thanks to the almost universal eligibility of parental leave among working women and the high take-up rates, differences in access or selection problems due to differential take-up are not a concern in our set-up. Moreover, the high eligibility rates combined with the high take-up rates allow us to generate estimates for the causal effects of parental leave that approach treatment effects for the whole Austrian population. In addition, given the high eligibility and take-up rates, any changes in parental leave rules affect a large variety of women to a large extent. The Austrian environment is also appealing because parental leave policy changes were substantial (maximum parental leave durations varied between 1 year and 2.5 years). Hence the various policy regimes in Austria cover a large range of leave durations that are observed in a cross-section of countries.

The remainder of the paper is organized as follows. Section 2 discusses the institutional background and lays out the relevant details of the Austrian parental leave reforms. In Section 3 we introduce the data and present some descriptive characteristics of our samples. Section 4 discusses identification and presents reduced-form evidence on the impact of policy parameters on return-to-work decisions and medium-run labor market success. Section 5 presents the theoretical framework and a calibrated version of the model. In Section 6 we use the model to make out-of-sample predictions and counterfactual experiments. Section 7 concludes.

2 Institutional Background and PL reforms

In this section we briefly describe the institutional background of Austria concerning family policies in general and parental leave policies in particular. We then discuss the reforms to the Austrian parental leave systems of 1990, 1996 and 2000. We argue that these reforms provide us with a quasi-experimental

situation allowing us to identify the causal effect of parental leave duration on labor market outcomes.

2.1 Parental leave policies before July 1990

Austrian family policy rules divide the time immediately before and after the birth of a new child into a period of maternity protection and a period of parental leave. *Maternity protection* starts 8 weeks before the estimated date of birth and lasts for 16 weeks (24 weeks for premature, multiple, and cesarian-section births). During this protection period mothers get a government transfer that replaces 100 percent of the pre-birth wage (i.e. average labor earnings during the last 3 months prior to benefit take-up). The maternity protection rule intends to protect the health of both mother and child by giving mothers the maximum incentive to stay off work around childbirth.

The period of maternity protection is followed by the *parental leave* period during which the mother (i) gets a flat government transfer and (ii) enjoys job protection. The government cash benefit amounts to roughly 35-40 percent of female net median income, is independent of household income and not taxed.[3] Cash benefits are conditional on staying at home with the child and are terminated when the mother returns to work before exhausting the maximum PL duration. Job protection means the mother has the right to return to the same job at her previous employer and cannot be fired during the first six weeks after returning from parental leave. Thereafter, the regular advance notice rules apply.[4]

According to the rules that were in place before July 1990, eligibility to parental leave benfits was tied to employees who had contributed a minimum number of months to the social security system. This work requirement amounted to at least 52 weeks within the two years prior for a first birth; and to 20 weeks within the last year for second and high-order births and for mothers younger than age 25. Self-employed mothers and mothers working in own-family firms and farms were not eligible.

2.2 The parental leave reforms of 1990, 1996 and 2000

While maternity protection rules remained roughly unchanged, the parental leave system underwent major changes since the early 1990s. The *first major reform* was enacted on July 1, 1990. Before July 1990 the maximum duration of parental leave ended at the day when the child turned one year of age. The 1990 reform extended both the maximum duration of job protection and the maximum duration of cash benefits by one year so that maximum PL duration ended 24 months after birth. The reform also introduced the possibility to share the second year of the parental leave by both parents and/or spend a part-time leave (i.e. reducing work-time by 50 percent and drawing only 50 percent benefits; either both parents during the second year, or one parent during the second and third year). However, while it turned out that mothers reacted strongly to increased leave durations neither take-up of parental leave by fathers nor take up of part-time leave was substantial. The 1990 reform was mainly intended to help

[3] An elevated benefit applies to single mothers and low-income households.

[4] The job protection rule of the Austrian parental leave system generates substantial firing costs. Since the advance notice period is at least 3 months, an employer who does not want to re-employ the mother after her baby-break has to pay her pre-birth wage for at least 4.5 months.

young mothers in combining childbearing and working. It was enacted in times when the economy was in a boom and the government did not face any severe budget constraint. Since take-up was unexpectedly high, this reform turned out to be quite costly.

The *second major reform* was enacted on July 1, 1996. It left the maximum duration of job protection unchanged. While the maximum duration of cash benefits remained unchanged, a sharing rule among both parents was introduced so that cash benefits could only be drawn for the maximum duration if each parent took a leave of at least 6 months. In practice, take-up of parental leave by fathers was (and still is) extremely low. Hence, the introduction of the sharing rule effectively reduced the maximum PL duration from the day when the child completed 2 years of age to the day when the child completed 1.5 years of age. The 1996 reform also implemented some minor changes to previous work requirement rules. The work requirement, within the last year prior to the birth, was reduced from 20 to 16 weeks for mothers under age 25; and was increased from 20 to 26 weeks for second and higher-parity births). A major intention behind the 1996 reform was budget cuts. Since the 1990 reform turned out to be quite costly (and since Austria wanted to join the EU and had to obey the EU deficit/debt rules) the government was under severe pressure to bring down the budget deficit and public debts. The 1996 PL reform was part of a series of changes to welfare programs in an effort of the government to bring down the budget deficit. [5]

The *third major reform* concerned births after July 1, 2000. Like that 1996 reform, the 2000 reform left the maximum duration of job protection unchanged but introduced several major changes to the cash benefit part of the system. It increased the maximum duration of cash benefits until the day before the child completed its third year of age keeping the parental sharing rule. Hence, the maximum duration of cash benefit effectively increased from 18 months to 30 months. The reform also allowed mothers to draw cash benefits *and* work – as long as yearly earnings did not exceed 14,600 Euros per year. Finally, the 2000 reform extended eligibility to cash benefits to all mothers (including the self-employed and mothers out of the labor force), i.e. cash benefits were no longer subject to a work requirement. This policy change was made public on August 7, 2001, and became effective for children born on or after January 1st 2002. In order to ensure equal treatment, parliament also allowed parents who were on parental leave on August 7, 2001 and gave birth after July 1st, 2000 to extend parental leave payments to 30 months (36 months if shared) provided that their annual income was below 14,600 EUR. While the increase in the earnings threshold for benefits eligibility allowed some post-July mothers to work while receiving benefits after month 18, we believe this is probably of second order in analyzing medium-run labor market outcomes.

We claim that the three reforms were unlikely to be anticipated at the time of conception for parents who gave birth within a few months around the policy change. For example, the 1990 reform act passed the Austrian parliament in April 1990 while in January 1990 it was still unclear whether the reform would be implemented at all (and, if so, when). The 1996 reform followed a similar political history with high uncertainly regarding its details and likelihood of implementation around the last months before it took

[5] It is important to note that none of the other reforms to the welfare system was tied to the child's date of birth so that they are expected to equally affect all women.

effect. We therefore believe that self-selection into the pre- and post-reform regimes through fertility decisions is highly improbable. Still, parents could self-select into the more generous leave regimes by rescheduling planned cesarian sections (1990 or 1996) or speeding induced labor (1996). We address these issues in the next section where we discuss the empirical strategy.

The situation of the 2000 reform is different, as this reform was implemented retrospectively on January 1, 2002 but the new rules applied for all mothers whose birth took place on July 1, 2000 or later. Therefore, manipulation of conception or delivery dates can be ruled out completely. However, a comparison of mothers who gave birth immediately before and immediately after July 1, 2000 might be affected by other factors. The reason is that mothers who delivered in July/Augst 2000 may have made their labor supply choices on the basis of pre-July 2000 PL rules (and may have committed themselves towards their employers). A second potential confounder for the 2000 reform is that results might not only be the result of extended PL durations but can also be generated by the introduction of generous earnings limits, that allowed mothers under the new regime to draw benefits while working. Both possible confounders induce mothers to work more under the post-July 2000 rules. While we cannot do much about this, we show in Section 4.2 that the group returning to work due to these two factors appears to be rather small. In any case, we note that results obtained from contrasts based on the 2000 reform are most likely to be downward biased (i.e., they provide a lower bound for the PL treatment effect).

2.3 Other fertility related family policies

Besides PL benefits, fertility-related family policies in Austria consist of a broad set of measures that we only briefly discuss here. A further transfer to which parents are eligible are *child allowances* (Familienbeihilfe). There is universal eligibility to these benefits (meaning that all parents with sufficiently long residence in Austria are eligible) and parents are eligible as long as kids are still in the education system. Benefit levels depend on the age of the child. The tax system has *deductions for children* (Kinderabsetzbeträge), that increase with the number of children. Furthermore, before 1997 parents were eligible to a *birth benefit* (Geburtenbeihilfe) of 1,090 Euros, paid out to mother in several steps upon medical inspections between the child's birth and its fourth birthday. The supply of *child care facilities* for small children is rather low. According to the OECD (Employment Outlook 2001) the proportion of children under age 3 enrolled in child-care arrangements was only about 4 % in 1998 which is very low be international standards.[6] In contrast, informal care arrangements or extended family care arrangements are very important for dual earner families in Austria with with children under age 3 years.

While the most significant changes in fertility-related family policies during the 1990s concerned changes in PL legislation, several other minor changes were made with respect to other family policies. In 1997 the birth benefit was abolished. In 1998 there was a major effort by the central government to

[6]For instance, the comparable number for the U.S. is 54 %, for Denmark, Norway and Sweden 64 %, 40 %, and 48 %, respectively. Germany, and southern European countries have similarly low levels of child care facilities for kids under age 3. These figures include both public and private child care provision such as group care in child-care centers, residential care, childminders based in their own home, care provided by person who are not a family-member; see OECD Employment Outlook 2001.

improve the supply of childcare facilities in public kindergardens (Kindergartenmilliarde). While this was a major effort of the government, it was targeted towards the 3 to 6 years old children rather than children below the age of 3 so that this policy did not directly interfere with changes in PL rules. Moreover, it is important to note that eligibility to none of the additional family policies changed discontinuously on July 1st (the date of parental leave regime changes). Therefore, they are not expected to confound our estimates for the effects of the alternative parental leave regimes.

3 Data

We use data from the Austrian social security register (ASSD). The ASSD consists of administrative individual register data collecting information relevant for old-age social security benefits. As these benefits depend on individuals' earnings and employment histories, the data set reports individuals' complete employment histories since 1972 for the universe of Austrian private sector workers. Furthermore, not only employment histories, but also time with childbearing and rearing ("*Kinderersatzzeiten*") are relevant for old-age social security benefits. This is why the ASSD also reports high-quality information on the number of births by female employees with previous social security contributions.

The ASSD has several advantages which will be of particular importance for the empirical strategy developed below. First, the data set covers the *universe* of the private sector employees in Austria implying that we can rely on large samples, even when very specific groups are considered. Second, the data reports, on a daily basis, the occurrence of a birth and take-up (and durations) of maternity protection and PLs since the year 1972. This allows us to determine precisely both the PL eligibility status as well as the maximum duration of PL of mothers. Third, as all employment and earnings over an individual's life cycle are reported in the data, we can look in a very detailed way at the joint distribution labor supply behavior and earnings of mothers over extended time periods.

To examine the impacts of the parental leave reforms on return to work behavior and labor market outcomes, we select mothers who gave birth two months before and two months after each policy change. We select all women who are potentially eligible for PL entitlements using the same criteria for all years. Since we are interested in post-birth labor market outcomes of women interrupting their careers to go on PL we apply a stricter criteria than the PL eligibility required by law, and restrict the sample to women employed in the year prior to giving birth. For each reform we define a treatment and a comparison group. The comparison group consists of women who gave birth under the least generous PL regimes (i.e. between May 1 and June 30 in 1990 and 2000, and between July 1 and August 30 in 1996); the treated group consists of women who gave birth under the more generous PL regimes (i.e. between July 1 and August 30 in 1990 and 2000 and between May 1 and June 30 of 1996). We further stratify the sample by parity and perform a separate analysis for women giving birth for the first time and for women giving birth at higher parities. 2005 is the last year available to us with earning records. We therefore limit the analysis on labor market performance to the fifth year after the child's birth to provide a common time period to analyze and compare the effects of the three reforms. Because the ASSD covers

the universe of all individuals who, at some previous date, paid social security contributions, we end up with a sufficiently large data set. Our sample includes 10,815 mothers who gave birth at parity one between May-August 1990 (the year of the first policy change), 10,514 mothers who gave birth at parity one between May-August 1996, and 9,103 mothers who gave birth at parity one between May-August 2000. The samples for mothers giving birth at parities higher than one include 4,449 mothers in 1990, 3,856 mothers in 1996, and 4,351 mothers in 2000. As we explain below, we also add to the sample of each reform, a cohort of mothers who gave birth during the same months in the year that preceded the reform. Our final samples for parity one include 21,507, 21,146, and 18,345 mothers for 1990, 1996, and 2000, respectively. Our final samples for parity higher than one include 8,575, 7,754, and, 8,541 mothers.

4 Reduced Form Evidence

4.1 Econometric method

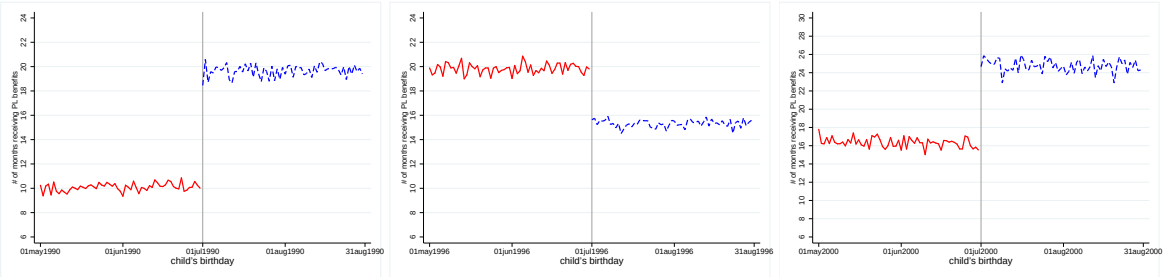
Using the samples described above, we investigate how strongly duration of PL changes as a function of date of birth. Panel A of Figure 1 reports average durations of benefit receipt within the first two years after child's birth for mothers giving birth between May 1 and August 30 in 1990 and in 1996 and for the first 30 months after child's birth for mothers giving birth between May 1 and August 30 in 2000. The figures show very clearly that benefits take-up is highly responsive to changes in PL regulations.[7] For example, mothers who gave birth before July 1990 received PL benefits for an average of 10 months. In contrast, the corresponding number for mothers who gave birth after June 1990 is, on average, about 20 months. Importantly for our empirical strategy, there is no trend in average PL durations within the period before the PL change and within the period after the PL change for none of the three years of policy changes.

Panel b of Figure 1 plots benefits take-up for the cohort of mothers giving birth between May 1st and August 30th of the year preceding each of the reforms. As clearly seen, there is no discontinuity in the length of parental leave around July 1st in years when there was no policy change. This suggests that exposure to the new PL regimes is the source of the discontinuity break between June 30th and July 1st and not any type of seasonality in childbearing or labor market behavior of mothers.

