Working Paper

Income Constraints and Female Labor Supply during Parental Leave

Stefan Halbauer*

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Abstract

One of the driving forces behind the still-prevailing gender wage gap is the disproportionate impact of children on the careers of women. The majority of OECD countries offer a combination of cash benefits and job protection to alleviate income losses after childbirth and encourage job continuity thereafter. Employment possibilities during parental leave are usually limited by income constraints. While numerous studies analyze changes in the length of parental leave and find only minor effects on labor market outcomes of women in the longer run, little is known about the effect of income constraints during parental leave. Working in a reduced form during the baby break could foster careers of mothers, strengthen their attachment to the employer and may help to prevent the loss of human capital. Two Austrian reforms that changed the income constraints during parental leave quite drastically offer a quasi-experimental setting to examine the effect of income limits on female labor supply during parental leave. In 2002, a reform quadrupled the income threshold and mothers' employment in the months 11-17 after birth increased by 2-3 percentage points from a baseline of 7%. A shorter 12-month alternative to the already existing longer flat-rate benefits was introduced in 2010. These new income related benefits were financially very attractive for high-earning women, but accompanied by stricter income limits, which reduced employment of high-earning mothers in the first year after birth by more than 5 percentage points from a baseline of 12%. While this reform intended to foster mother's careers and improve the reconcilability of family and work, it strongly discouraged working in the first year after giving birth.

*PhD Candidate in Economics at the Vienna University of Economics and Business

1 Introduction

Female employment has grown considerably over the last few decades in Austria, while male employment remained stable on a high level.[1] The rising female employment was accompanied by an increase in part-time working arrangements for women.[2] While the gap in employment rates between childless women and mothers decreased over the last few decades, a parenthood gap in working hours has emerged (Berghammer and Riederer, 2020).[3] The high share of part-time employed women is one of the reasons for the high unadjusted gender pay gap in Austria (2018: 19.6% - Eurostat (2020)).

The diverse impact children have on labor market outcomes of women and men received a lot of attention in recent years. Kleven et al. (2019b) find that in Denmark, the part of gender inequality in wages that can be attributed to children has doubled between 1980 and 2013 (from 40 to 80%). They argue that the unexplained part of the gender wage gap found nowadays in most decomposition studies is largely due to children. Kleven et al. (2019a) estimate child penalties in six countries. They find that women in Austria face the second-largest long-run child penalties among those countries. In contrast to the United States and the United Kingdom, these penalties in Austria are not a result of extensive margin effects (employment), but mostly driven by the intensive margin (hours worked) and wage-rate effects.

Considering the huge impact children have on the gender wage gap, the importance of public policies for a more gender-equal society is obvious. Therefore, a vast amount of research deals with several aspects of family policies. For example, changes in the duration of parental leave induced by reforms were studied intensively and seem to affect women's return-to-work behavior, but the impact on women's labor market outcomes in the medium- and long-run is very limited (e.g. Lalive et al., 2013, Schönberg and Ludsteck, 2014, Dahl et al., 2016). Another well-studied family policy is public childcare. Expansions of institutional childcare were found to positively affect maternal employment by some authors (e.g. Nollenberger and Rodriguez-Planas, 2015, Kunze and Liu, 2019, Dhuey et al., 2021), while others found little to no evidence for any positive effects (e.g. Havnes and Mogstad, 2011). Even though childcare costs are considerable in many countries, several studies find only small to no effects of childcare subsidies on female labor market participation and working hours (e.g. Givord and Marbot, 2015, Zangerl and Pham, 2020). An extensive study by Kleven et al. (2020) combines those two strands of the literature and assesses the contribution of parental leave policies and child care expansions over 60 years in Austria to

[1] OECD (2020a): Austrian labor force participation rate (ages between 25 and 54):
Females: 1999: 75.7%; 2019: 85.7%; Males: 1999: 93.9%; 2019: 92.4%

[2] OECD (2020b): Austrian share of part-time employed over dependent employees aged between 25 and 54: Females: 1999: 27.3%; 2019: 34.4%; Males: 1999: 1.7%; 2019: 5.1%

[3] OECD (2012): Austrian women aged 25-54, childless or with children (< 15 years):
Employment rate: childless: 82.2%; with children: 74.6%
part-time employment: childless: 27.2%; with children: 52.1%

the long-run evolution of gender inequality. In line with most of the literature about parental leave extensions, they find a relatively small negative short-term effect on female labor market outcomes, but no effect over a longer time horizon of ten years. Additionally, they find no effect of expansions of publicly provided child care, neither considered individually nor interacted with parental leave policies.

Most parental leave systems limit women's labor supply during parental leave with income constraints, but this essential component of parental leave policies received little to no attention by economists. Part-time working arrangements in the first two years after childbirth could strengthen mothers' attachment to the employer and foster labor market careers of mothers. Keeping in touch with colleagues and clients might facilitate an easier re-entry for mothers and working at least some hours per week during the baby break may help to mitigate the loss of human capital, firm-, and job-specific skills. Furthermore, the decision of mothers to work during parental leave, even in a reduced form, instead of staying out of work completely could act as a signal to the employer about their future effort (see Tô (2018) for the signaling role of parental leave).

One drawback of early part-time returns to work is the possibility of a "lock-in" effect (Kunze, 2022). If the transition back to a full-time position gets less likely after working part-time, such working arrangements would have long-lasting negative consequences for mothers' careers. Such a "lock-in" effect could be driven by the demand side (e.g. discrimination by the employer), but also by the supply side (e.g. habituation). Evidence for the existence or absence of such an effect is scarce, but unpublished research by Regina T. Riphahn shows that in Germany women working in minor employment (*Minijobs*) after giving birth face lower chances of regular employment even ten years later.[4] Conversely, Baertsch and Sandner (2022) study a reform incentivizing part-time work for high-income mothers in Germany and do not find any evidence for the existence of such a lock-in effect.

In general, working in the first year after childbirth is rather the exception than the rule in Austria. Work in the second year was also quite uncommon until 2010 (see below and section 3 for a more detailed description of the parental leave reform of 2010). For an overview, a good showcase are mothers who gave birth in Austria in 2005 and worked in the private sector in the 2 years before. In 2005, the job protection for mothers lasted until 2 years after childbirth and parental leave benefits could be drawn up to 30 months after birth[5]. Benefit receipt was tied to an income threshold of €14,600. From those 25,428 women in my sample, 7,227 (28%) worked at least one month with income above the

[4] Two articles in German report about those findings:
https://www.oeaw.ac.at/news/karrierekiller-wenn-junge-muetter-auf-mini-jobs-setzen;
https://www.oeaw.ac.at/news/minijobs-verschaerften-die-karrierenachteile-durch-mutterschaft

[5] 36 months if the father draws parental leave benefits for at least 6 months.

minor employment threshold[6] in the months 6 to 23 after birth, primarily while drawing parental leave benefits (89%). And even for those women, such working arrangements were mostly temporary, since nearly half of them worked 6 or less out of these 18 months. Women in this sample, who worked in the first two years after childbirth, were on average older, more likely to be white-collar workers, had higher income before birth and shorter histories of unemployment. They were more likely to work in large companies (above 99 employees) and high-paid industries (e.g. Banking, Law, Insurance) and living in Vienna, but less likely to work in lower-paid industries (e.g. Cleaning, Retail).