We use a *regression discontinuity design* to assess the effects of duration of PL benefits and job protection on mothers' return to work decisions and subsequent labor market performance. Let T denote the date of birth of a child, Y the labor market outcome of interest (e.g., time to return to work, employment status, earnings, etc.) and D a treatment indicator. Where $D = 1$ for mothers giving birth under the more generous policy regime in the relevant year (post-July 1st in 1990 and 2000 and pre-July 1st in 1996) and $D = 0$ otherwise. Assignment to treatment is a discontinuous function of the date of birth T. That is, $D = I(T >= t_0)$ for the 1990 and 2000 sample and $D = I(T < t_0)$ for the 1996 sample.

[7] While our data set does not report the PL eligibility status directly, we observe actual PL take-up. Note that take-up of parental leave is itself an endogenous variable. However, as most mothers use up the eligibility period, this indicator is informative on the treatment intensity.

Figure 1: Months receiving parental leave benefits



(a) 1990 (b) 1996 (c) 2000

(d) 1989 (e) 1995 (f) 1999

Notes: This figure reports average number of months receiving parental leave benefits within 24 months (panels a,b,d,c, and f) or within 30 months (panel c) by child's date of birth for the sample of mothers giving birth at parity one. Panels a,b, and c report benefits take-up for pre- and post-July mothers who gave birth in the reform years: 1990, 1996, and 2000. Panels d,e, and f report benefits take-up for pre- and post-July mothers who gave birth one year before each of the reforms.

Where t_0 is the day of policy change (July 1st of the relevant year).

Evidence presented above shows that assignment to treatment changed discontinuously between June 30 and July 1. Thus $E(D|T = t_0 + \epsilon) = 1$ and $E(D|T = t_0 - \epsilon) = 0$, i.e. assignment to treatment is "sharp" in the terminology of Hahn et al. (2001).[8] An intuitively appealing contrast that infers the causal effect of extended PL benefits is the following:

$$E(Y|T = t_0 + \epsilon) - E(Y|T = t_0 - \epsilon)$$

It can be shown that for $\epsilon > 0$ sufficiently small, this contrast identifies the average effect of offering extended PL benefits on the outcome of interest (Hahn et al. 2001).[9]

In the empirical analysis we report results based on $\epsilon = 61$ calendar days. More precisely, we compare between mothers who gave birth in July/August and mothers who gave birth in May/June. To control for any differences in demographic characteristics or labor market performance between mothers who

[8] Note that in the analysis, we treat time as discrete with the smallest time unit equal to 1 day. This guarantees, that the density of births at t_0 is non-zero.

[9] When assignment to treatment is sharp, $E(Y|t_0 = t_0 + \epsilon) - E(Y|T = t_0 - \epsilon) = E(Y_1 - Y_0|T = t_0 + \epsilon) + E(Y_0|T = t_0 + \epsilon) - E(Y_0|T = t_0 - \epsilon)$ with Y_0 denoting the non-treatment outcome $D = 0$ and Y_1 denoting the treatment outcome $D = 1$. For $\epsilon > 0$ sufficiently small, this contrast identifies the average effect of treatment at calendar time t_0 – $E(Y_1 - Y_0|T = t_0)$ – provided that $E(Y_0|T)$ is continuous in t_0.

give birth before or after July 1st we also add a pre-reform cohort of mothers who gave birth during the May-August interval. The causal effect of the extension of PL benefits is therefore attained by the difference between the outcomes of mothers who gave birth in July/August versus of May/June in the year of the policy change (i.e., 1990, 1996, and 2000) relative to the difference in outcomes of mothers who gave birth in July/August versus May/June in the year preceding the policy change (i.e., 1989, 1995, and 1999). Namely, we identify the causal effects of PL extensions using a *difference-in-differences regression discontinuity* (*DID-RD*) approach. The estimating equation is the following:

$$y_{imt} = \beta_0 + \beta_1 D_m * reform_t + \beta_2 D_m + \beta_3 reform_t + x_i'\gamma + z_{imt}'\delta + \epsilon_{imt}$$

where y is the outcome of mother i who gave birth in month m of year t; D equals one for the months of the more generous leave regime; *reform* equals one for the reform years (1990, 1996, or 2000); x is a vector of mother's characteristics that includes mother's age at birth and the following indicators of mothers' labor market performance measured 12 months before child's birth: tenure, experience, months of unemployment, cumulative income, and daily wage, and indicators for industry, region, and white collar. We also adjust for changes in macro economic conditions at time of re-entry into the labor market by controlling for the local unemployment rate in the region of pre-birth employment. However, since time of re-entry is a choice variable, we focus on differences in conditions at time of re-entry that are driven by exogenous factors. Namely, we control for the unemployment rate at end of benefits and job protection periods. These covariates are included in vector z.[10] Doing so ensures that effects on labor market outcomes are not driven by changes in the business cycle at time of re-entry.

There are several reasons why a comparison between mothers giving birth in May/June and mothers giving birth in July/August is informative on the *causal* effect of duration of PL benefits. First, observed characteristics of the two groups are very similar. This is what we would expect if assignment to treatment is almost as good as randomly assigned. Table 1 shows that the two groups are quite comparable in terms of their pre-birth background characteristics and pre-birth labor market outcomes for the three policy years with the exception of a few characteristics such as age in 1990, for instance. Differences get smaller, however, once we condition on age and include the pre-reform cohort to control for any seasonal differences between mothers who give birth between May/June and July/August. Importantly, pre-birth job characteristics, like average earnings per day and white collar employment are almost identical between the two groups.[11] As shown in Appendix Table A1, we also find no differences between pre- and post-July mothers who gave birth at parities greater than one. Nevertheless, while pre- and post- July

[10] For May to June 1990 mothers and for May to June 1989 mothers, we control for the unemployment rate in pre-birth region of employment 12 months after the child's date of birth. For July to August 1990, May to August 1995, and May to June 1996 mothers we control for the local unemployment rate 24 months post-birth. For July to August 1996, May to August 1999, and May to June 2000 mothers we control for the local unemployment rate 18 and 24 months after giving birth, and for July to August 2000 mothers we condition on the local labor market situation 24 and 30 months after giving birth.

[11] There are some differences in pre-birth labor market outcomes in 1990. However, these differences are small relative to the outcome means and are of inconsistent signs across outcomes. For example, post-July mothers in 1990 seem to have pre-birth daily earnings that are about 1 percent higher relative to pre-July mothers. On the other hand, they are less likely to work in white collar occupations. In 1996 and 2000, we see no differences in pre-wage earnings.

mothers are similar, they are not completely identical. Our analysis below will therefore control for these individual pre-birth characteristics.

Table 1: about here

A *second feature* that justifies our approach is that not only treated and comparison mothers are similar in terms of pre-birth characteristics, but they also face virtually identical macroeconomic and labor market conditions before and after giving birth. On average, July to August mothers gave birth to the child that defines their treatment status only two months after May to June mothers. Moreover, by including a cohort of mothers who gave birth in the pre-reform year, we further assure that any seasonal differences in labor market conditions or labor supply costs (e.g., holidays, vacations, seasonal work, childcare enrollment, etc.) correlated with month of birth will be differenced out.

A *third reason* that justifies the validity of our identification strategy refers to the way the treatment status is assigned to individuals. As we focus on births that took place during a relatively short period (from May until August), this comes close to a process of random assignment of treatment status to individuals unless women could plan births during this period. As described in the previous section, anticipation of the reforms was minimal. However, even if anticipations of the reforms by the time of conception is very unlikely, some parents could still self-select into the more generous PL regimes by rescheduling planned cesarean sections or induced labor. We assess the possibility of such manipulation as follows. First, we analyze the frequency of births by date during the months of May-August for the years of the policy changes and do not find any evidence of a spike in births on the days surrounding July 1st. Moreover, we find that the distribution of births by date of birth in years of policy changes highly resembles the distribution observed in years where there was no policy change. Second, because manipulation of birth dates is more likely to exist around the reform date, we estimated alternative models where we allowed for a two-sided linear trend in time to policy change. Estimates from this specification are highly similar to those reported here although they are less precise. In addition, we also re-estimated all models while excluding mothers who gave birth during one or two weeks around the cutoff date. Estimates from these samples are virtually identical to those obtained when using the full sample and reported below. As an additional test for the robustness of our results, we also defined some placebo treatments by assigning a treatment status to cohorts of mothers who gave birth in non-reform years. Estimates from these regressions showed no significant impacts for these placebo treatments.

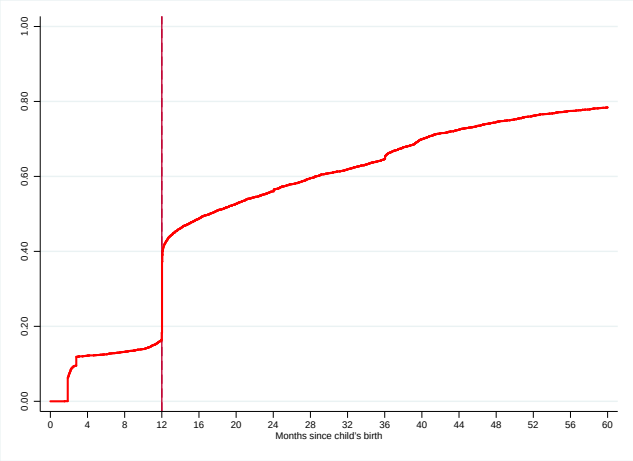
4.2 Return to Work Decisions

In this section we analyze the effects of changes in duration of the benefit and job protection periods on return to work decisions. We begin by reporting results based on mothers of first born children. The advantage of focusing on women at parity one is that eligibility of parental leave entitlements is almost universal among these women as most of them worked prior to giving birth. In addition, their pre-birth labor market history is more informative about their skills and earnings capacity. On the other hand, it is important to note that since about half of these women give birth to at least one more child during

the period of interest, our results are also influenced by fertility interactions. To asses the relative role of fertility interactions, we also examine the impacts of the PL reforms among women who give birth at higher parities. Results for mothers at higher parities are qualitative similar to those reported here and are reported in Appendix tables A2 and A3.

Figure 2 plots Kaplan-Meier failure functions for time until return to work for mothers giving birth before July 1990. The vertical line at month 12 denotes the end of the benefits and job protection period. Roughly 10 percent of the pre-reform mothers return to work within 3 months after birth. Thereafter, the proportion returning to work increases gradually reaching a level of 18 percent before the child's first birthday. This implies that more than 80 percent of mothers of newborn children fully exhaust their parental leave entitlements. At the child's first birthday, the proportion of mothers back at work increases sharply to 43 percent. Thereafter the proportion back at work increases steadily reaching a level of almost 80 percent after 5 years.

Figure 2: Return-to-work before July 1st 1990



Notes: This figure shows the proportion who have returned to work at or before t months after child's birth. The sample includes mothers giving birth at parity one between May 1st and June 30th 1990. Women giving birth before July 1990 are eligible for 12 months of job protection and 12 months of benefits payments.

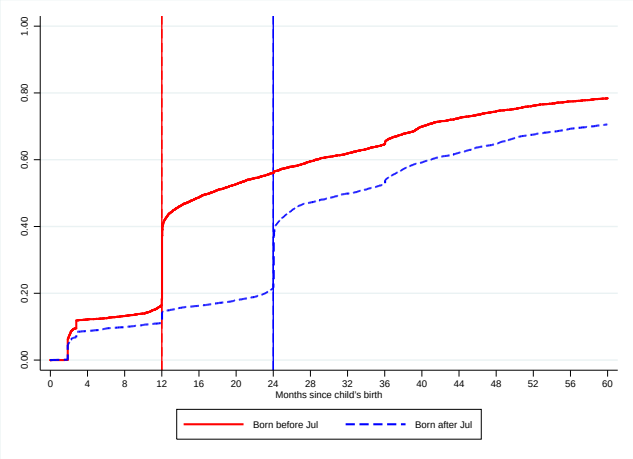
How does the extension of job protection and benefits affect mother's return to work behavior? The 1990 reform, which guaranteed job protection for 24 months, had the potential of increasing the fraction of mothers returning to work within the job protected period. On the other hand, since benefits payments were also extended by the same amount of time, return to work times are likely to be delayed. Figure 3 plots return to work profiles for mothers giving birth before and after the policy change. The solid line plots profiles of pre-reform mothers and the dotted line plots profiles of post-reform mothers. The vertical lines denote the end of the JP and benefits period of the two regimes.

As expected, return to work behavior of mothers who stay on leave for less than 12 months is almost unchanged by the PL reform. These mothers are strongly attached to the labor market and their return to work is not bounded by the PL policies. A sizable gap in the behavior of pre- and post-July mothers

appears at month 12 when the two groups of women face a different policy environment. While at the term of 12 months a significant share of pre-reform mothers return to work, a sizeable share of the post-reform women delay return-to-work and exhaust the two years of extended leave benefits. At the child's second birthday, when benefits and job protection end, a large fraction of post-reform mothers return to work. Interestingly, the 12-month extension of job protection and benefits leaves the proportion of mothers who return to work within the job protected period almost unaffected. Overall, the extension of PL entitlements shifts the return to work profile by about 12 months while preserving its original shape.[12]

Interestingly, the return to work profile is also shifted for mothers who return to work after PL benefits and job protection are exhausted. This shift could be a result of an income effect or a shift in the focal point regarding the expected return to work time. The shift in return to work profiles beyond the exhaustion of PL mandates implies that the share of women who return to work is still lower (by about 7 percentage points) for the post-reform group than for the pre-reform group even 60 months after birth. Nevertheless, as we will discuss in Section 4.3, this delay in return to work does not translate into a reduction in earnings in the medium run.

Figure 3: Return-to-work with extended benefits 1990



Notes: This figure shows the proportion who have returned to work at or before t months after child's birth. The sample includes mothers giving birth at parity one between May 1st and August 30th 1990. Women giving birth before July 1990 are eligible for 12 months of job protection and benefits payments. Women giving birth after July 1990 are eligible for 24 months of job protection and benefits payments.

We have seen in Figure 3 that mothers delay their return to work considerably as a response to an extension of parental leave benefits and the job protected period. A natural question is whether delays in return to work were induced by the extension of the job protected period, by the extension of benefits or both. The 1996 and 2000 reforms allow us to shed light on this question as we have in both cases changes in the duration of benefits payments that are independent of the duration of job protection. Figure 4

[12]Note that mothers who give birth after July 1st 1990 are less likely to return to work during the first 12 months after birth. This reduction in return to work is not causally related to the reform since it appears also in years where no policy change takes place. Our difference-in-difference estimates address this first year seasonality pattern in return to work.

(panels a and b) plots Kaplan-Meier failure functions for return to work profiles of mothers giving birth before and after the 1996 and 2000 reforms. Recall that the 1996 reform reduced the duration of benefits payment to 18 months while leaving the job-protection period unchanged at 24 months. This reform allows discussing the role of paid job-protected leave as opposed to unpaid job protected leave. The 2000 reform extended benefits by 12 months thus adding 6 months of paid protected leave and 6 months of paid unprotected leave.

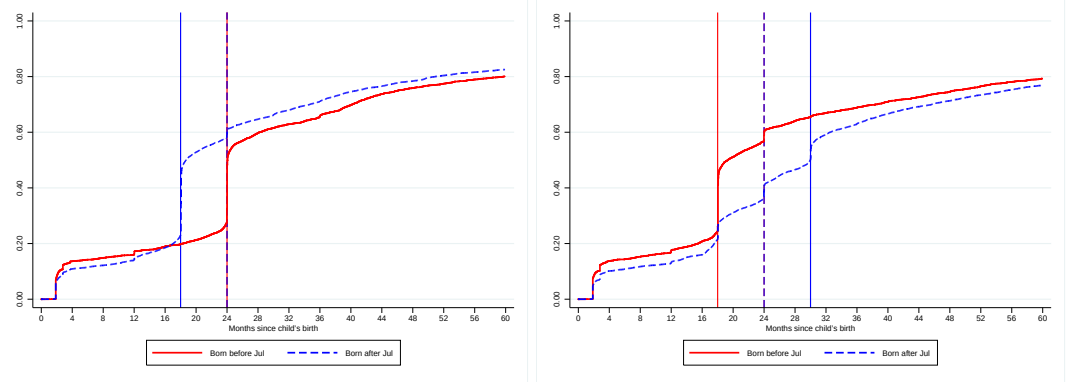
As seen in panel a of Figure 4, the shortening of the benefits period induced a large fraction of mothers to return earlier to work. The return to work profile is shifted backwards but, to a lower extent, relative to the expansion of the 1990 reform. This seems reasonable as the 1996 reform shortened the duration of benefits payments but left the duration of the job-protected period unchanged. About 26 percent of the post-reform mothers return to work exactly at month 18 when benefits are exhausted. Still, there is a sizable group of mothers (12 percent) who stay at home beyond the exhaustion of benefits but return within the period of unpaid job-protected leave. About 4 percent of the mothers return to work exactly at the end of the job protected period. Return to work responses to the 1996 reform suggest that while benefits and job protection have independent effects in delaying women's return to work, the impact of benefits duration appears to be more significant. This conjecture is further supported by changes in return to work profiles induced by the 2000 reform.

Panel b of Figure 4 plots return to work profiles for pre- and post- reform mothers in 2000. Post-July mothers received 12 extra months of benefits payment but only 6 of them were job protected. Starting from month 18, these mothers could also combine work and benefits provided that they did not pass the income ceiling. Clearly, the post-reform cohort displays a return to work profile that is consistent with the changes imposed by the PL reform. In this case, the return to work profile is shifted forward responding to the extension of the benefits period. Again, we see in this case that mothers respond to both duration of benefits and job protection. We also observe a relatively small proportion of post-July mothers (about 8 percent) who return to work exactly at month 18, the first month when the income ceiling to withdraw benefits was raised enabling mothers to work without losing the right to withdraw benefits. The share returning to work at month 24, when job protection ends, is similar to the corresponding share in the pre-reform group. There is a further sizable group returning exactly when benefits are exhausted at month 30 suggesting that duration of benefits payment even when not coupled with job protection induced some mothers to delay their return to work.

The previous set of figures clearly show that mothers are highly responsive to both benefits and job protection, with benefits appearing to play a more important role. A larger proportion of mothers return to work when benefits end before the job protection period than when the job protection period ends before the period of benefits payments. We will see in Section 5 that empirical return-to-work profiles clearly match the predictions of our search model: reservation wages are shifted upward to a larger degree by extension of benefits than extension of job protection.

Table 2 summarizes the effects of PL extensions on return to work behavior by reporting *DID-RD* estimates of the three reforms on total months on leave (censored at 60 months), the likelihood of

Figure 4: Return-to-work profiles for the 1996 and 2000 reforms



(a) 1996 (b) 2000

Notes: This figure shows the proportion who have returned to work at or before t months after child's birth. The sample includes mothers giving birth at parity one between May 1st and August 30th of 1996 (panel a) and 2000 (panel b). Women giving birth before July 1996 are eligible for 24 months of job protected and paid leave. Women giving birth after July 1996 and before July 2000 are eligible for 24 months of job protected leave but only 18 months of paid leave. Women giving birth after July 2000 are eligible for 24 months of job protected leave and 30 months of paid leave.

returning to work within 60 months, the likelihood of returning to pre-birth employer, and daily wages at first post-birth job. Each column reports estimates for a specific policy reform (i.e., 1990, 1996, and 2000). Outcome means for the cohort exposed to the less generous leave are reported in *italics*. In all cases, estimates contrast the cohort with the more generous leave (post-July in 1990 and 2000 and pre-July in 1996) to the cohort with the more restricted leave (pre-July in 1990 and 2000 and post-July in 1996). The table reports estimates for mothers giving birth at parity one; estimates for mothers giving birth at higher parities are reported in Appendix Table A2.

Table 2: about here

As seen in the first row of the table, the 1990 extension of PL entitlements by 12 months delays return to work by 7.8 months. In 1996, 6 months of extra benefits appear to delay return to work by 3.4 months. The 2000 reform, which added 6 months of protected benefits and 6 months of unprotected benefits, delayed return to work by 3 months. Estimates reported in the second and the third row of the table show the effects on time until return to work stratified by destination: pre-birth jobs versus new jobs. It is not possible to draw causal conclusions from a this stratification as the reforms are likely to affect the composition of the groups who return to pre-birth versus new jobs. Still, it is interesting to see that PL extensions delay return to work to both pre-birth jobs as well as to new jobs, with a slightly larger impact on delays in returns to pre-birth jobs.

We also see that the more generous regimes reduced the chances that mothers ever return to work within 5 years after birth by 7 to 2 percentage points depending on the reform and parity.[13] However,

[13]For the 2000 reform we do not see a negative impact at parity one but we do find a negative impact at parities higher

as we will see in the next section, despite the fact that fewer mothers ever returned to work in the more generous leave regimes, employment rates in year 5 are not affected. An additional interesting finding is that extension of benefits and job protection generated only small changes to the relative chances that mothers return to their pre-birth employer or switch to new jobs after giving birth. We will turn back to this last finding in Section 6.1 where we outline a search model to examine the role of benefits and job protection and the interactions between these two policy instruments.

The last three rows of the table report the effects of the three reforms on daily wage at the first job after birth, daily wage at first job for those returning to their pre-birth employer, and daily wage at first job for mothers who started new jobs after birth. These estimates have to be taken with caution as they are affected by selection into employment and selection into pre-birth versus new jobs. In addition, we do not observe hours of work. Nevertheless, it is interesting to see that post-birth wages observed upon re-entry into the labor market are not affected by extensions of benefits or job protection.

4.3 Medium-Run Effects

The purpose of this section is to discuss the medium run effects of parental leave extensions on mothers labor market performance after childbirth. We begin by presenting in Figure 5 *DID-RD* estimates along with confidence intervals for the effects of PL extensions on cumulative outcomes such as labor market experience, months unemployed, and total earnings. The figure shows the dynamic effects of the reforms on these cumulative outcomes starting from the child's birth until year 5 after birth. The vertical lines denote the end of the job protection or the benefits period in the less generous leave regime. We also report in Table 3 the impacts on cumulative outcomes observed in year 5.

The first row of Figure 5 plots the impacts of PL extensions on labor market experience accumulated since the child's birth. It is clear that mothers in the more generous leave regimes accumulate fewer months of employment relative to mothers who gave birth in the less generous regime. However, it is interesting to see that the loss of labor market experience occurs entirely during the period where the two groups face different PL regulations. Namely, we do not observe further losses in labor market experience after both groups have exhausted their PL leaves. Overall, as reported in the first row of Table 3, we see that the 1990 reform reduces work experience by 3.2 months, the 1996 reform by 2 months, and the 2000 reform reduces experience by 1.4 months. Interestingly, while extension of leave regulations significantly prolonged the time until return to work, the loss in work experience was much smaller.

Why doesn't extended parental leave crowd out work experience one-for-one? We find that mothers under the less generous PL regimes return to work earlier but have less stable employment immediately after birth. Moreover, mothers under the less generous regimes compensate it with higher participation rates in other social insurance programs, such as unemployment insurance, which also provides income replacement while not employed.[14] Indeed, as seen in the second row of Figure 5 and summarized in Table 3, mothers who face the less generous PL regimes claim about 3 additional months of unemployment

than one (see Appendix Table A2 for results at higher parities).

[14] Unemployment insurance is conditional on work experience prior to claiming benefits and treats receipt of parental leave as work experience. Most of the mothers in our sample are eligible for unemployment benefit receipt.

benefits in 1990 and almost one additional month in 1996 and 2000 relative to their counterparts in the more generous regimes. The gap in months unemployed between the two groups of mothers is generated during the first 36 months after the child's birth.

The last row of Figure 5 plots annual differences in cumulative earnings from work since the child's birth. The extended time on leave generated an earnings loss of 3,100 and 2,700€for mothers who gave birth in the more generous regimes of 1990 and 1996. Interestingly, the gap in cumulative earnings from work between mothers in the less and the more generous leave regimes is entirely generated in the first 36 months after the child's birth.[15] From then on, we do not observe any further increases in the gap in cumulative earnings. This finding is important as it suggests that while mothers in the more generous leave regimes suffer from a permanent income loss, this loss is totally generated by forgone earnings during the leave period with no further consequences on earnings capacity once they return to work.

Table 3: about here

We next turn to examine labor market outcomes observed in the fifth year after the child's birth. A key potential challenge in examining post-birth labor market performance is differential selection into employment among pre- and post-July mothers. We examine this issue in Appendix A.1 where we compare employment rates of pre- and post-July mothers by year since the child's birth and look at differential selection into employment according to mother's pre-birth characteristics. The selection analysis leads us to conclude that not only employment rates of pre- and post- July mothers are similar once both groups have exhausted their PL provisions, but we can also assure that pre- and post- July mothers who are employed come from the same part of the earnings potential distribution starting from year three after child's birth.[16] These two findings are important as they imply that a comparison of labor market outcomes between pre- and post-July mothers in the medium and in the long run is unlikely to be confounded by differences in characteristics across the groups.

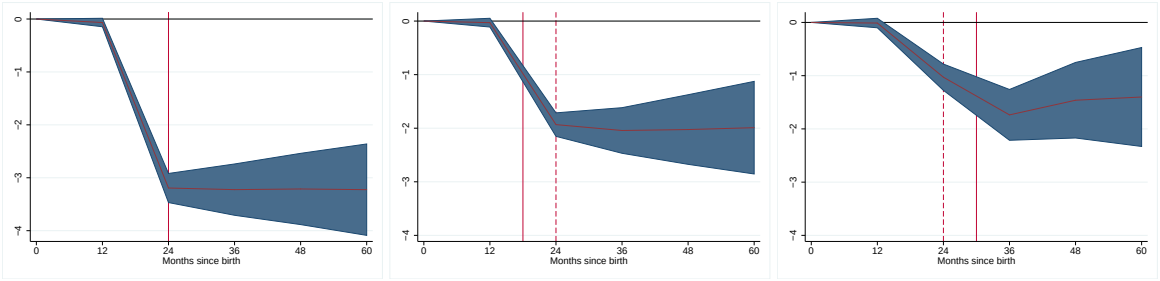
Table 4 reports *DID-RD* estimates of the impacts of the three reforms on labor market outcomes observed in the fifth year after the child's birth. As seen already in figure A.1, we find no differences in employment rates between pre- and post-July mothers. We therefore conclude that despite the fact that more generous leave regimes delay mothers' return to work, they do not have any detrimental impact on employment in the medium-run. We also find no significant differences in the likelihood that mothers are still working for their pre-birth employer five years after birth. If anything, it seems that mothers in the more generous leave regimes are more likely to continue working for their pre-birth employer five years after the child's birth. Although we only find a positive impact on this outcome for mothers giving birth at parity one. Another interesting finding is that despite the negative impacts of the extended leave

[15] Note that income losses in the 2000 reform are smaller as mothers could work while still receiving benefits starting from month 18 after the child's birth. Still we do see losses for mothers giving birth at parities higher than one as reported in Appendix Table A3.

[16] While we do not find any differences in observed characteristics, there could of course differences in unobserved characteristics. We cannot entirely rule out this possibility, even though the lack of any differences in observables hints that the presence of large differences in unobservables is very unlikely, especially if these unobservables are correlated with the observed covariates.

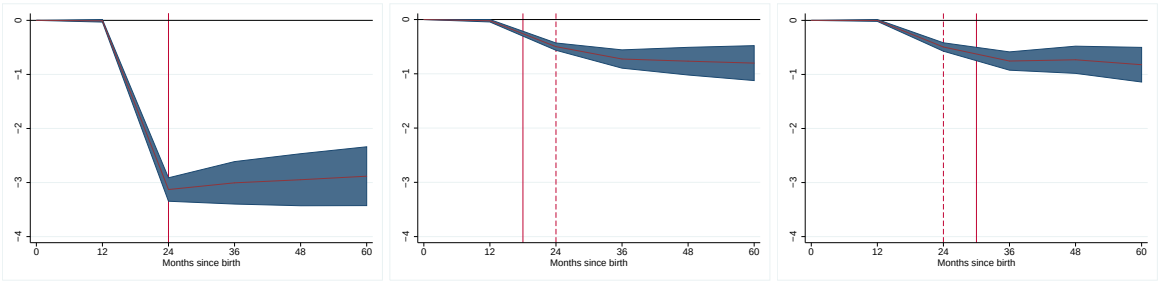
Figure 5: Reduced Form Effects on Cumulative Outcomes

1.Months Employed



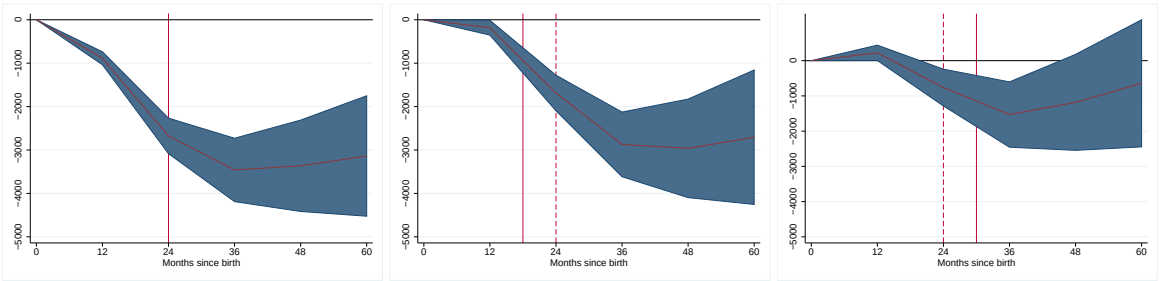
(a) 1990 (b) 1996 (c) 2000

2.Months Unemployed



(d) 1990 (e) 1996 (f) 2000

3.Cumulative Earnings



(g) 1990 (h) 1996 (i) 2000

Notes: This figure plots *DID-RD* estimates (along with confidence intervals) for the impacts of the reforms on cumulative outcomes by months since the child's birth. The samples include all mothers who gave birth at parity one between May 1 and August 30. Estimates come from regressions that compare outcomes between the cohort exposed to the more generous regime and the cohort exposed to the less generous regime relative to the outcomes of pre- and post- July mothers in the pre-reform year. Regressions control for age at birth, and the following indicators for mothers' labor market performance measured 12 months before the child's birth: tenure, experience, months of unemployment, cumulative income, daily wages, and indicators for industry, region and white collar occupation. Regressions also control for the unemployment rates in the region of pre-birth employment at the end of the job protection and benefits payments periods.

regimes on work experience, tenure with current employer is not significantly affected by the reforms.[17] Furthermore, we find that labor market attachment as reflected by the number of months worked in year 5 after the child's birth is unaffected by the longer leaves taken by mothers in the more generous regimes.