Specifically looking at mothers' working behavior during the first year after birth, mothers who gave birth in Austria between January 2008 and September 2009 (not affected by the 2010 reform) and worked in the private sector in the 2 years before childbirth are quite informative. They faced a more generous income limit of €16,200 and could additionally choose shorter parental leave models with higher flat-rate benefits (20 or 15 months)[7]. 4,673 of those 44,350 women (10%) worked at least one month with income above the minor employment threshold (€349.01 in 2008) in the months 6 to 11 after birth, mostly while drawing parental leave benefits (86%). Again, those women had higher income and shorter histories of unemployment before birth, worked in better paid industries and were more likely to be white collar workers and living in Vienna.

Before 2002, the income constraints during parental leave were even stricter, only allowing for minor employment (€301.54 in 2002). This changed with a parental leave reform that quadrupled the income limit to €14,600, relaxed the eligibility criteria and prolonged the duration of benefit receipt.[8] Another reform in 2008 relaxed the income threshold even further to €16,200. Contrarily, the introduction of income-related parental leave benefits as an alternative to the already existing flat-rate benefits in 2010, which primarily aimed at high earning women, drastically lowered the income limit back to the minor employment threshold (€366.33 in 2010).[9]

The setup of these reforms offers a quasi-experimental setting to examine the effect of income constraints during parental leave on the labor supply of mothers. The effects of the two most drastic changes are analyzed in this paper. The increase of the income limit in 2002 affected all mothers. Employment in the

[6] *Geringfügige Beschäftigung*: Income up to €323.46 in 2005.

[7] 24 and 18 months if the father draws parental leave benefits for at least 4 or 3 months.

[8] See Lalive et al. (2013) for an analysis of the effect of this expansion of parental leave on mothers.

[9] This reform introduced an additional, shorter parental leave model that offers 80% of the net earnings from the pre-birth job with a minimum of €1,000 and a maximum of €2,000. In addition, income above the threshold did not result anymore in the need to pay back the whole benefit amount, but only the amount above the income threshold. See Bamieh and Ziegler (2023) for an analysis of the effect of the changes in the duration and the benefit amount in 2008 and 2010 on mothers.

months 11 to 17 after childbirth increased by 2 percentage points (from a baseline of 7.2% of women working during these months in the control group which was not affected by the reform), often at the pre-birth employer. While mothers with lower pre-birth income were stronger affected in terms of monthly earnings, high-income mothers were stronger affected in terms of employment. As expected, the reform of 2010 had the opposite effect for women with a higher income before birth and no effect on low-income mothers. For high-income mothers, the stricter income limits decreased employment in the first eleven months after childbirth by more than 5 percentage points (from a baseline of 12.4%) and monthly earnings by more than €100 (from a baseline of €277 - note that nearly 90% of women in the control group were not working and this is counted as 0 earnings pulling the mean downwards).

In the next section, the data for the empirical analysis is introduced. Section 3 provides an overview of the institutional setting in Austria. The analysis of the parental leave reform of 2000/2002 is presented in section 4 and the reform of 2010 in the following section. A short discussion about the policy implications follows in section 6 and section 7 concludes.

2 Data

The empirical analysis in this project is based on data from the Arbeitsmarktdatenbank (AMDB des AMS Österreich und des BMA). The AMDB is a linked firm-worker data set that covers the whole workforce in the Austrian private sector from 1972 onward (the data stems from the same sources and is very similar to the ASSD - Zweimüller et al., 2009). Information on a daily basis is available for spells of employment, unemployment, maternity leave (*Wochengeld*), parental leave benefit-receipt (*Kinderbetreuungsgeld / Karenzurlaubsgeld*) and childbirth. For each calendar year and employer identifier, individual earnings are recorded and additionally aggregated individual monthly income data is available starting in the year 2000. Employment spells contain information about the type of employment used to distinguish between blue- and white-collar employees. On the firm level, the data offers additional information about the geographical location and the industry affiliation. From 2004 onwards, information about the location of the main residence (NUTS-3) is available, and from 2007 on fathers can be matched over co-insurance data for 82-88% of mothers. Major drawbacks of this data set are that earnings are top-coded (*Höchstbeitragsgrundlage*: €75,180 gross per year in 2020), there is no information about working hours or occupation type.

3 Institutional Background

In Austria, the main burden of childcare falls on women, especially for mothers with very young children. The share of fathers over all recipients of parental leave benefits was constantly below 5% between 2008 and 2019 (StatisticsAustria, 2020b). In cohabiting households with children below the age of six, males spend on average 7.33 hours per day on paid word, while females spend only 2.35 hours on paid work. In such households, this discrepancy is reversed for unpaid work. Women spend more than twice as much time as men on child care and household chores (Wernhart et al., 2018). Additionally, the share of children below the age of three in institutional childcare facilities is still quite low, even though it increased from 7.7% in 2000 to 27.6% in 2019 (StatisticsAustria, 2020c).[10] These numbers hide the fact that only 56% of the 2044 municipalities in Austria even offered institutional childcare for children below the age of two and a half years in 2019 (StatisticsAustria, 2020e).[11]

Under these circumstances, the possibility to work with a young child at home, even in a very reduced form, often depends on the availability of alternative childcare arrangements during working hours for most mothers. One option is that fathers reduce working hours and stay at home to care for the child during the working hours of the mother. Alternatively, care could be provided by friends or extended family (e.g. grandparents of the children) or childminders (*Tagesmütter*).

In 2019, according to StatisticsAustria (2020a), around 38.2% of the 235 thousand women, aged between 15 and 64 years in Austria, who lived with a child below the age of three were working. The majority of those 90 thousand women was working part-time (28.8% below 16 hours per week, 50.8% between 16 and 35 hours per week, 20.2% above 35 hours per week).

However, even if mothers of young children have childcare arrangements that allow them to work at least a few days per month, most of them are on a job-protected leave and draw parental leave benefits. It is important to note that there is a distinction between the job-protected period after giving birth (*Elternkarenz*) and the period of parental leave benefit-receipt (*Kinderbetreu-*

[10] 2.2% of children below one year, 24.4% of children aged one year, and 54.3% of children aged 2 were in institutional childcare facilities in 2019 (StatisticsAustria, 2020d). The share of children between three and five years in institutional childcare facilities increased from 77.6% in 2000 to 93.4% in 2019 (StatisticsAustria, 2020c).