[17]Note that while we observe a marginally negative impact on tenure for the 2000 reform for mothers who give birth at parity one, we do not observe a negative impact for mothers who give birth at higher parities (see Appendix Table A3 for estimates for mothers at parities greater than one).

More interestingly, we see that despite the delay in return to work and loss in work experience, there are no detrimental impacts on daily earnings (neither when we examine all mothers nor when we condition on employment) or on annual earnings. [18] This last finding is of highly relevance for the behavioral model described below.

Table 4: about here

5 Behavioral Framework

This section proposes a simple dynamic search model to reproduce the empirical return to work patterns of mothers under different parental leave systems. The objective is to understand the differential roles played by job protection and cash benefits in shaping mothers' return to work behavior. The model is an extension of Mortensen's (1986) baseline search model and deliberately kept very simple to be able to focus on the key elements driving return to work[19]

5.1 Dynamic search model

Women become mothers at $t = 0$ and quit their job at wage w_o, the pre-birth or protected wage, to go on parental leave (PL)[20]. Assume that mothers are heterogenous in their pre-birth wages. While on PL, mothers engage in parenting or home production and gain constant value c per unit time. For some time period τ_o mothers can return to their pre-birth job at wage w_o and they receive cash benefits of b for τ_b periods, where b is a fixed cash amount equal for all mothers. Thus, high wage mothers have a lower replacement rate than low wage mothers. While on leave, mothers engage in job search receiving a flow of λ job offers from the wage offer distribution $F(w)$. For simplicity, there are no search costs and the job offer arrival rate and wage offer distribution are the same for all mothers irrespective of search effort. The wage offer distribution is not time-dependent, implying that mothers do not suffer from human capital depreciation of any form.[21]

[18] We also examine labor market outcomes in the longer run, by looking at the effects of the 1990 and 1996 reforms in year 10 and 9 after birth respectively. Results, not reported here but available upon request, show no significant differences in employment rates or earnings between pre- and post-July mothers.

[19] A search model is well suited to study the two policy instruments since job protection has a clear value and interpretation in a market with frictions. In a neoclassical labor market mothers would not benefit from job protection since they would offer their labor productivity competitively at any point in time if the value of working would exceed the value of not working. Also note that we see a constant flow of mothers accepting new job offers in the data, pointing to the fact that some fraction of mothers are actively searching for jobs (i.e. those for which search costs are lower than expected gains from search).

[20] To be precise, the first two months after birth are not governed by parental leave but maternity insurance, which is mandated time off work by law. Therefore, mothers are only able to consider going back to work after month 2. In the model, we capture this fact by mechanically preventing mothers from returning to work before month 2 but still compute everything starting at $t = 0$.

[21] This abstraction in the model seems reasonable if one considers the reduced form results which show no evidence for negative impacts on earnings in the medium-run despite the delayed returned to work observed among mothers in the more generous leave regimes.

Jobs last forever and job offers are assumed to be on a take-it-or-leave-it basis for mothers.

Then, mothers' behaviour features a reservation wage property so that wage offer w is accepted iff $w \geq w^*(t)$, where $w^*(t)$ denotes the reservation wage in period t. The reservation wage is nonstationary due to time-dependency of the cash benefit component as in Van den Berg (1990) and is given by (see appendix A.2)

$$\frac{dw^*(t)}{dt} = r(w^*(t) - b(t) - c) - \lambda \int_{w^*(t)}^{\infty} (x - w^*(t))\, dF(x), \tag{1}$$

where job protection enters as boundary condition $w^*(t) \geq w_o \forall t \leq \tau_o$. Cash benefits are given by $b(t) = b$ if $t \leq \tau_b$ and zero otherwise. r denotes the discount rate. For $t \geq \max[\tau_b, \tau_o]$ (i.e. when the cash benefit and job protection periods are over) the reservation wage converges to a stationary value given by

$$w_s^* = c + \frac{\lambda}{r} \int_{w_s^*}^{\infty} [x - w_s^*] dF(x). \tag{2}$$

Intuitively, the reservation wage takes account of home production value, benefits, and expected gains from the search process. Mothers face a trade-off between three alternatives: receiving home production value, benefits and prospects for high job offers in the future; receiving the current wage offer forever; or receiving their pre-birth wage forever.

The reservation wage exhibits nonstationarity and (potentially) discontinuity, depending on the configuration of τ_b and τ_o. If $\tau_b = \tau_o$ equations 1 and 2 fully characterize the reservation wage. It is discontinuous at $t = \tau_b$ if $w^*(\tau_b) > w_s^*$ due to the restriction that $w^*(\tau_b)$ is greater than w_o (due to job protection).

If $\tau_b < \tau_o$, equation 1 simplifies for $\tau_b < t \leq \tau_o$ with $w^*(t) = \max[w_o, w_s^*]$, so the reservation wage is stationary on this time interval and discontinuous at $t = \tau_o$ if $w_o > w_s^*$. If $\tau_b > \tau_o$, there is a discontinuity at $t = \tau_o$ if $w^*(\tau_o) > w_o$. The following discussion will make clear that the discontinuous points in the reservation wage are central for determining return to work behavior in the search model.

Whether job protection has any effect on mothers depends on the stationary value of the reservation wage, w_s^* and the value of the pre-birth job, w_o. If $w_s^* \geq w_o$ then the mother will not return to her pre-birth job during the period of job protection since the reservation wage will be above the pre-birth wage for all t as receiving benefits strictly increases the reservation wage. If $w_s^* < w_o$ the mother may or may not return to the pre-birth job, depending on the set-up of policy parameters. Again, we have to distinguish between three cases. If $\tau_b = \tau_o$ mothers will return to the pre-birth job within the protected period, either at the very beginning or at benefit/job protection end (the discontinuity point in the reservation wage). Second, if $\tau_b < \tau_o$ mothers will return to their pre-birth jobs either initially or at benefit end. It will never pay for them to wait after benefits are exhausted and return to the pre-birth job (e.g. until job protection ends) since mothers compare the value of the pre-birth job to the value of search, which consists of the expected gain from searching plus the home production value and is thus constant over time. Waiting implies opportunity costs of forgone earnings while the expected benefit stays the same. Therefore, waiting is never attractive. In this case, the discontinuity plays no role at all, since the mother has already returned for sure before job protection ends.

Third, if $\tau_b > \tau_o$ mothers either return to the pre-birth job initially, at the job protection end (the

discontinuity point) or do not return to the pre-birth job at all, depending on the level of the pre-birth wage. Thus, some mothers may be induced not to return to their protected jobs when the benefit period goes beyond the job protection period.

5.2 Cash benefits vs. job protection

Return to work behavior is affected differentially by the two policy instruments. While introducing and extending cash benefit payments always leads mothers to delay return to work, job protection leads to opposing effects. For high wage mothers introducing job protection clearly speeds up return to work, as they will then return instantly instead of even taking up parental leave. Extending job protection does not affect this group. For low wage mothers on the other hand, introducing or extending job protection has no effect. For intermediate wages, there are two effects. First, the protected wage increases the reservation wage which leads mothers to be more selective with regard to job offers and thus delays return to work. Second, by returning to work with certainty within the protected period, expected time of returning to work is decreased.

We now turn to analyze how a population of mothers heterogenous with respect to their pre-birth wages reacts to different policy configurations. Consider the definition of the hazard rate out of PL,

$$\phi(t) = \begin{cases} 1 & \text{if } w^*(t) = w_o \text{ and } t \leq \tau_o \\ \lambda\left[1 - F(w^*(t))\right] & \text{otherwise} \end{cases} \tag{3}$$

$\phi(t)$ is the probabilistic rate at which mothers exit parental leave conditional on not having left already. Note that $\phi(t)$ is only defined if the mother did not already return to the pre-birth job before t.

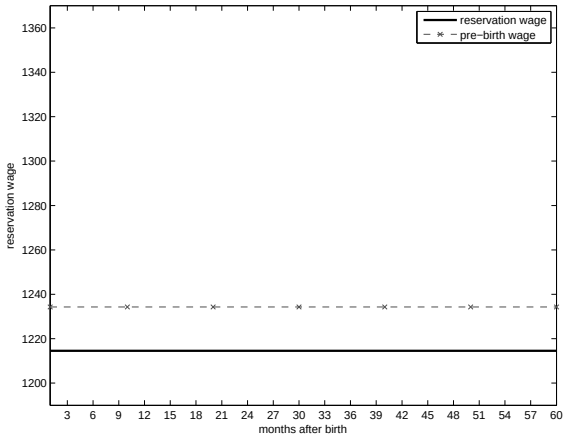
There are two potential mass points where a discrete mass of mothers leaves PL and returns to their pre-birth jobs, at $t = 0$ and at $t = \tau_b$. Mothers with very high pre-birth wages will immediately return to their pre-birth jobs as neither benefits nor home production compensate for the earnings loss. Mothers with intermediate pre-birth wages will leave at benefit exhaustion as detailed previously. By increasing the duration of cash benefit payments while jobs are protected the second mass point shifts along with the duration of benefits. If benefit duration is extended beyond job protection the mass point stays fixed at job protection end and decreases in size, as some mothers are incentivized to forgo their right to return to their pre-birth jobs.

Figure 6 shows the effect of cash benefits and job protection on a particular "intermediate" pre-birth wage of 1,234 Euros/month.[22] Job protection is important to this mother as the stationary reservation wage without parental leave lies below the pre-birth wage, as seen in panel (a). Panel (b) shows the effect of introducing cash benefits, which induces the mother to be more selective with regard to job offers the

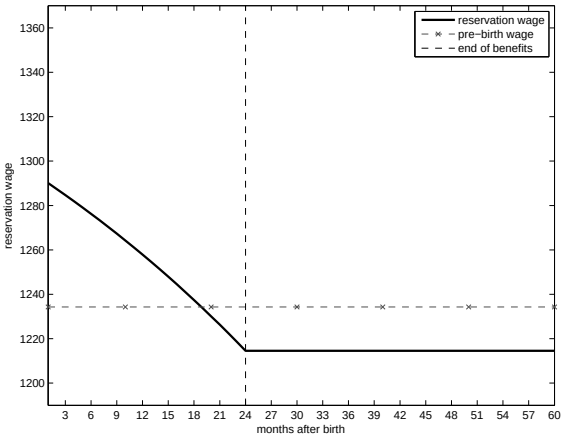
[22] We picked this wage as an intermediate wage as it provides the best example illustrating the differential effects of the two policy instruments. Note that mothers with very high pre-birth wages are not affected by changes in the policy instruments while mothers with very low pre-birth wages are only affected by the cash benefit component. Intermediate pre-birth wages are affected differentially by the two policy instruments. As detailed in footnote 24 we also experimented with an extended version of the model that includes heterogeneity in home production. In this case, the differential reaction occurs across the entire distribution of pre-birth wages.

Figure 6: Reservation wage examples

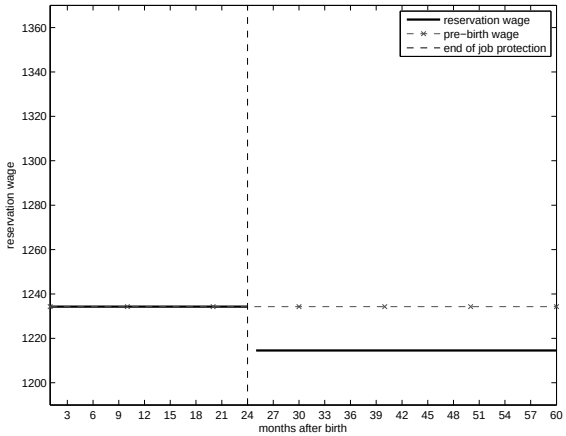
(a) No job protection/cash benefits



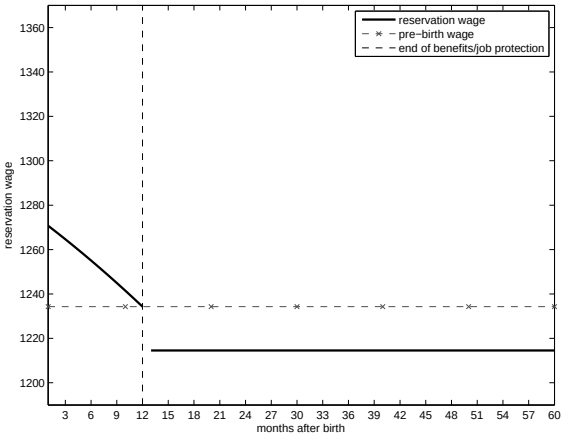
(b) Only cash benefits



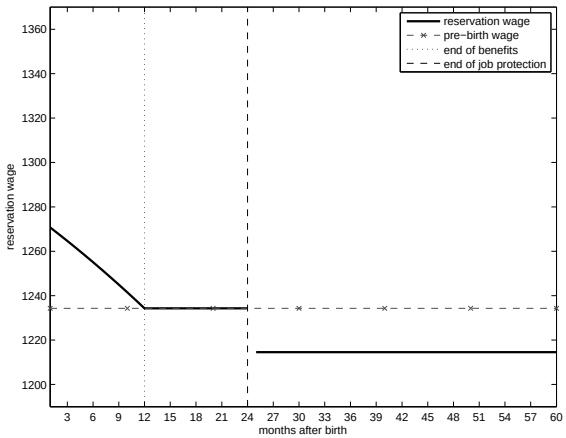
(c) Only job protection



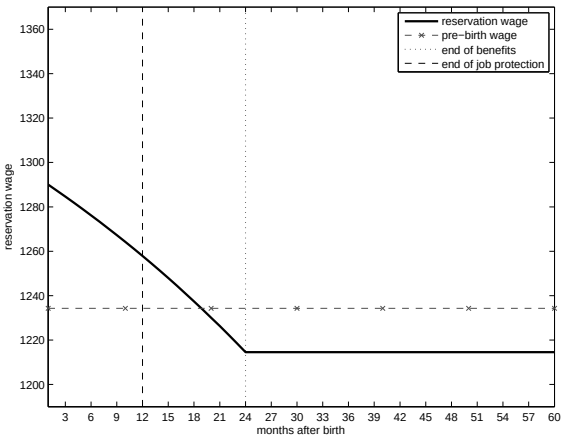
(d) BD=JPD



(e) BD<JPD



(f) BD>JPD



Note: BD = benefit duration, JPD = job protection duration. The figures plot reservation wages for a selected pre-birth wage of 1,234 Euros/month (60th percentile of empirical pre-birth wage distribution), an "intermediate" wage. Parameters for calibration: $\lambda = 0.02321645$, $c = 818.4139$, $b = 404.4$, $\hat{\mu} = 7.0039$ and $\hat{\sigma} = 0.3872$.

further she is from the benefit end. Panel (c) shows how introducing job protection changes the picture (job protection until month 3 is assumed to be always present due to maternity insurance). Now the mother returns to work right after giving birth, as this is of more value to her than her (stationary) value of being on parental leave. Panel (d) shows a situation when cash benefit duration and job protection duration coincide. In this case, benefits duration determines the time of returning to the pre-birth job. Contrary to the regime in panel (c) it now pays to wait for some time and collect cash benefits. Should a good job offer arrive, the mother would still return earlier, of course. Panels (e) and (f) show how the two policy instruments interact. In panel (e), where benefits end before job protection, the mother would return to her pre-birth job for sure at benefit end, while in panel (f), where benefits end after job protection, the mother is induced to forgo her right to return to her pre-birth employer to collect the 2 years of benefits. In other words, the present value of parental leave, composed of the expected value of search, cash benefits, and home production, exceeds the value of the pre-birth job at any time during job protection.

5.3 Calibration

To gain intuition on the empirical response pattern of mothers to different parental leave regimes we calibrate the model outlined above to replicate the observed return to work patterns. We draw pre-birth wages from the empirical pre-birth wage distribution one year prior to birth. This ensures that birth anticipation effects like reductions in the work intensity are ruled out. For the wage offer distribution from which mothers receive wage offers while on PL we choose the lognormal distribution with parameters mean μ and standard deviation σ. These are estimated from the pre-birth empirical (net) wage distribution. This yields $\hat{\mu} = 7.0039$ and $\hat{\sigma} = 0.3872$.[23]

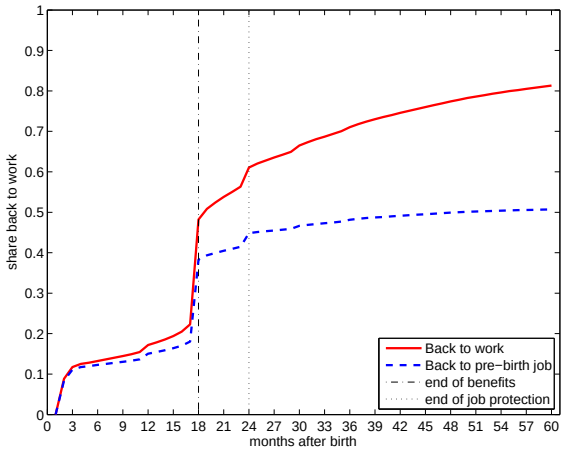
We try to match the model to the data by searching for parameters where the sum of the squared distance between the expected (model) and empirical failure rate (the percent of mothers that are back to work) after birth is minimized. This is what Card and Hyslop (2005) call an informal summary measure of fit. We choose regime 3 (1996–2000) for the calibration and match the share of mothers back to new and the share back to pre-birth employer at 3, 18, 24 and 60 months. Regime 3 provides a nice set-up as benefit duration and job protection do not overlap (benefit duration is 18 months and job protection duration is 24 months).

The interest rate is fixed to $r = 0.01$ per month, corresponding to a yearly interest rate of 12%. The flat cash benefit transfer is set to its actual value in 1996: 404.4 Euros/month, or about 40% of the

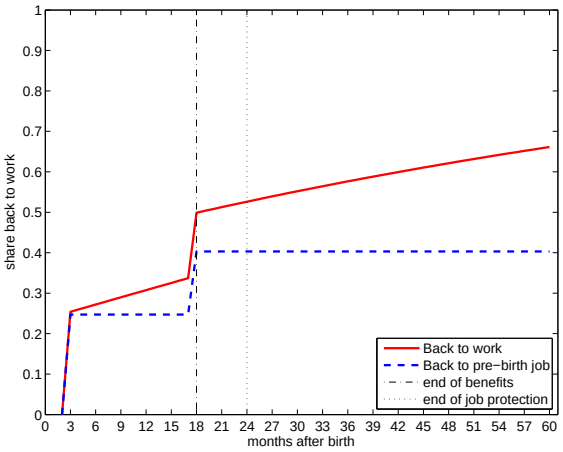
[23] Note that there are two issues with estimating the parameters of the wage offer distribution. First, wages offered to women who gave birth to a child will not be the same as wages women earn prior to going on parental leave since women are more likely to go on part time work, etc. Second, the wage offer distribution is different from the cross section wage distribution (Jolivet et al. 2006). Our approach deals with the second issue since we estimate the parameters of the wage offer distribution from the population of women that are leaving jobs rather than from the cross section distribution of wages. Our model does not allow for changes in hours and wages offered from pre- to post-birth. The calibration deals with this issue by adjusting the calibrated value of the arrival rate of job offers and the value of home production so as to match the empirical return to work profile.

Figure 7: Calibration in regime 3

(a) Empirical return to work:



(b) Calibrated return to work:



Note: Figures correspond to regime 3 (1996–2000) in Austria, where mothers were entitled to 18 months of benefits and 24 months of job protection. Parameters for calibration: $\lambda = 0.02321645$, $c = 818.4139$, $b = 404.4$, $\hat{\mu} = 7.0039$ and $\hat{\sigma} = 0.3872$. Share back is calculated from aggregating the hazard rates for 200 pre-birth wages from the empirical pre-birth wage distribution.

median net wage. Finding λ and c is then done by using a simplex algorithm. This yields $\lambda = 0.02321645$ and $c = 818.4139$. Note that λ in our model captures not only the degree of frictions in the labor market that mothers face but also any other components affecting the expected value of search. Examples are liquidity constraints, decreasing value of home production, and deviations from proportional discounting.

Figure 7 shows the calibration target (the empirical shares back to work and to pre-birth employers) in panel (a) and outcome in panel (b). The model captures the general picture quite well. In particular, the shares back to work and pre-birth employer at months 18 and 24 are well matched. Also, the relative share that returns to new employers is overall nicely replicated. Most importantly, the relative importance of benefits and job protection are confirmed, with benefits playing a very large role in shaping return to work.

There are also some shortcomings. Most notably, initial returns are overpredicted and the model predicts a flow to new jobs while the data hints more at a flow to old jobs and a spike in accepting new job offers. Concerning the first mismatch issue, note that a model that allows for decreasing values of home production generates a lower share of initial returns, as waiting for *some* time before returning to the pre-birth job would then pay off for almost all mothers. This is shown in Appendix A.3. Allowing for decreasing values in home production would also generate a smooth increasing share back to pre-birth jobs between 3 and 18 months. Concerning the unmatched spike, note that, as is in most search models, our set-up does not allow for a discrete mass of mothers leaving to *new* jobs at any time due to the nature of job offers arriving continuously as take-it-or-leave-it offers without recall. Possible remedies to the model might be to limit mothers to start searching for jobs at a specific time, or to allow mothers to bargain with employers over job starting time (as in Boone and Van Ours, 2009). Nevertheless, despite some

discrepancies between the model and the empirical patterns, it is reassuring to see that our model matches return to work patterns on important dimensions and that it captures the qualitative predictions with respect to the policy instruments, especially given its relative simplicity. We are therefore less concerned by the fact that it fails in some regards.[24]

We evaluate the fit and suitability of the model further by predicting "out of sample" mothers' reaction to the Austrian PL reforms in the next section.

6 Policy

The objective of this section is twofold. First, we assess to what extent the behavioral framework can predict mothers' responses to the three Austrian parental leave reforms. This comparison informs how well the framework captures return-to-work decisions. Second, we use the behavioral framework to examine the impacts of three counterfactual policies: a regime with neither job protection nor benefits, a policy with just benefits, and a policy with just job protection. We contrast return-to-work profiles in these counterfactual systems to understand the role of each component of the parental leave policy in shaping return to work decisions.

6.1 Predictive Capability

This subsection compares a series of simulated return-to-work profiles with their empirical counterparts. We use the model calibrated in section 5 and feed it with the cross-section of mothers' pre-birth wages used to produce the reduced form evidence presented in section 4.1 to simulate how the three Austrian reforms affect return-to-work profiles. Figure 8 shows empirical return to work profiles (left) and simulated return to work profiles (right).

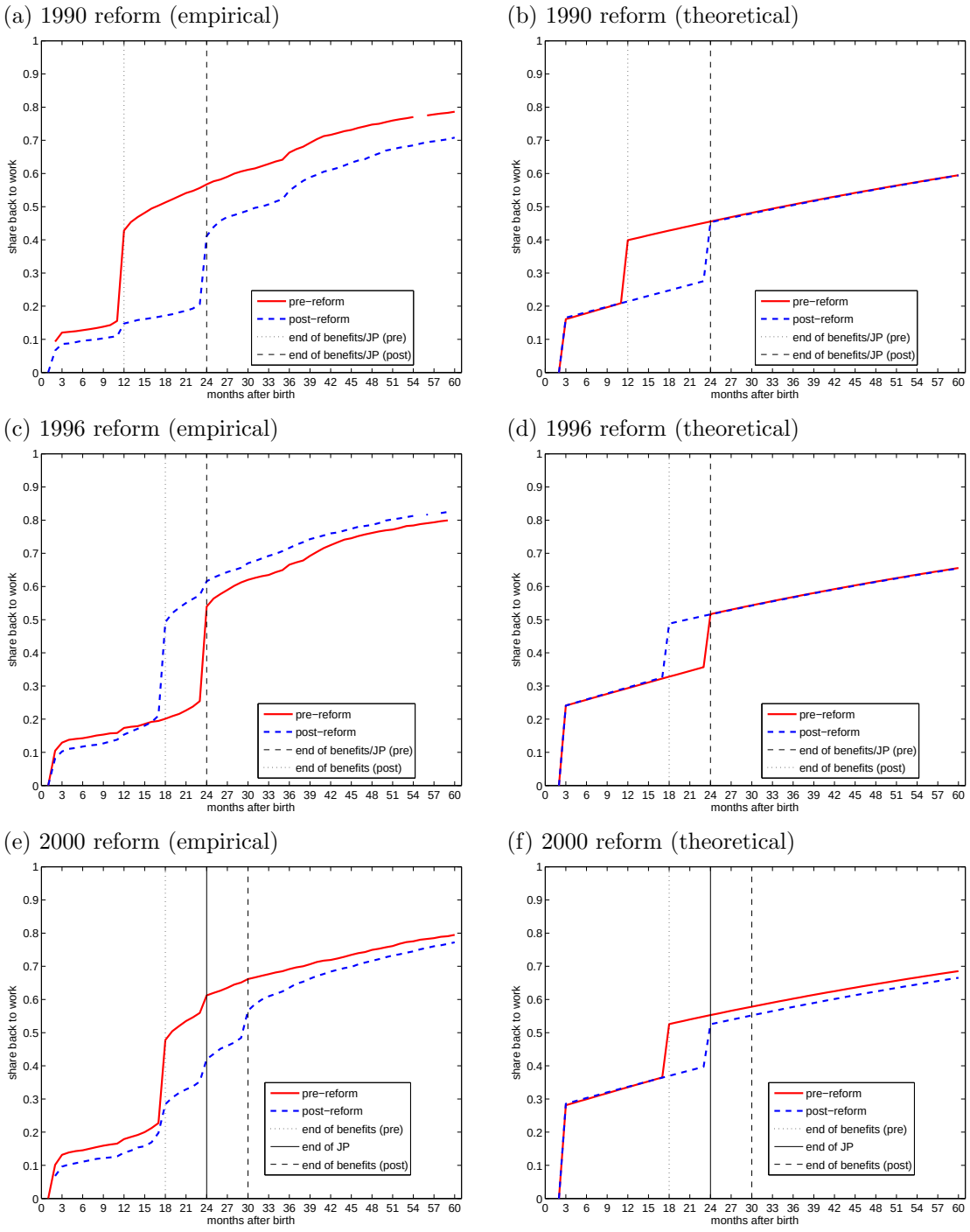
The 1990 reform extends job protection duration and benefit duration from 12 months to 24 months (Figures 8a and 8b). This extension of parental leave duration induces a delay in return to work that is concentrated in the second year after giving birth according to the empirical return-to-work profile. The simulated return to work profile replicates the delay in return to work in the second year after birth quite well. The key difference between the two sets of profiles occurs from the third year after birth onwards. While the empirical profile shows that *fewer* women have returned to work even after the end of the benefits and job protection period, the simple model predicts that the proportion of women having returned to work in the medium-run is *not affected* by the reform. [25]

The 1996 reform reduces benefit duration from 24 months to 18 months keeping job protection at 24 months (Figures 8c and 8d). The reduction in benefit duration speeds up return to work primarily

[24] Note that the only heterogeneity in the model is in pre-birth wages. Clearly, mothers also differ in other respects, notably in preferences for children, other household income, search costs, etc. We have experimented with an extension of the model allowing heterogeneity in home production values and fitting wage deciles' return-to-work behavior instead of just the aggregate. While this improves some aspects of the model fit, it does not provide additional insights into mothers' reactions to the two policy instruments, which is the central question of the paper.

[25] We will discuss all discrepancies between data and model and offer possible explanations and solutions at the end of this subsection.

Figure 8: Empirical and Simulated Return-to-Work Profiles



Notes: This figure shows empirical and calibrated return-to-work profiles for three reforms of the Austrian parental leave system. a) shows the empirical and b) the simulated profiles for the 1990 reform that extend the duration of benefits and job protection from 12 months to 24 months, c) shows the empirical and d) shows the simulated profile for the 1996 reform that reduces benefit duration from 24 months to 18 months keeping job protection duration at 24 months, e) shows the empirical, and f) shows the simulated profile from the 2000 reform that extends benefit duration from 18 months to 30 months, again keeping job protection duration at 24 months.

in months 18 to 24 according to the empirical return-to-work profile. The model captures this central feature of the data well at a qualitative level. Model and data disagree in terms of the quantitative importance of this reform. The model predicts 20 % of all women return to work when benefits run out in month 18 whereas 30 % return in that month in the data. Moreover, the model predicts no difference in the share of women having returned to work 60 months after birth. In the data, about 2-3 % more women have returned to work by month 60 in the regime with shorter benefit duration.

The 2000 reform prolongs benefit duration from 18 months to 30 months again keeping job protection duration unchanged (Figures 8e and 8f). The model captures the delay in return to work induced by the reform between month 18 (when benefits used to run out) and month 24 (when job protection runs out) well.[26] Moreover, the model captures the medium-run difference in the share ever returning to work by month 60 well. Yet model and data disagree in terms of the share of women waiting to see benefits run out in month 30. Whereas the empirical share is 20 %, only 5 % do so according to the model.