[11] 46.7% of the municipalities offered facilities exclusively dedicated to children below the age of three (*Krippen, Kleinkindbetreuungseinrichtungen*) and additional 9.3% offered a facility for mixed ages (*altersgemischte Einrichtungen* - the minimum age in these facilities depends on the county and ranges from one to two years). in 2019, 27.3% of the facilities exclusively dedicated to children below the age of three (*Krippen, Kleinkindbetreuungseinrichtungen*) were opened for less than 8 hours per day and 21.3% were closed for more than 25 days per year (StatisticsAustria, 2020f). Every municipality offers either a *Kindergarten* (available for children aged three and above, except for two counties with a minimum age of two and a half years) or a facility for mixed ages.

ungsgeld / Karenzurlaubsgeld) in Austria and that both of them are conditional on mother's income in Austria. Job protection means that employers are obligated to offer women the same or a comparable job after returning from the baby break until the second birthday of the child. During this job-protected period, minor employment (*geringfügige Beschäftigung*: up to €460.66 per month in 2020) is possible during the whole duration. Since 2002, women could earn income above this threshold for up to a quarter of the duration (13 weeks for a whole year). The pre-birth employers are not obligated to offer any employment during the job protected period, but their consent is required if a woman wants to work for a different employer during this time, regardless of whether the employment is below or above the threshold for minor employment.[12]

Working during parental leave benefit-receipt is possible, but limited by an income threshold. This threshold was changed several times in the last few decades and so were the sanctions for exceeding it. The most drastic change was implemented through the parental leave reform of 2000, which was partly motivated by the *dramatic* decrease in birth numbers during the 1990s (from around 95 thousand per year in 1992 to 78 thousand in 1999). The conservative government parties (*ÖVP* and *FPÖ*) argued that the reform should give parents the possibility to stay at home with their kids, reduce poverty, and increase the distributive justice by abolishing the working requirements and, thereby, expanding the number of beneficiaries. Before 2002, any earnings above the minor employment threshold (up to €296.2 per month in 2001) meant that parental leave benefits for the whole calendar year needed to be paid back. This threshold was raised to €14,600 per year in 2002[13] and another time in 2008 to €16,200 per year. The rules for exceeding this threshold were also changed in 2008. From that year on, only the amount exceeding the threshold had to be paid back. In 2010, an individual threshold was introduced in addition to the fixed amounts. The individual threshold amounted to 60% of the earnings in the calendar year before childbirth and was only applicable if it exceeded €16,200 per year. For the income-related parental leave benefits, also introduced in 2010, a different, much lower, income threshold applies (2010: €5,800 per year; 2012: €6,100 per year; 2013: €6,400 per year).

[12] The law defines no consequences for exceeding the income threshold during the job-protected period or working during this time without the pre-birth employers consent. A possible consequence would be the end of the job-protected period, but, to my knowledge, not a single case regarding such violations was brought in front of court and legal uncertainty remains.

[13] The income regarded for these thresholds lies in-between the gross and net earnings. For example in 2002, the earnings ceiling amounted to a gross salary of around €1,130 per month (around €15,820 per year including the 13th and 14th special payments generally common in Austria).

4 The Parental Leave Reform of 2000/2002

4.1 Empirical Approach - Reform of 2000/2002

To assess the effect of income constraints on female labor supply during parental leave, I exploit the variation in income limits during parental leave induced by two reforms in Austria. The most promising reform happened in 2002. Not only did the limit for income earned during parental leave benefit-receipt quadruple, but also the restrictions for paid work during the job-protected period were softened. Instead of a fixed income limit during job protection equal to the threshold for minor employment (up to €301.54 per month in 2002), women could earn income above this threshold for a quarter of the duration (e.g. 13 weeks for a whole year). Both rules applied to births after June 30, 2000 and the new thresholds applied to income earned after December 31, 2001. Women who gave birth during this transition period were already eligible for a longer duration of parental leave benefit-receipt – 30 instead of 18 months with 6 additional months if both parents draw parental leave benefits for at least 6 months.

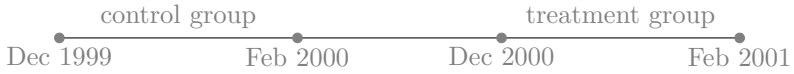
To evaluate the impact of this elevated income threshold on mothers' labor supply during the baby break, I restrict the sample to mothers between the ages of 20 and 45 working in the private sector. The treatment group consists of mothers who gave birth between December 2000 and February 2001.[14] I observe their monthly labor earnings between August 2001 and May 2002. Thus, I consider earnings in five months with a lower and five months with a higher income threshold. Their children were aged between 6 and 8 months in August 2001 and between 15 and 17 months in May 2002. The control group consists of mothers who gave birth between December 1999 and February 2000. For the control group, monthly earnings between August 2000 and May 2001 are considered. While the treatment group was eligible to parental leave benefits until their child was two and a half years old, for the control group the eligibility for parental leave benefits ended 18 months after childbirth. With this setup, I assess the differences in labor market outcomes (e.g. employment, monthly earnings) between 2001 and 2002 for the treatment group (lower vs. higher

[14] This reform was implemented on January 1, 2002 and the law was published in August 2001. Hence, manipulation of conception or delivery dates as a result of the enactment can be ruled out for the treatment group. Nevertheless, the new parental leave benefits (*Kinderbetreuungsgeld*) were already roughly outlined in the government program from February 2000 (amount of the cash benefits, abolishment of the working requirements, and the planned enactment date – January 2002 – including the retrospective extension of benefit payment for births from July 2000 onward). Some details differed from the actual law (extension to 24+12 months of benefit payment was planned, but 30+6 months were enacted) and some proposals remained vague (*higher* income threshold, but no explicitly mentioned amount). Selection into fertility due to these announcements is possible, but a successful conception in the first few months after the announcement of the planned reforms is an ambitious goal. It is unlikely that a noteworthy share of the sample could be affected. It is even less likely that a popular petition from September 1999, which among other things, demanded the introduction of the *Kinderbetreuungsgeld*, had any effect on planned fertility (183 thousand signees). Additionally, figure 11 in the Appendix shows no signs of bunching around the reform date.

income threshold), relative to differences in earnings between 2000 and 2001 for the control group (only lower income threshold).

This approach can be summarized visually in the following way:

Births: (Dec 2000 – Feb 2001) vs. (Dec 1999 – Feb 2000)



Labor market outcomes in:
2000–2001 for control group
2001–2002 for treatment group

The following difference-in-differences event study model is estimated (standard errors are clustered at the birth month level) using the *fixest* package (Bergé, 2018) in R (R Core Team, 2023)[15]:

$$
\begin{aligned}
Y_{ictm} = & \sum_{n \epsilon \{Dec, Jan, Feb\}} \alpha_n \; \mathbb{1}\{m = n\} + \\
& + \sum_{u \epsilon \{Aug, Sep, Oct, Nov, Jan, Feb, Mar, Apr, May\}} \beta_u \; \mathbb{1}\{t = u\} + \theta \; D_c + \\
& + \sum_{u \epsilon \{Aug, Sep, Oct, Nov, Jan, Feb, Mar, Apr, May\}} \gamma_u \; D_c \; \mathbb{1}\{t = u\} + \varepsilon_{ictm}
\end{aligned}
\tag{1}
$$

Y_{ictm} represents the labor market outcome (e.g. employment, monthly earnings) in calendar month t (August-May) of mother i of birth cohort c who gave birth in calendar month m. D_c is an indicator equal to one if the mother gave birth during the transition period of the 2000 reform (treatment group – births between December 2000 and February 2001) and equal to zero for births unaffected by the 2000 reform (control group – births between December 1999 and February 2000). $\mathbb{1}\{.\}$ is the indicator function. The overall mean difference in outcomes between treatment and control group is captured by θ. Birth-month fixed effects α_n control for seasonality and effects of the age of the child (e.g. children born in December are 6-15 months old in the months August to May)

[15]The results are virutally the same when using individual fixed effects and clustering standard errors at the individual level instead.

on mothers' labor supply. The parameters β_u measure the monthly time profile of earnings in the control group and γ_u measure the difference in time profiles between the treatment and control group relative to the reference month December. The coefficients of interest are the γ_u for the months January to May. If the elevated income thresholds had any effect on earnings these coefficients would be significantly different from zero.

4.2 Results - Reform of 2000/2002

The following six graphs show the effect of the parental leave reform of 2000 for two sub samples: women with low and high pre-birth earnings. Pre-birth earnings are defined as the accumulated earnings in the years 2 and 3 before birth (the 12 months directly before birth might be less comparable/informative due to varying length of the maternal protection period before birth - e.g. risk pregnancies or premature births). The sample is split at €30,000 (approximately twice the yearly median income for females) resulting in a sample of 7,492 women with high pre-birth earnings and 4,630 with low pre-birth earnings. For a comparison of the treatment and control group, see section 8.4 in the Appendix.

The three different outcomes considered are the following:

- Employment is defined as an indicator for earnings in that calendar month above the minor employment threshold (e.g. €296.2 in 2001)
- Employer Continuity - Employment at the pre-birth employer (pre-birth employer is defined as the main employer 12 months before birth)
- Monthly Earnings

It is quite clearly visible that the reform of 2000 increased employment by around 2 percentage points from a baseline of 3% in month 1 (January) and 5% in month 4 (April) for the low-income group. A little bit stronger effects up to 3 percentage points were found for the high-income group from a baseline of 7% in month 1 and 11% in month 5. For both groups a good part of these employment increases happened at the pre-birth employer. For low-income mothers, also monthly earnings increased by around €20 in months 1 to 4 from baseline values between €49 in month 1 and €87 in month 4.[16] No effect on monthly earnings can be found in month 5. For high-income mothers the effect of the reform on monthly earnings is smaller and insignificant. For the results tables, see section 8.2 in the Appendix.

Before the reform of 2000, employment for mothers during parental leave benefit receipt was only allowed below the minor employment threshold or by pausing

[16] Note that these baseline values represent the means of monthly income in the respective months for the control group and since most mothers do not work, their 0 incomes pull down the mean.

the benefit receipt for one or more calendar months. The drastic increase of the income limit induced mothers to increase employment and this increase happened nearly entirely combined with benefit receipt. While this reform affected employment of both, high- and low-income mothers, monthly earnings were only affected for low-income mothers. A possible explanation is that before the reform, high-income mothers could easier forgo benefits in order to be able to work than low-income mothers.

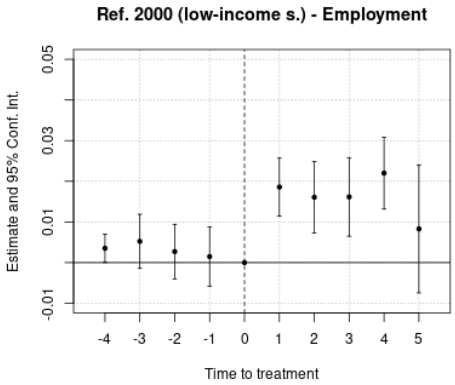


Figure 1: Reform 2000 (low-income sample): Effect on Employment

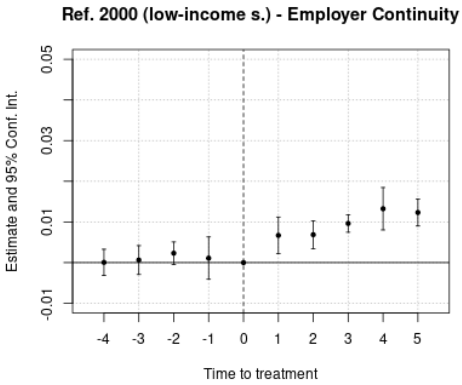


Figure 2: Reform 2000 (low-income sample): Effect on Employer Continuity

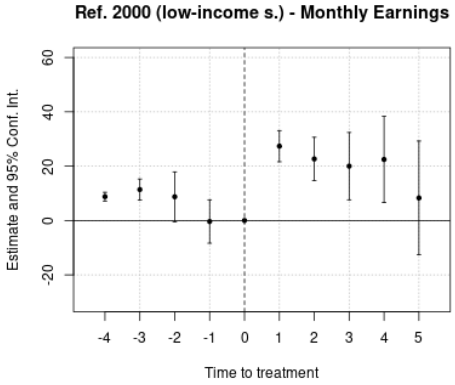


Figure 3: Reform 2000 (low-income sample): Effect on Monthly Earnings

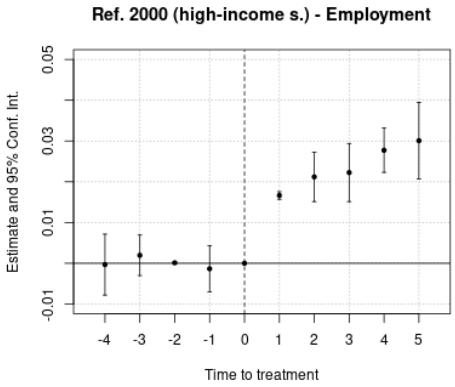


Figure 4: Reform 2000 (high-income sample): Effect on Employment

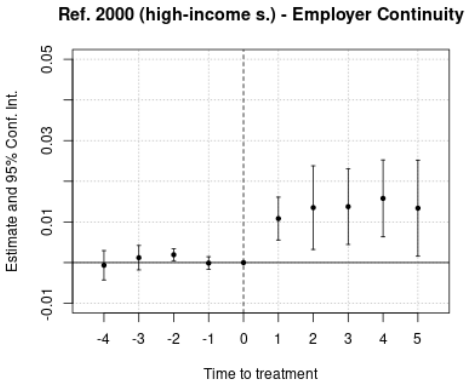


Figure 5: Reform 2000 (high-income sample): Effect on Employer Continuity

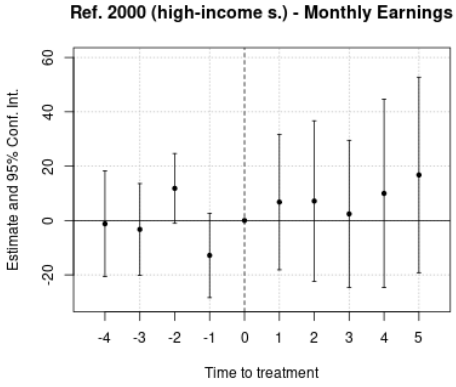


Figure 6: Reform 2000 (high-income sample): Effect on Monthly Earnings

5 The Parental Leave Reform of 2010

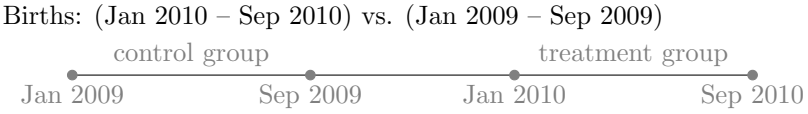
5.1 Empirical Approach - Reform of 2010

Another interesting reform, especially for high-income mothers, was enacted in 2010. Mothers who gave birth before October 2009 could choose between three different variants of flat-rate parental leave benefits with a maximum duration of 15, 20, or 30 months; monthly payments of €800, €624, or €436; and additional 3, 4, or 6 months if both parents draw parental leave benefits for at least 3, 4, or 6 months. For mothers who gave birth after December 31, 2009, two additional variants were added. Both variants granted parental leave benefits up to 12 months after birth (up to 14 months after birth if both parents draw benefits for at least 2 months), but one offered a monthly flat-rate amount of €1,000 and the other offered substantially higher income-related benefits equal to 80% of net earnings before birth (floor: €1,000 monthly; ceiling: €2,000 monthly). For the flat-rate versions, an income threshold during benefit-receipt of €16,200 per year applied (or an individual threshold of 60% of pre-birth earnings), but a much lower income threshold of €5,800 per year applied for the income-related benefits. A transition period was granted to mothers who gave birth between October 1, 2009 and December 31, 2009.