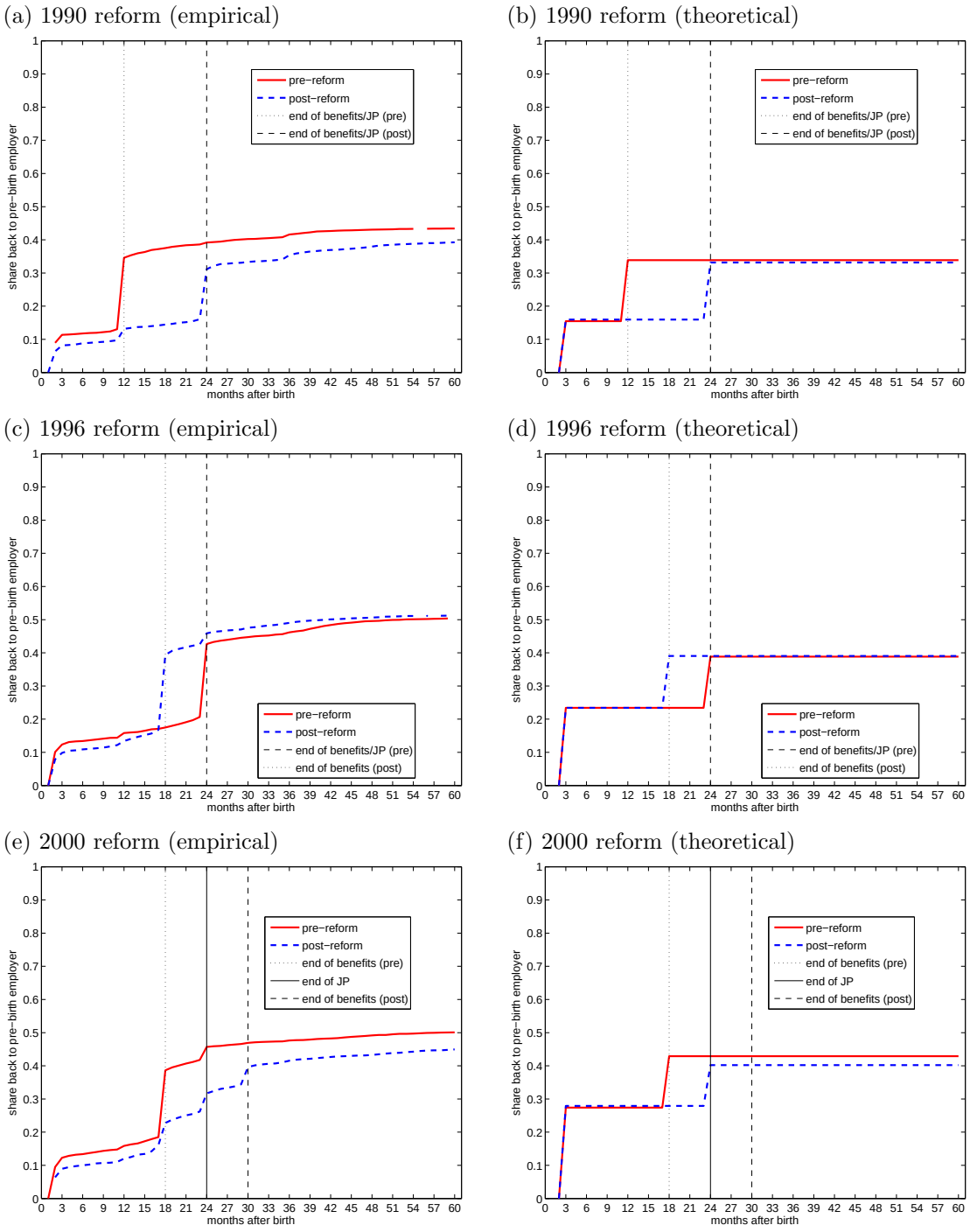
How well does the model replicate return to same employer profiles? Figure 9 displays the empirical (left) and simulated (right) share of women who have returned to the pre-birth employer as a function of time since birth. Results for the 1990 reform indicate that extending both job protection and benefit duration by 12 months induces an horizontal shift in the return-to-same employer profile. This feature is apparent in both the empirical and the simulated return to work profile. Interestingly, extending the duration of job protection does not increase the share of mothers returning to the pre-birth employer. This is a central feature of the model since a mother returns to the pre-birth employer if and only if her stationary reservation wage after job protection and benefits have run out is below the pre-birth job. As in the simulated profile, we see that the empirical profile does not show an increase in the share returning to work. Simulation and model disagree, however, in terms the proportions having returned to the pre-birth employer. Extending parental leave reduces the share returning to work slightly (less than 1 percentage point) in the model. The reduction observed in the empirical profile is of about 5 percentage points but mostly derives form the overall reduction in the share returning back to work.

The 1996 reform, which reduces benefit duration by 6 months, induces some mothers who would have returned at 24 months to their pre-birth employer, to do so already at 18 months (i.e., when benefits run out). This fact is apparent and strong both in the empirical and in the simulated return to same employer profile. The empirical return to same employer profile additionally shows that around 5 percent of the women who return after 24 months still do so after benefits have been reduced – a fact the simulated profile does not replicate because the reservation wage attains the stationary level when benefits run out. This means that mothers either return to the same employer when benefits run out or they never do so.[27]

[26] The empirical return to work profile shows more women returning in month 18 after the extension of parental leave benefits than the simulated return to work profile. This is because some decisions to return to work were scheduled before the extension of parental leave benefits was enacted and because some mothers took advantage of the lift in the income ceiling and combined work and benefits starting from month 18 (i.e., after the reform became effective). Since we do not incorporate these features in the model, we do not interpret the differences between observed and predicted shares as a model fitting failure.

[27] Note that a model with declining value of home production can replicate the fact that some women return to work when job protection runs out. Since that proportion is relatively small, we choose to report here the more parsimonious

Figure 9: Empirical and Simulated Return-to-Same Employer Profiles



Notes: This figure shows empirical and calibrated return-to-same employer profiles for three reforms of the Austrian parental leave system. a) shows the empirical and b) the simulated profiles for the 1990 reform that extend the duration of benefits and job protection from 12 months to 24 months, c) shows the empirical and d) shows the simulated profile for the 1996 reform that reduces benefit duration from 24 months to 18 months keeping job protection duration at 24 months, e) shows the empirical, and f) shows the simulated profile from the 2000 reform that extends benefit duration from 18 months to 30 months, again keeping job protection duration at 24 months.

Both simulated and empirical return to work profiles show no difference in the medium-run proportions returning to the same employer.

Turning to the 2000 reform, which extends benefits by 12 months, the empirical profile shows that this extension induces most women who would have returned to their pre-birth employer after 18 months to do so after 24 months. There is a second group of women who would have returned to their pre-birth employer after 18 or 24 months but now do so after 30 months. Apparently, these women are able to negotiate a return to the same job even after job protection has run out. The simulated return to same employer profile mimics the shift from 18 months to 24 months but does not replicate the shift to 30 months since the model does not allow for delayed start dates. Yet the model and the data agree very well that the 2000 reform reduces the share returning to work via their pre-birth employer by month 60.

Overall, the simple framework is capable of replicating the four most important features of both the overall return to work profile and the return to same employer profiles. First, both the empirical return to work profile and the simulated return-to-work profiles are discontinuous at the dates when benefits end. Second, the model manages to replicate the shares returning to the same employer and going to a new employer quite well. Third, changes to benefit or job protection duration affect return to work times more strongly through returns to the same employer than search for a new job. Fourth, changes to benefit duration affect return to work more strongly in the period with a guaranteed option to return to the same employer than in other periods.

Yet, the simulated profiles differ from the empirical ones in two key aspects. First, the immediate effect of the reforms on return to work is less important in the simulated return to work profiles than in the empirical ones. This is mainly due to more women returning to their pre-birth employer immediately after maternity leave ends in the simulated profiles. The fit of the model could be improved by introducing heterogeneous and declining value of home production (see appendix A.3 and footnote 24). If mothers care about being at home more strongly immediately after birth than when their child has turned one or two years old, their initial reservation wage would be higher and would decline more strongly relative to the simple version of the model. The higher initial reservation wage would reduce the share returning to the pre-birth employer immediately after birth. Moreover, some women with very high but decreasing value of home production would remain on parental leave even if benefits have ended and return to their pre-birth job when job protection ends.

The second aspect where the empirical and simulated return to work profiles disagree is in terms of the medium-run effects of the reforms on the share returning to work. Empirical return to work profiles indicate that fewer women return to work in the system with more generous parental leave rules. Simulated profiles show no reduction in return to work in the more generous regimes of 1990 and 1996 and only a small reduction in return to work for the 2000 reform. Yet note that the simulated profile replicates the medium-run reduced form effects on employment in year 5 after birth quite well (see Section 4.3). Neither the simulated profile nor the data show evidence of a reduction in the share of women employed in year 5. Moreover, the data and the simulated profiles agree that employment effects of the reform are

version of the model. An extension of the model with declining value of home production is discussed in Appendix A.3.

concentrated in the year where incentives differ (year 2 after birth). Mismatch in the share returning to work between the simulated profiles and data is driven by temporary returns to work in the data that do not contribute to medium run employment. In the model, women who return to work remain employed permanently. Therefore, return to work profiles generated from the model directly capture medium run effects.

6.2 What Matters?

Parental leave policies aim to generates the opportunity for prolonged parental care immediately after birth while maintaining medium-run labor market attachment of parents involved in child care. This sub-section discusses how well job protection and benefits achieve these aims.[28] We simulate return to work profiles in three counterfactual parental leave systems (Figure 10). In all systems, parental leave begins after two months of mandatory maternity leave which is fully paid and job protected. The first counterfactual system assumes there is no parental leave after maternity leave ends. The second system pays benefits until the second birthday of the child but there is no guarantee to return to the previous job. The third system guarantees the option to return to the pre-birth employer until the child turns 2 but does not provide benefits. We contrast the return-to-work profiles in these three systems with the factual system that offers both parental leave benefits and job protection until the child turns two years.

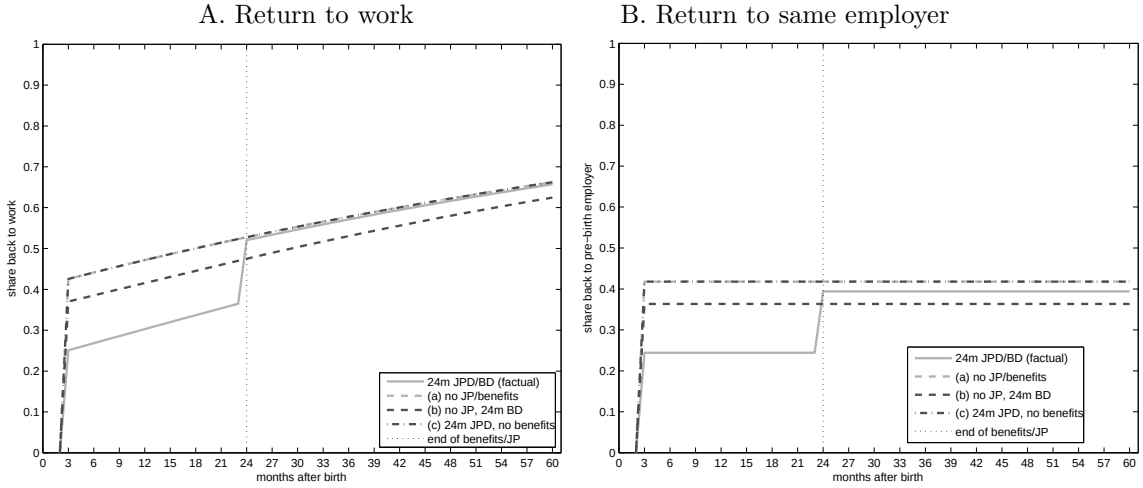
Consider first the benchmark case with no parental leave after the end of maternity leave. In this system, 43 % of all women return to work immediately after maternity leave ends (Figure 10A). These women continue working for the pre-birth employer (Figure 10B). The remaining women re-enter the labor market looking for a new job. Simulations suggest that 24 months after birth 53 % have returned to work, and 60 months after birth 66 % of all women have ever returned to work.

The benefits only system delays return to work for two reasons. The share of women who return to the same employer is smaller. Whereas 43 % return to the same employer in the benchmark, only 37 % return to the same employer immediately after maternity leave ends because benefits increase their reservation wage (Figure 10B). Moreover, those who re-enter the labor market by looking for a new job return to work at a slower rate during the time when parental leave benefits are paid (until month 24) than after benefits have run out (month 25 onwards).[29] There is no benefit exhaustion spike since the reservation wage adjusts smoothly with forward looking agents. Eventually, only 47 % of all women have returned to work by month 24 and only 62% have returned by month 60. The benefits only system generates more time with the child immediately after birth by reducing the share returning to work during the first 24 months but it fails to maintain medium-run labor force attachment.

[28] We abstract from a number of additional issues that are central for a comprehensive discussion of parental leave. For instance, our discussion does not quantify the budgetary incidence of the different systems, neither do we assess the costs on employers incurred due to job protection, nor from the role of maternal care for child development. These issues are clearly important for a comprehensive assessment of parental leave policies. Nevertheless, we regard knowledge on the role of benefits and job protection for return to work decisions to be of first order importance and focus on providing this evidence.

[29] Indeed, the hazard rate to new jobs is initially at a level of 0.67 percent per month and it increases to 0.75 percent per month – its stationary level. Results available upon request.

Figure 10: Counterfactual Return-to-Work Profiles



Notes: The Figure shows return-to-work (A) and return-to-same employer profiles under three counterfactual policy regimes: a) no parental leave after job protected and paid maternity leave of 2 months, b) benefits during 24 months but no job protection, c) job protection during 24 months but no benefits. The fourth profile shows return to work with 24 months of benefit and job protection.

The job protection only system does not affect return to work at all compared to the benchmark system where job protection ends after maternity leave. This is because women value being at home equally immediately after birth as during the two years of the parental leave spell. Since the value of taking up parental leave does not change, a mother will either return to her pre-birth job immediately after maternity leave ends or not at all. Note that allowing for declining value of home production would generate a delay in return to work in a system with job protection only (see Appendix C). The delay in return to work is, however, less important than the one generated by the system that offers benefits only.

The system that offers a combination of both benefits and job protection delays return to work substantially in comparison with the benchmark. About 25 % of all women return to the same employer immediately after maternity leave ends. Just before benefits and job protection end, 36 % of all women have returned to work. The share of women having returned to work when benefits and job protection end is 52 % or only 1 percentage point lower than in the benchmark. Five years after giving birth to their child, almost the same proportion of women have returned to work in this generous system as in the benchmark with no parental leave. The share of women who return to the same employer is slightly lower in the combined system than in the benchmark but this effect is largely compensated by more women leaving parental leave for a new job.

The combined system also generates more time for care immediately after birth and higher medium-run employment relative to the system that pays a benefit without protecting pre-birth jobs. Similarly, the system that pays a benefit on top of job protection clearly dominates a system that protects pre-birth jobs in terms of time for care immediately after birth. This suggests that parental leave benefits and

job protection complement each other in achieving time for care with high medium run labor market attachment. This conclusion is robust to allowing a decreasing value of home production (see Appendix A.3).

Does changing the duration of benefits and job protection improve the extent to which the twin aims can be attained? The simulated profile for the 1990 reform shows that extending benefit and job protection duration from 12 to 24 months increases the time available for parental care with little decrease in the share ever returning to work.[30] Thus, whether parental leave should be available for two years instead of one year crucially depends on the demand for parental care in year two.

Does asynchronous timing of benefits and job protection help in attaining the twin aims of time for parental care and medium run labor market attachment? The simulated profile for the 1996 reform shows that extending job protection beyond benefits neither adds much time for parental care nor does it affect medium-run labor market attachment. The simulated profile for the 2000 reform shows that ending job protection before benefits end adds time for parental care but jeopardizes medium run labor market attachment.[31] We therefore conclude that synchronized duration of parental leave benefits and job protection dominates asynchronous timing of benefits and job protection.