To evaluate the effect of this lower income limit for income-related benefits on mothers' labor supply, the sample is again restricted to mothers between the ages of 20 and 45 working in the private sector. Mothers could be eligible for income-related benefits above €1,000 monthly, but choose a flat-rate version, because of the more generous income constraints or other reasons. To ensure that only mothers who would choose the income-related parental leave bene-

fits are included, the sample is restricted to mothers with pre-birth earnings that would grant income-related parental leave benefits of at least €1,500 per month. For most of those mothers, the incentive to choose a flat-rate version is negligible. I assess the difference in labor market outcomes (e.g. employment, monthly earnings) over a longer time span around birth (12 months before childbirth until 96 months after) between mothers who gave birth between January and September 2010 (affected by the reform)[17] and mothers who gave birth between January and September 2009 (neither affected by the reform nor the transition period).

This approach can be summarized visually in the following way:



Labor market outcomes between 12 months before birth until 96 months later are considered (the effect of the income constraints is seen until 11 months after birth; from the 12th month after birth onward, the effect of the introduction of the two 12-month parental leave options is most probably the main driver of any effects)

The following difference-in-differences event study model is estimated (standard errors are clustered at the birth month level) using the *fixest* package (Bergé,

[17] The government program from November 2008 briefly mentions the plan to introduce income-related parental leave benefits, but without explicitly stating any amounts. The introduction date of January 1, 2010 for the income-related parental leave benefits was mentioned first in parliament in March 2009, but again without specific amounts. The first time a government official mentioned the substantial increase of up to €2000 per month was in the beginning of September 2009 (*Familienstaatssekretärin* Christine Marek). Considering the timeline and vagueness of government communication regarding income-related parental leave benefits, selection into fertility seems to be of minor importance. Furthermore, the actual number of births in the end of 2009 and the beginning of 2010 show no sign of any effect on realized fertility (the numbers of births in the months September 2009 until April 2010 differ from the average numbers of births in the same months of the previous 10 years by -3 to +1% without a discernible pattern). Since mothers who gave birth in December 2009 faced virtually the same parental leave regime as mothers who gave birth in January 2010, concerns about manipulation of conception or delivery dates can be clearly dismissed. Regarding the significantly lower income threshold for the income-related parental leave benefits, the first news articles about these lower income limits were published in August 2009 (e.g. https://www.derstandard.at/story/1250691186421/kindergeld-regierung-schickt-neues-kindergeld-in-begutachtung). Additionally, figure 12 in the Appendix shows no signs of bunching around the reform date.

2018) in R (R Core Team, 2023)[18]:

$$
\begin{aligned}
Y_{ictm} = & \sum_{n \epsilon \{Jan, Feb, \ldots, Aug, Sep\}} \alpha_n \; \mathbb{1}\{m = n\} + \\
& + \sum_{u \epsilon \{-12, -11, \ldots, -1, 0, 1, \ldots, 95, 96\}} \beta_u \; \mathbb{1}\{t = u\} + \theta \; D_c + \\
& + \sum_{u \epsilon \{-12, -11, \ldots, -1, 0, 1, \ldots, 95, 96\}} \gamma_u \; D_c \; \mathbb{1}\{t = u\} + \varepsilon_{ictm}
\end{aligned}
\tag{2}
$$

Y_{ictm} represents the labor market outcome (e.g. employment, monthly earnings) in calendar month t (month 12 before birth up to month 96 after birth) of mother i of birth cohort c who gave birth in calendar month m. D_c is an indicator equal to one if the mother gave birth in 2010 (treatment group - affected by the 2010 reform) and equal to zero if the moter gave birth in 2009 (control group - unaffected by the 2010 reform). $\mathbb{1}\{.\}$ is the indicator function. The overall mean difference in outcomes between treatment and control group is captured by θ. Birth-month fixed effects α_n control for seasonality. The parameters β_u measure the monthly time profile of earnings in the control group and γ_u measure the difference in time profiles between the treatment and control group relative to the month of birth. The coefficients of interest are the γ_u for the months 2 to 11 after birth (labor market outcomes in the months afterwards are most probably mainly affected by the introduction of the shorter parental leave options and only to a minor extent by the reduced income threshold during parental leave). If the elevated income thresholds had any effect on earnings these coefficients would be significantly different from zero.

5.2 Results - Reform of 2010

The following 4 graphs show the effects of the parental leave reform of 2010 on the same 3 outcomes as defined in section 4 and the following additional outcome:

- Employment during parental leave is defined as an indicator for employment during a calendar month during parental leave benefit receipt (employment without parental leave during these months could happen if the mother paused the benefit receipt for this calendar month, the father could be on leave or the mother's leave already ended)

[18]The results are virutally the same when using individual fixed effects and clustering standard errors at the individual level instead.

The sample is restricted to mothers with pre-birth earnings high enough to ensure income-related parental leave benefits of at least €1,500 per month. For those mothers, the accompanying drastically lower income limit is quite surely binding, since the incentive to choose such high benefits (€1,500 monthly income-related benefits instead of €1,000 flat-rate benefits) outweighs the disadvantage of lower income limits for the vast majority of mothers. This reduces the sample size from 34,800 to 8,535 women. For a comparison of the treatment and control group, see section 8.5 in the Appendix.

The graphs show a strong reduction in employment induced by the stricter income limits of around 5 percentage points (from baseline values ranging from 10 to 15%), which gets stronger over time until month 11 after birth. This drop in employment is nearly entirely happening during months of benefit receipt and to a lesser extent for employment at the pre-birth employer. A drop in monthly earnings is visible as well, ranging from €93 to €160 from a baseline of €200 to €400.[19] The credibility of the effect on monthly earnings is stained by pre-trends in the months 12 to 5 before childbirth. The most likely explanation are anticipation effects by mothers. Since the income-related benefits are calculated over the last 3 calendar months before maternal leave (*Wochengeld / Mutterschutz*), which usually starts 2 months before the expected date of childbirth and earlier for risk pregancies, the incentive is high to boost income in those months. For the results tables, see section 8.3 in the Appendix.

For the full sample, the effects are quite similar, but weaker in magnitude. Conversely, for the sub-sample of mothers with low pre-birth earnings granting at most €1,050 monthly (nearly no incentive to choose the income related benefits), no effects can be found in the first 11 months after birth, but later on the effects of the introduction of the income-related parental leave benefits and the 12-month flat-rate model are clearly visible.

The same pattern starting a year after birth (note that the reform introduced new and shorter parental leave options with a maximum duration of 12 months) can be observed for the whole sample and the sample of mothers with high pre-birth earnings - a strong positive effect in monthly earnings and employment for the next year that slowly fades out after. As mentioned before, this is obviously induced by the shorter income-related parental leave benefits and not the accompanying income limit.

[19] Note that these baseline values represent the means of monthly income in the respective months for the control group and since most mothers do not work, their 0 incomes pull down the mean.

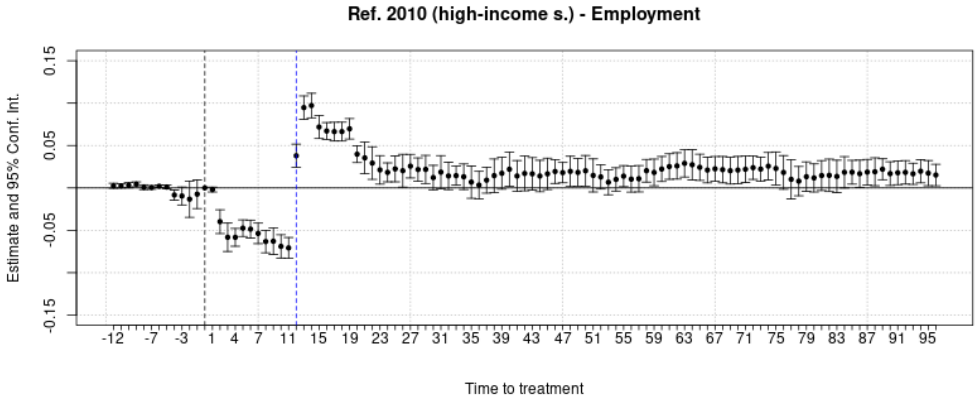


Figure 7: Reform 2010 (high-income sample): Effect on Employment

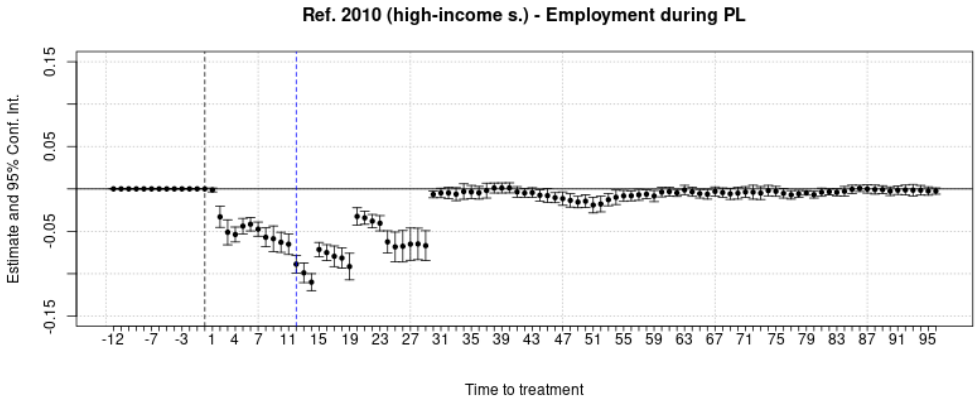


Figure 8: Reform 2010 (high-income sample): Effect on Employment during PL

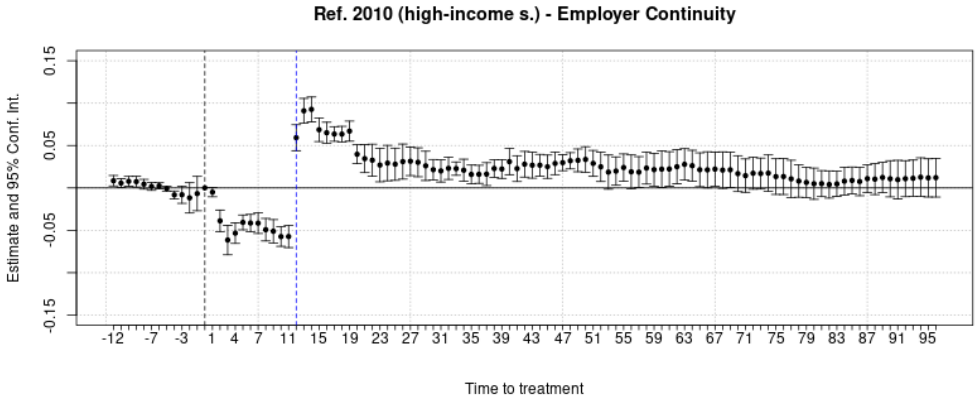


Figure 9: Reform 2010 (high-income sample): Effect on Employer Continuity

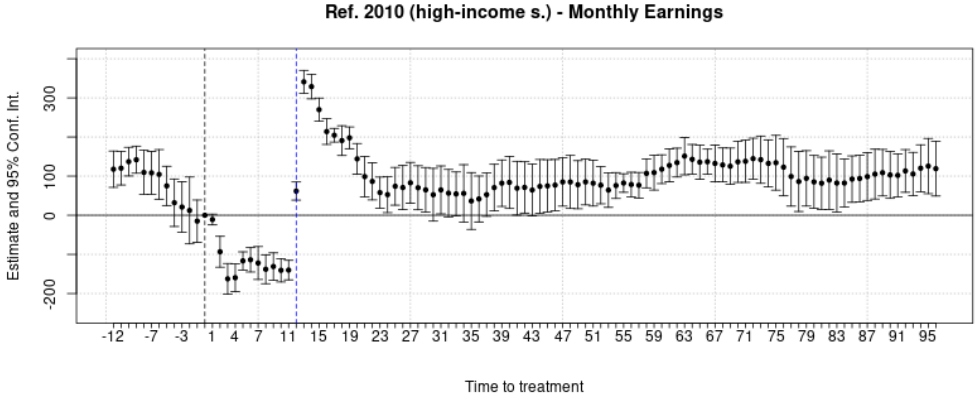


Figure 10: Reform 2010 (high-income sample): Effect on Monthly Earnings

6 Discussion

Income constraints during parental leave seem to strongly affect the decision of mothers to work after childbirth. While many government and social insurance benefits are means-tested and tied to income limits to avoid misuse and offer help only to those in need (e.g. unemployment benefits, old-age pension), the goals of the parental leave system changed in the last few decades and are somewhat different. The Austrian government program of 2007 mentions the

increase of the income threshold as a means to safeguard families financially. The government program of 2008 states that the introduction of the income-related parental leave benefits aims to foster mother's careers, improve the reconcilability of family and work, and increase fathers' participation. Moreover, the program states that the rules for calculating the admissible income during parental leave should be made easier and announced the introduction of income limits dependent on pre-birth income. It was not mentioned explicitly, but a similar reform in Germany aimed at increasing fertility of highly educated and high-earning women (see Raute (2019) for further information).