7 Conclusions

This paper studies the causal effect of alternative parental leave systems on short- and medium-run labor market outcomes of mothers by analyzing three major changes to parental leave regulations in Austria. These successive policy changes allow us to identify the causal effect of alternative parental leave systems on return to work, job continuity as well as employment and earnings careers following extended periods of parental leave. The contribution of the paper is twofold. One the one hand, we provide evidence on the relative importance of the two major instruments that characterize parental leave systems: the maximum duration of cash benefits and the maximum duration of job protection. On the other hand, we shed new light on the respective impact of the two policy instruments by setting up a simple (non-stationary) search model in which return to work behavior is determined in a crucial way by these two policy parameters.

We find that a longer duration of parental leave induces a significant delay in return to work. Extending parental leave benefits and job protection by one year (the 1990 reform) increases the time between birth and the first post birth job (return-to-work) by about 8 months. Reducing the duration of benefit payments by 6 months while keeping job protection at 12 months (the 1996 reform) speeds up return-to-

[30] The empirical profile has a higher price in terms of the share ever returning to work. Note, however, that the differential shares returning to work do not translate into differences in the share working 5 years after birth, i.e. there is more temporary return to work in the comparison group. We therefore focus on the simulated profile that is not affected by temporary return to work.

[31] Again, we focus on the simulated profile since this profile shows the pure effect of extending benefits beyond job protection. The actual 2000 reform also allowed women to combine working with parental leave. We speculate that this has increased labor market attachment among women facing more generous benefit rules. Moreover, note that the 2000 reform reduces employment among women at parity two. Taken together, these findings suggest that there is indeed a negative effect of extending benefits beyond job protection.

work by 3.4 months. Lastly, extending payment duration by 12 months while guaranteeing job protection for only half of that period (the 2000 reform) delays return to work by 3.4 months. Nevertheless, despite the significant delays in return to work among mothers exposed to the more generous leave regimes, we find no detrimental effects on their labor market outcomes in the medium-run.

Our theoretical analysis suggests that introducing deterministic parental leave durations into a simple search model helps us to better understand the role of cash benefits and job protection duration in parental leave policies. It turns out that, despite its lean set-up, our model generates a return to work profile that comes surprisingly close to the observed empirical one. We also use the model to make out-of-sample predictions and undertake some counterfactual experiments. We find that a system that offers benefits without job protection clearly offers more time for parental care but this comes at some cost in terms of medium-run labor market attachment. A system that offers extended job protection without parental leave benefits does not generate much additional care by parents nor does it increase medium-run labor market attachment compared to the benchmark. The system offering a combination of both benefits and job protection generates substantial additional time for care in the protected period after giving birth at little cost in terms of long-run labor market attachment. This means that the two policies interact to subsidize time for parental care immediately after birth while maintaining medium run labor market attachment.

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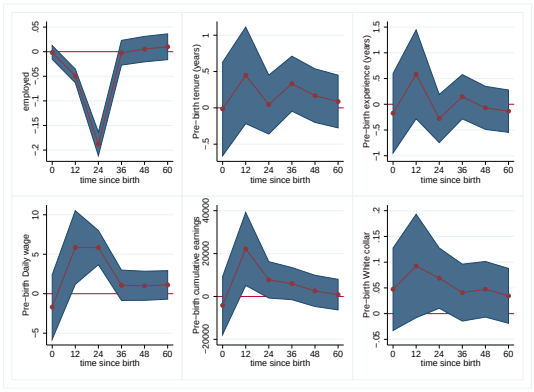
A Appendix

A.1 Investigating Selection into Employment

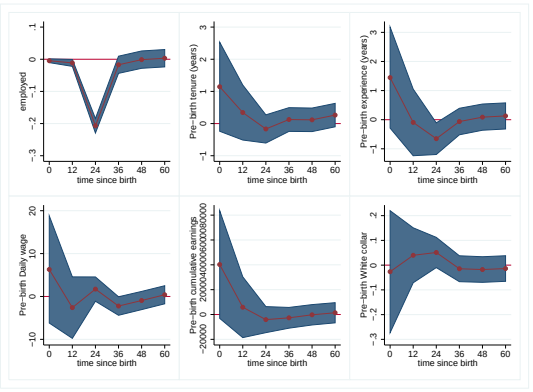
We examine differential selection into employment in Figure A.1, panels a, b, and c for the three policy reforms. The first quadrant in each of the three panels shows *DID-RD* impacts of the reforms on employment rates (along with confidence intervals) by year since the child's birth. As expected, in the second year after childbirth, employment rates of mothers in the less generous regimes are higher compared to those of mothers in the more generous regimes. Nevertheless, there are no differences in employment rates between pre- and post-July mothers starting from year 3 after child's birth when both groups have exhausted their respective parental leave provisions. Interestingly, despite the fact that mothers giving birth in the more generous regimes were less likely to have ever returned to work (as seen in Section 4.2), employment rates of mothers in the more and less generous regimes are virtually identical starting from year 3 after birth. The contrasting result in these two outcomes is explained by the fact that a larger share of mothers in the less generous regimes returned to work but only for a short period of time.

The following set of figures in panels a,b, and c of Figure A.1, check for differential selection into employment in each of the years following childbirth by comparing pre-birth labor market outcomes of pre- and post-July mothers in the reform year relative to mothers in the pre-reform year by employment status. In year 2 after birth we observe that employed mothers who gave birth in the more generous leave regimes are positively selected (i.e., they have better pre-birth labor market outcomes relative to mothers employed in the less generous regimes). Starting from year 3, once employment rates of pre- and post-July mothers equalize, we see no further evidence of differential selection into employment.

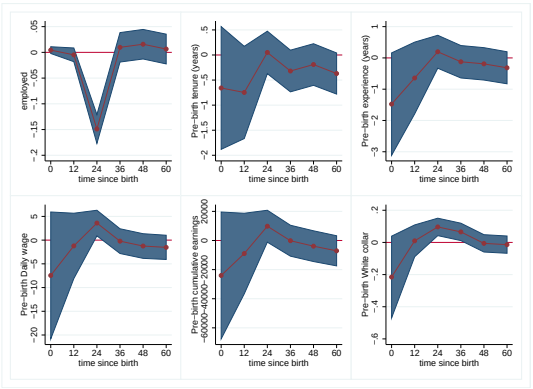
Figure A.1: Selection into Employment



(a) 1990



(b) 1996



(c) 2000

Notes: This figure show differences in labor market outcomes, along with confidence intervals, between pre- and post-July mothers in the three reforms relative to pre-and post-July mothers in the pre-reform year by months since child's birth. In all cases, the outcomes of women in the more generous regime are subtracted from the outcomes of women in the less generous regime. The samples include mothers giving birth at parity one. The first quadrant in each panel shows differences in employment rates by months since child's birth. The following quadrants check for differential selection into employment between pre- and post-July mothers in the reform year relative to the pre-reform year by comparing pre-birth characteristics of employed mothers relative to unemployed mothers.

A.2 Derivation of equation 1

Consider a discrete time search problem where agents receive any number of wage offers in a period of length h.[32] Of interest is the best of n offers, denoted $\hat{w} = \max[w_1, \ldots, w_n]$. Let $P(\hat{w} \leq x | w_i, n) \equiv G(x, n)$, i.e. the probability that the best of the n offers is less or equal than x. Let $q(n, h)$ be the probability that the agent receives n wage offers in a period of length h, defined as follows.

$$q(n, h) = e^{-\lambda h} \frac{(\lambda h)^n}{n!} \tag{4}$$

where λ is the offer arrival rate. Let $V_E(w)$ be the present discounted value of accepting a wage offer w, working forever at that wage. Assume that an agent starts by being on leave in period $t = 0$ with the

[32] This model is an extension of Mortensen (1986) and draws from Van den Berg (1990).

prospect of returning to her old employer within τ_o periods at a wage of w_o and being entitled to benefits of $b(t)h$ per period, where $b(t) = b > 0$ if $t \leq \tau_b$ and $b(t) = 0$ otherwise. Agents get intrinsic utility/home production of ch per period of length h. Future consumption is discounted by $\beta(h) = \exp(-rh)$, where r is the interest rate.

For $t < \tau_o$, so that agents are still eligible to return to the old employer in the next period, the value of discarding any pending job offers and not returning to the pre-birth employer in this period (i.e. the value of staying on leave), $V(t)$, is given by

$$V(t) - (c + b(t))\, h = \beta(h) \left\{ \sum_{n=1}^{\infty} \left[q(n,h) \int_0^{\infty} \max\left\{ V(t+h), V_E(w_o, V_E(x)) \right\} dG(x,n) \right] + \right. \tag{5}$$
$$\left. + q(0,h) \max\left[V(t+h), V_E(w_o) \right] \right\}.$$

The right-hand side gives the expected value of search in the next period, where we sum over all possible numbers of received wages, comparing the highest wage offer to the alternatives: staying on leave and returning to the pre-birth job. Note that the protected job adds "amnesia" to the model in the sense that the agent's value of leave today becomes independent of benefit function values after $\hat{t}$, where $\hat{t}$ denotes the time of returning to the pre-birth job. In other words, to the agent it does not matter whether she is eligible to one or two years of benefits if she would return to the old job within one year anyway.

Equation 5 can be written as

$$V(t) - V(t+h) = \beta(h) \left\{ \sum_{n=1}^{\infty} \left[q(n,h) \int_0^{\infty} \max\left\{ 0, V_E(w_o) - V(t+h), V_E(x) - V(t+h) \right\} dG(x,n) \right] \right. \tag{6}$$
$$\left. + q(0,h) \max\left[0, V_E(w_o) - V(t+h) \right] \right\} + (c + b(t))\, h - (1 - \beta(h)) V(t+h).$$

Dividing by h and letting $h \to 0$, the following continuous time version of equation 6 is obtained[33].

$$\frac{dV(t)}{dt} = rV(t) - b(t) - c - \lambda \int_0^{\infty} \max\left\{ 0, V_E(w_o) - V(t), V_E(x) - V(t) \right\} dF(x). \tag{7}$$

It can never be the case that $V(t) < V_E(w_o)$ if $t \leq \tau_o$, since the current value of leave includes the option of returning to the pre-birth job at wage w_o, so the option value of leave has to be at least as high as the value of the pre-birth job. Using this, equation 7 can be simplified as follows, keeping in mind the restriction that $V(t) \geq V_E(w_o)$.

$$\frac{dV(t)}{dt} = rV(t) - b(t) - c - \lambda \int_0^{\infty} \max\left\{ 0, V_E(x) - V(t) \right\} dF(x) \tag{8}$$

It is helpful to reformulate the problem using the reservation wage property. The reservation wage denotes the lowest job offer the agent would accept at any given time and is given by $w^*(t) = rV(t)$. Using this yields equation 1 in the paper:

$$\frac{dw^*(t)}{dt} = r(w^*(t) - b(t) - c) - \lambda \int_{w^*(t)}^{\infty} (x - w^*(t))\, dF(x) \tag{9}$$

[33] Using $\lim_{h\to 0}(1 - \beta(h))/h = r$, $\lim_{h\to 0} q(1,h)/h = \lambda$, $\lim_{h\to 0} q(n,h)/h = 0$ for $n \neq 1$, and l'Hôpital's rule. (cf. Mortensen 1986, Van den Berg 1990)

with the restriction that $w^*(t) \geq w_o$ for $t \leq \tau_o$. The pre-birth wage w_o thus enters as an initial condition at $t = \tau_o$. Ceteris paribus, the higher w_o, the less steep the reservation wage for $t < \tau_o$.

If wage offers are distributed lognormally with μ and σ denoting the mean and standard deviation of the associated normal distribution, then the "λ-term" in equation 1 can be written as follows.

$$\lambda \int_{w^*(t)}^{\infty} (x - w^*(t))\, f(x)dx = \lambda \int_{w^*(t)}^{\infty} xf(x)dx - \lambda \int_{w^*(t)}^{\infty} w^*(t)f(x)dx$$
$$= \lambda \left[\exp\left(\mu + \frac{\sigma^2}{2}\right) \Phi\left(\frac{\mu + \sigma^2 - \log w^*(t)}{\sigma}\right) - w^*(t)\left(1 - \Phi\left(\frac{\log w^*(t) - \mu}{\sigma}\right)\right)\right].$$

We use this expression in the calibrations to solve for the reservation wage of agents differing in w_o, given the parameters λ, c, μ and σ.

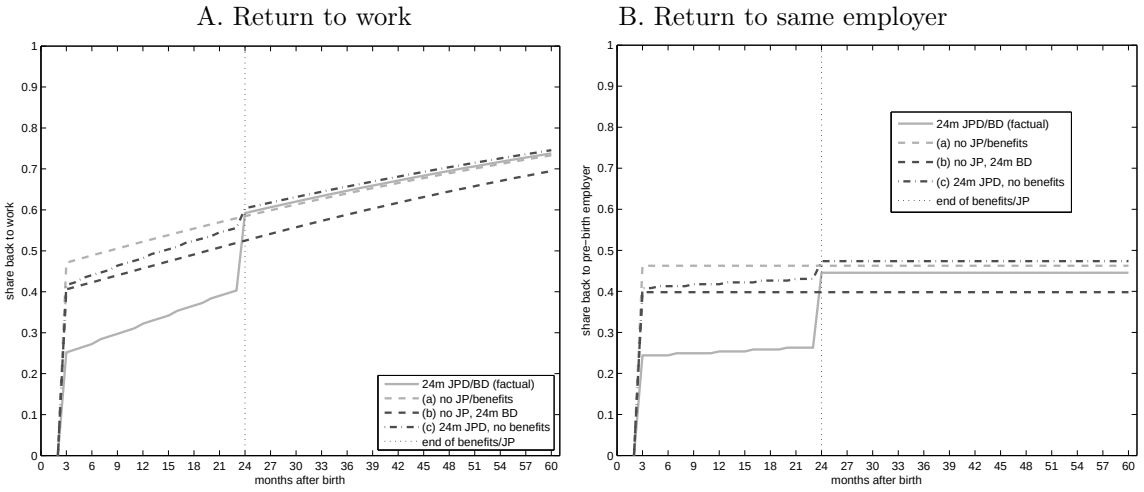
A.3 Allowing for decreasing value of home production

Figure A.2 presents counterfactual simulations for a model that incorporates decreasing value of home production. This might be appropriate as mothers' value of being with the child (and the production value of maternal care) may decrease over time, reflected in the fact that parental leave systems are always designed for a limited time after birth. The model allows for linear decay in the value of home production, i.e. the value of home production after t periods on parental leave is $v(t) = max(c - at, 0)$. The calibration keeps the the parameters at the levels reported in the text and searches for the value of a that maximizes fit in regime 3 (1996-2000).

Simulation results from this extended model differ from those from the baseline model in the following aspects. First, the initial share of women returning to work increases compared to the baseline model. This is because the present discounted value of being on parental leave is lower with decreasing value of home production relative to the baseline model with constant home production. Second, the isolated role of job protection becomes more important as it delays return to work in the short run relative to the benchmark regime. Interestingly, offering job protection only slightly increases the share of women returning to work in the medium run. This is primarily driven by a higher share of women returning to the same employer within the job protection period.

Allowing for decreasing value of home production neither changes the return to work profile for the parental leave system that offers only benefits nor the return to work profile of mothers who have benefits and job protection. Thus, the main conclusion that both benefits and job protection are needed to ensure that women have time for care without jeopardizing their medium run-employment is robust to decreasing value of home production.