Considering the intentions behind modern parental leave regulations, it is counter-intuitive to discourage women from working, even if they receive parental leave benefits. A counter-argument would be fairness and austerity concerns, in the sense that high-earning women, not in need of help from the government, would be able to receive a higher monthly income (including benefits) during parental leave without income constraints than before birth (e.g. if they do not reduce working hours). But regarding fairness another argument against income constraints, much more in line with the intentions behind modern parental leave regulation, can be made with the following example:

Two families with similar pre-birth income apply for income-related benefits after childbirth. In both families the mother draws the benefits. In family A, the mother does not work during parental leave and the father does not reduce working hours, while the mother in family B works in a reduced form and the father reduces working hours accordingly to take care of the child during the mother's working hours. In this scenario family A continues to receive the pre-birth income from the father and the mother receives benefits. Family B faces a reduction in income for the father, which is (partly) offset by the earnings of the mother, but every Euro above the income limit reduces her parental leave benefits. Even though family B follows the intentions of the legislator much closer (higher participation of the father, more career-oriented mother, better reconcilability of family and job), this behavior would get sanctioned through income constraints during parental leave.

Furthermore, practical concerns play a role here too. In a recent survey by the Austrian chamber of labor[20], 60% stated that they are not satisfied with the Austrian parental leave regulations. The main reasons for this dissatisfaction were the complicated rules (62%) and the rules concerning income constraints (51%). Additionally, the very long time required for processing applications and the overboarding bureaucracy are mentioned by many respondents.[21] If

[20] The short report in German can be found here:
https://wien.arbeiterkammer.at/service/presse/PK_-_Kinderbetreuungsgeld_Weg_mit_den_familienfeindlichen_Hu.pdf

[21] An early evaluation of the parental leave reform of 2008 (Rille-Pfeiffer et al., 2009) reveals similar opinions regarding the income constraints during parental leave. 52.3% of respondents assess the change regarding the sanctions for exceeding the income limit during parental

already the applications sometimes take several months for processing, controlling individual income, calculating individual income thresholds and demanding payback of benefits seems like an excessive burden for the seemingly overloaded public servants.

In addition to these concerns, also employers could suffer when women get discouraged from working during parental leave, even in a very reduced form. This may be particularly a concern for women in very specialized or important positions, which are hard to substitute. A series of studies analyze the effects of parental leave on firms. For the duration of the absence, employers need to find replacements, which can be costly and time-consuming, or shift the burden to co-workers. In general, the effects of parental leave on firms seem to be small, but Brenøe et al. (2023) and Ginja et al. (2023) find stronger negative effects for firms with few internal substitutes. In contrast, Huebener et al. (2022) find that birth-related absences have only small effects on firms up to 50 employees, even though "smaller firms appear more susceptible to negative effects of longer absences than larger firms".

7 Conclusion

In this paper, I analyze the effect of income constraints on female labor supply during parental leave. Two different reforms changed those income limits quite drastically and offer a quasi-experimental setting that enables me to evaluate the effect of income thresholds during parental leave on mothers' labor supply during this time from two different perspectives. First, the income threshold was increased for all mothers. Second, a much stricter income limit mainly affecting high-income women was introduced.

Both reforms had significant effects in the expected direction on employment. The reform of 2000 quadrupled the income limit from a low level, the minor employment threshold, and increased employment in the months 11-17 after birth by 2-3 percentage points from a baseline of 7% for all mothers. Monthly earnings increased by approximately €20 from baseline values ranging from €49 to €87[22] for low-income mothers, but no significant effect on earnings could be found for high-income mothers. In the treatment group, most mothers worked besides receiving parental leave benefits after the income limits were raised. I speculate that high-income mothers who wanted to work under the regime with

leave - only the amount exceeding the threshold has to be paid back and not the whole amount of benefits received - as very important (19.8% as important). And 48% assess the increased income limits as very important (19.5% as important), while only 41.9% assess the introduction of the newly introduced shorter parental leave options as very important (30.7% as important).

[22]Note that these baseline values represent the means of monthly income in the respective months for the control group and since most mothers do not work, their 0 incomes pull down the mean.

the low income thresholds could forgo benefits much easier than low-income mothers and therefore earnings were not significantly affected by the reform for high-income mothers.

The reform of 2010 only affected high-income mothers, because for most low-income mothers the income-related benefits were no viable option and therefore nothing changed for them in terms of income limits during parental leave. For high-income mothers the reform brought a sharp reduction of 5 percentage points from a baseline of 12% in the first 11 months after birth. Monthly earnings decreased in the first 11 months after birth by €93 to €160 from baseline values ranging from €200 to €400. Not much can be said about effects beyond this time window, because starting in month 12, labor market outcomes of women were most probably mainly affected by the introduction of the shorter parental leave options and only to a minor extent by the reduced employment before.

Especially the strict income limit applying to women receiving income-related parental leave benefits strongly affected their decision about working in the first 11 months after birth. For women in very specialized or important positions, as well as for women who cannot be easily substituted, this could be very detrimental for their employers. Ginja et al. (2023) show that the effect of a 3-month parental leave expansion on firms in Sweden strongly depends on the availability of internal substitutes. Similar findings were reported by Brenøe et al. (2023).

A related and very important question is if working part-time during parental leave, instead of staying out of work completely during that time, actually improves mothers' subsequent labor market prospects. In a future draft of this working paper, I plan to incorporate two approaches trying to answer this question and additional robustness checks for sections 4 and 5.

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8 Appendix

8.1 Bunching of births

The following two graphs show no sign that bunching of births occured around the reform dates or edge days of the treatment and control groups. The graphs show the number of births by calendar day around the reform dates. The short horizontal stripes in blue show the mean number of births within the different birthmonths of the control group, while the short red horizontal stripes show the mean number of births within the months of the treatment group. The green stripes show the mean number of births within the same calendar months which neither belong to the treatment nor the control group. The gray stripes show the mean number of births within the remaining months.

Even though the number of births varies a lot between different calendar months, this seasonality is common for the occurrence of births with a peak between July and September and low numbers of births especially in the months February, March, April and December. See figure 15 for a visualization showing the seasonality of first order births in the years 2005 to 2016 in Austria. In this graph, the number of births is divided by the number of days in the respective month, multiplied by the number of days in the respective year, divided by the number of births in the respective year resulting in a value around 1. For a better visualization, this value is multiplied by the mean number of daily births over the whole timespan from 2005 to 2016. This approach should account for the different number of days in the calendar months and the different number of births in each year.

Apart from the common seasonality in the number of births, no sign of bunching of births is visible. Neither around the reform dates, nor around the edge days of the treatment and control groups.