Figure A.2: Counterfactual Return-to-Work Profiles



Notes: The Figure shows return-to-work (A) and return-to-same employer (B) profiles under three counterfactual policy regimes: a) no parental leave after job protected and paid maternity leave of 2 months, b) benefits during 24 months but no job protection, c) job protection during 24 months but no benefits. The fourth profile shows return to work with 24 months of benefit and job protection. Calibrated value of decay in parental leave is $a = 2.8178$ (EUR / month).

Table 1. Descriptive Statistics of Pre-Birth Characteristics and Labor Market Performance: Treated and Comparison Groups

	1900				1996				2000			
	Pre	Post	Raw difference	Controlled DID	Pre	Post	Raw difference	Controlled DID	Pre	Post	Raw difference	Controlled DID
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Age	25.1	25.3	0.221	0.207	26.9	26.9	-0.012	-0.052	27.7	27.5	-0.127	-0.012
			(0.082)	(0.115)			(0.088)	(0.123)			(0.102)	(0.142)
A. Labor market history												
Tenure	3.5	3.6	0.077	0.095	3.5	3.5	0.006	0.167	3.9	3.7	-0.171	-0.099
(years)			(0.064)	(0.080)			(0.067)	(0.087)			(0.074)	(0.097)
Experience	6.2	6.3	0.121	0.018	6.9	6.8	-0.103	0.004	7.4	7.3	-0.161	-0.118
(years)			(0.073)	(0.073)			(0.082)	(0.094)			(0.093)	(0.103)
Unemployment	0.2	0.2	0.019	-0.013	0.4	0.4	0.011	-0.026	0.5	0.5	-0.009	-0.013
(years)			(0.009)	(0.012)			(0.013)	(0.017)			(0.016)	(0.022)
B. One year before birth												
Avg. daily earnings	33.4	35.2	1.833	3.640	39.8	39.9	0.108	0.036	47.3	44.6	-2.638	-4.216
			(0.532)	(2.666)			(0.564)	(0.915)			(2.905)	(3.222)
White collar	0.6	0.6	-0.018	-0.022	0.7	0.6	-0.024	0.001	0.7	0.7	-0.006	0.009
			(0.009)	(0.013)			(0.009)	(0.013)			(0.010)	(0.013)
Daily earnings	41.8	42.6	0.795	0.659	49.8	49.9	0.046	0.460	54.2	54.3	0.142	0.799
			(0.313)	(0.375)			(0.384)	(0.477)			(0.469)	(0.566)
Observations	5,143	5,672	10,815	21,507	5,104	5,410	10,514	21,146	4,477	4,626	9,103	18,345

Table 2. The Causal Effects of the Reforms on Return to Work

	1990	1996	2000
	(1)	(2)	(3)
Duration of PL	7.847	3.410	2.968
(censored at 60 months)	(0.539)	(0.511)	(0.547)
	27.690	*27.830*	*28.499*
Duration of PL	7.263	3.518	3.689
(for those back to pre-birth job)	(0.435)	(0.442)	(0.457)
	12.286	*16.569*	*15.842*
Duration of PL	6.874	2.805	2.794
(for those back to new job)	(0.645)	(0.641)	(0.722)
	27.058	*28.373*	*28.072*
Back within 60 months	-0.072	-0.023	-0.009
	(0.011)	(0.011)	0.012
	0.786	*0.826*	0.795
Back to pre-birth employer	-0.039	-0.003	-0.021
(censored at 60 months)	(0.013)	(0.014)	0.014
	0.434	*0.512*	0.501
Daily wage at 1st job after birth	1.567	-0.771	0.546
	(0.540)	(0.567)	(0.956)
	31.693	*35.042*	*34.026*
Daily wage at 1st job after birth (pre-	1.008	-0.914	1.236
birth employer)	(0.764)	(0.722)	(0.947)
	34.412	*37.607*	*35.190*
Daily wage at 1st job after birth (new	1.995	-0.439	-0.141
employer)	(0.712)	(0.885)	(1.761)
	28.339	*30.857*	*32.034*
Number of observations	21,507	21,146	18,345

Notes: This table reports *DID-RD* estimates for the impacts of the 1990, 1996, and 2000 reforms on mother's return to work. The samples include all mothers who gave birth at parity one between May 1st and August 30th. Regressions compare differences in outcomes between the cohort exposed to the more generous regime and the cohort exposed to the less generous regime relative to the outcomes of pre- and post-July mothers who gave birth in the year preceding the reform. Estimates come from regressions that control for age at birth, and the following indicators for mothers' labor market performance measured 12 months before the child's birth: tenure, experience, months of unemployment, cumulative income, daily wages, and indicators for industry, region and white collar occupation. Regressions also control for the unemployment rates in the region of pre-birth employment at the end of the job protection and benefits payments periods. Robust standard errors are reported in parentheses. Standard errors are reported in parenthesis. Means of the comparison group (i.e., the group with access to the less generous regime) are reported in italics.

Table 3. The Causal Effects of the Reforms on Cumulative Outcomes in Year 5 After Child's Birth

	1990	1996	2000
	(1)	(2)	(3)
Months in employment	-3.225	-1.990	-1.401
	(0.441)	(0.441)	(0.474)
	17.528	*20.432*	*19.167*
Months unemployed	-2.883	-0.803	-0.820
	0.278	0.164	0.163
	7.329	3.398	3.029
Cumulative earned income	-3,138	-2,706	-643.1
	(707)	(790)	(920.4)
	25,468	32,731	31,472
Number of observations	21,507	21,146	18,345

Notes: This table reports *DID-RD* estimates for the impacts of the 1990, 1996, and 2000 reforms on mother's cumulative outcomes observed in year 5 after the child's birth. The samples include all mothers who gave birth at parity one between May 1st and August 30th. Regressions compare differences in outcomes between the cohort exposed to the more generous regime and the cohort exposed to the less generous regime relative to the outcomes of pre- and post-July mothers who gave birth in the year preceding the reform . Estimates come from regressions that control for age at birth, and the following indicators for mothers' labor market performance measured 12 months before the child's birth: tenure, experience, months of unemployment, cumulative income, daily wages, and indicators for industry, region and white collar occupation. Regressions also control for the unemployment rates in the region of pre-birth employment at the end of the job protection and benefits payments periods. Robust standard errors are reported in parentheses. Standard errors are reported in parenthesis. Means of the comparison group (i.e., the group with access to the less generous regime) are reported in italics.

Table 4. The Causal Effects of the Reforms on Labor Market Outcomes in Year 5 After Child's Birth

	1990	1996	2000
	(1)	(2)	(3)
Employed	0.002	0.000	0.009
	(0.013)	(0.014)	(0.015)
	0.404	*0.513*	*0.486*
Working for pre-birth firm	0.062	0.025	-0.011
	(0.020)	(0.019)	(0.020)
	0.374	*0.388*	*0.400*
Tenure with current employer	0.677	0.008	-3.475
	(1.754)	(1.587)	(1.836)
	48.683	*50.367*	*53.156*
Months worked	-0.007	0.057	0.072
	(0.147)	(0.157)	(0.160)
	5.033	*6.281*	*6.064*
Earnings per day worked	1.246	1.141	-0.837
	(0.757)	(0.742)	(0.825)
	41.309	*43.624*	*44.962*
Earnings per calendar day	0.847	0.579	-0.303
	(0.639)	(0.736)	(0.754)
	16.691	*22.377*	*21.693*
Annual income	239.7	336.9	-299.9
	(225.2)	(282.6)	(270.0)
	6,977	9,644	9,008
Number of observations	21,507	21,146	18,345

Notes: This table reports *DID-RD* estimates for the impacts of the 1990, 1996, and 2000 reforms on mother's labor market outcomes measured in year 5 after the child's birth. The samples include all mothers who gave birth at parity one between May 1st and August 30th. Regressions compare differences in outcomes between the cohort exposed to the more generous regime and the cohort exposed to the less generous regime relative to the outcomes of pre- and post-July mothers who gave birth in the year preceding the reform. Estimates come from regressions that control for age at birth, and the following indicators for mothers' labor market performance measured 12 months before the child's birth: tenure, experience, months of unemployment, cumulative income, daily wages, and indicators for industry, region and white collar occupation. Regressions also control for the unemployment rates in the region of pre-birth employment at the end of the job protection and benefits payments periods. Robust standard errors are reported in parentheses. Standard errors are reported in parenthesis. Means of the comparison group (i.e., the group with access to the less generous regime) are reported in italics.

Table A1. Descriptive Statistics of Pre-Birth Characteristics and Labor Market Performance: Treated and Comparison Groups for Parities > 1

	1900				1996				2000			
	Pre	Post	Raw difference	Controlled DID	Pre	Post	Raw difference	Controlled DID	Pre	Post	Raw difference	Controlled DID
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Age	29.0	29.1	0.051	0.003	30.7	30.8	0.030	-0.007	31.2	31.3	0.062	-0.185
			(0.130)	(0.186)			(0.141)	(0.197)			(0.133)	(0.191)
A. Labor market history												
Tenure	3.9	4.0	0.107	0.271	3.8	3.7	-0.061	-0.122	3.7	3.6	-0.130	0.045
(years)			(0.110)	(0.147)			(0.123)	(0.161)			(0.106)	(0.146)
Experience	7.9	7.9	0.036	-0.065	8.2	8.4	0.160	0.021	8.4	8.4	-0.008	-0.058
(years)			(0.110)	(0.121)			(0.139)	(0.149)			(0.125)	(0.144)
Unemployment	0.4	0.5	0.021	-0.002	0.7	0.8	0.049	0.048	0.7	0.7	-0.002	-0.015
(years)			(0.025)	(0.035)			(0.037)	(0.052)			(0.034)	(0.049)
B. One year before birth												
Avg. daily earnings	34.2	34.1	-0.099	0.592	37.2	37.1	-0.099	0.986	40.1	40.1	-0.022	-0.511
			(0.426)	(0.677)			(0.615)	(0.860)			(0.685)	(0.826)
White collar	0.6	0.6	-0.020	-0.004	0.6	0.6	0.007	0.043	0.6	0.6	0.009	0.009
			(0.015)	(0.021)			(0.016)	(0.022)			(0.015)	(0.021)
Daily earnings	37.6	37.2	-0.419	-0.906	39.7	39.9	0.238	0.944	41.3	40.7	-0.665	-1.424
			(0.531)	(0.737)			(0.635)	(0.867)			(0.632)	(0.869)
Observations	2,165	2,284	4,449	8,572	1,937	1,919	3,856	7,754	2,199	2,152	4,351	8,541

Table A2. The Causal Effects of the Reforms for Mothers Giving Birth at Parities >1

	1990	1996	2000
	(1)	(2)	(3)
A. Return to Work			
Duration of PL	5.099	3.888	4.901
(censored at 60 months)	(0.873)	(0.841)	(0.756)
	27.920	*26.821*	*25.793*
Duration of PL	6.515	3.074	3.073
(for those back to pre-birth job)	(0.655)	(0.708)	(0.590)
	12.206	*16.693*	*15.788*
Duration of PL	2.330	2.718	5.182
(for those back to new job)	(1.247)	(1.164)	(1.079)
	29.556	*29.084*	*28.727*
Back within 60 months	-0.031	-0.032	-0.040
	(0.018)	(0.018)	(0.016)
	0.770	*0.845*	*0.857*
Back to pre-birth employer	-0.026	-0.048	-0.036
(censored at 60 months)	(0.020)	(0.023)	(0.020)
	0.498	*0.570*	*0.573*
Daily wage at 1st job after birth	1.012	-1.728	-0.402
	(0.760)	(0.866)	(0.829)
	31.700	*34.242*	*31.073*
Daily wage at 1st job after birth (pre-birth employer)	0.432	-2.856	-0.843
	(0.912)	(1.032)	(1.045)
	33.713	*36.059*	*31.617*
Daily wage at 1st job after birth (new employer)	2.124	0.088	-0.454
	(1.314)	(1.518)	(1.326)
	28.019	*30.470*	*29.973*
Number of observations	8,572	7,754	8,541

Notes: This table reports *DID-RD* estimates for the impacts of the 1990, 1996, and 2000 reforms. The samples include all mothers who gave birth at parities higher than one between May 1st and August 30th. Regressions compare differences in outcomes between the cohort exposed to the more generous regime and the cohort exposed to the less generous regime relative to the outcomes of pre- and post-July mothers who gave birth in the year preceding the reform. Estimates come from regressions that control for age at birth, and the following indicators for mothers' labor market performance measured 12 months before the child's birth: tenure, experience, months of unemployment, cumulative income, daily wages, and indicators for industry, region and white collar occupation. Regressions also control for the unemployment rates in the region of pre-birth employment at the end of the job protection and benefits payments periods. Robust standard errors are reported in parentheses. Standard errors are reported in parenthesis. Means of the comparison group (i.e., the group with access to the less generous regime) are reported in italics.

Table A3. The Causal Effects of the Reforms for Mothers Giving Birth at Parities >1

	1990	1996	2000
	(1)	(2)	(3)
A. Cumulative Outcomes in Year 5			
Months in employment	-2.793	-3.257	-3.908
	(0.790)	(0.769)	(0.720)
	22.219	*25.447*	*25.688*
Months unemployed	-3.037	-0.772	-0.696
	(0.451)	(0.306)	(0.279)
	7.155	*3.951*	*3.637*
Cumulative earned income	-2886.8	-3477.3	-4,833
	(1255.2)	(1427.3)	(1434.3)
	31,850	39,034	40,174
B. Labor Market Outcomes in Year 5			
Employed	-0.001	0.000	-0.036
	(0.021)	(0.023)	(0.021)
	0.548	*0.660*	*0.667*
Working for pre-birth firm	0.013	-0.032	0.019
	(0.028)	(0.028)	(0.026)
	0.519	*0.519*	*0.465*
Tenure with current employer	-0.863	-4.695	0.215
	(2.576)	(2.542)	(2.355)
	67.401	*65.105*	*58.823*
Months worked	0.016	-0.142	-0.507
	(0.236)	(0.250)	(0.227)
	6.607	*7.898*	*8.038*
Earnings per day worked	1.213	-0.958	-0.694
	(0.969)	(1.014)	(0.894)
	41.785	*44.010*	*44.345*
Earnings per calendar day	0.356	-0.655	-2.002
	(1.018)	(1.175)	(1.051)
	22.909	*29.057*	*29.362*
Annual income	66.5	477.7	-1,294
	(373.3)	(479.1)	(411.3)
	9,414	11,912	12,031
Number of observations	8,572	7,754	8,541

Notes: This table reports *DID-RD* estimates for the impacts of the 1990, 1996, and 2000 reforms. The samples include all mothers who gave birth at parities higher than one between May 1st and August 30th. Regressions compare differences in outcomes between the cohort exposed to the more generous regime and the cohort exposed to the less generous regime relative to the outcomes of pre- and post-July mothers who gave birth in the year preceding the reform. Estimates come from regressions that control for age at birth, and the following indicators for mothers' labor market performance measured 12 months before the child's birth: tenure, experience, months of unemployment, cumulative income, daily wages, and indicators for industry, region and white collar occupation. Regressions also control for the unemployment rates in the region of pre-birth employment at the end of the job protection and benefits payments periods. Robust standard errors are reported in parentheses. Standard errors are reported in parenthesis. Means of the comparison group (i.e., the group with access to the less generous regime) are reported in *italics* .