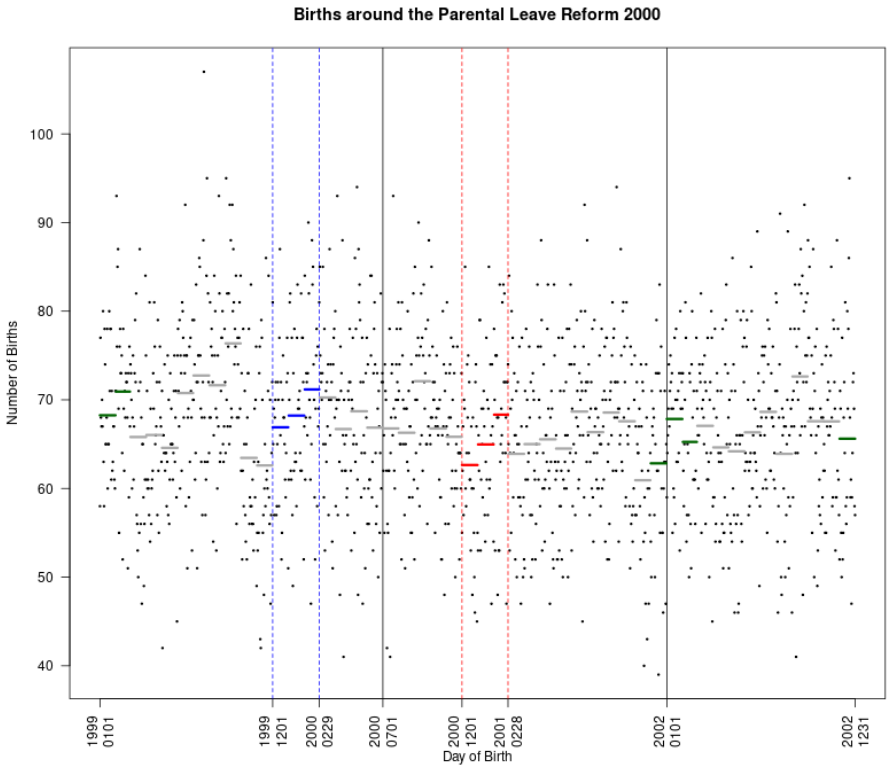

Figure 11: Number of births by calendar day - 2000 reform

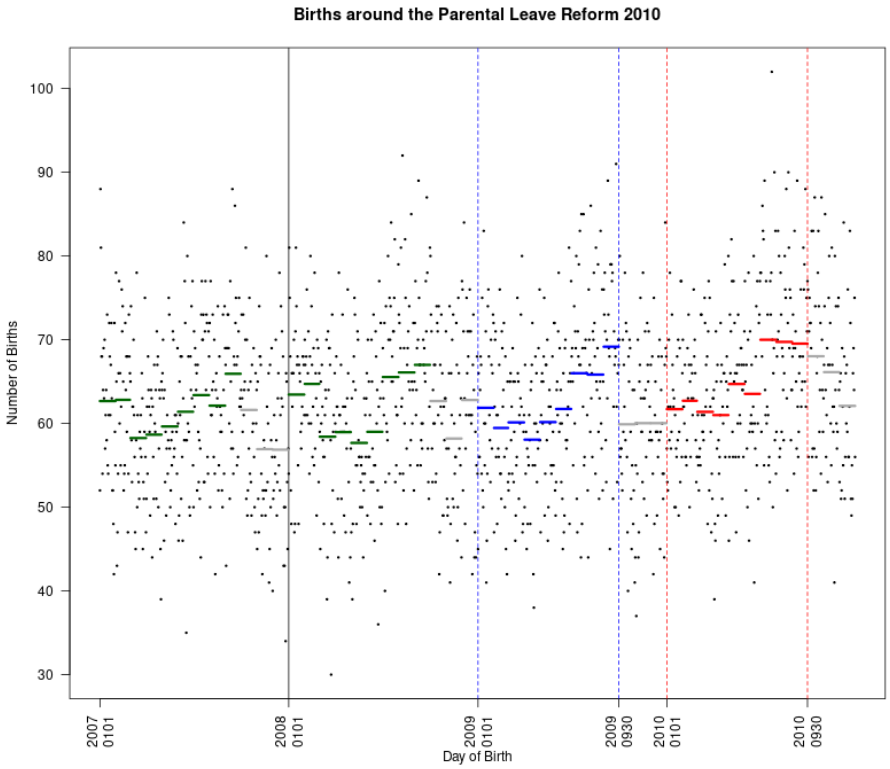

Figure 12: Number of births by calendar day - 2010 reform

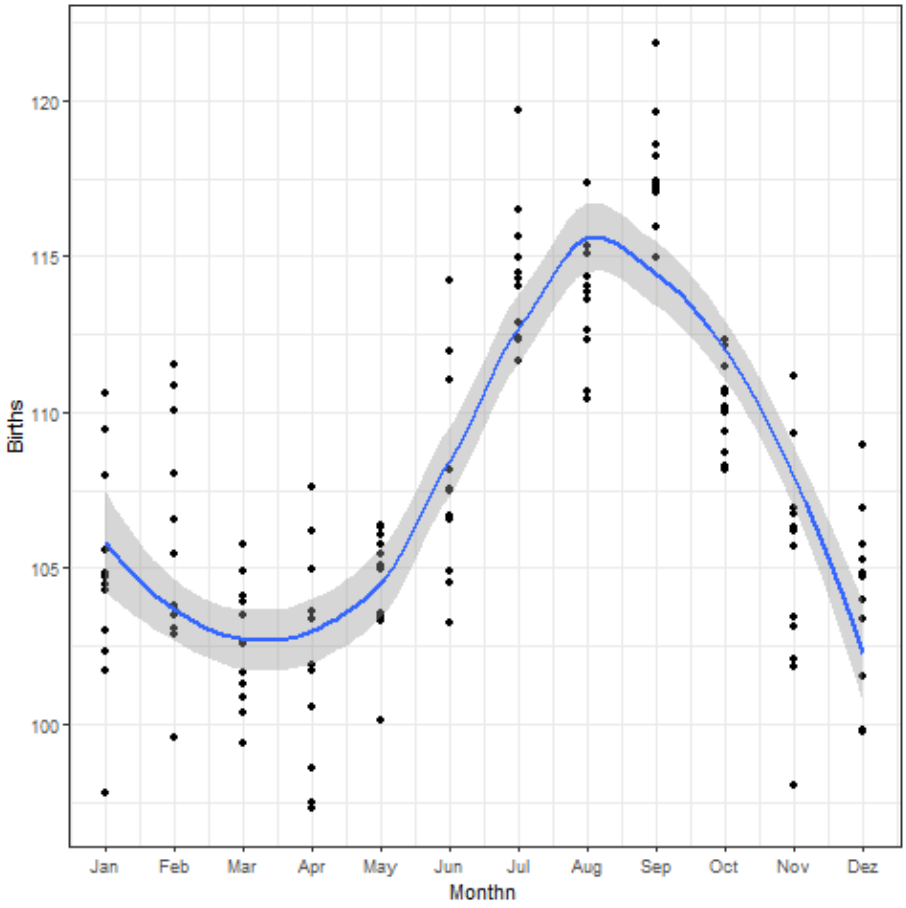

Figure 13: Seasonality in the number of First Order Births between 2005 and 2016

8.2 Results tables - Reform of 2000/2002

The following six tables report the coefficients of interest (month interacted with treatment) for the months 1 to 5 or January to May (2002 for the treatment group & 2001 for the control group), standard errors (clustered at the birth month level) and the mean of the outcome in the control group. The first three tables report results for the low-income sample (4,630 individuals) and the next three tables report results for the high-income sample (7,492 individuals). The outcomes considered are: employment (earnings in that calendar month above the minor employment threshold - e.g. €296.2 in 2001), employer continuity (pre-birth employer defined as the employer 12 months before birth) and monthly earnings.

	1	2	3	4	5
t × treat	0.018585	0.016069	0.016148	0.022003	0.008287
Std. Error	0.003624	0.004470	0.004925	0.004516	0.008023
Mean of control	0.027940	0.036280	0.043369	0.043786	0.052127

Table 1: Reform 2000 (low-income sample): Effect on Employment

	1	2	3	4	5
t × treat	0.006693	0.006848	0.009630	0.013245	0.012318
Std. Error	0.002307	0.001749	0.001104	0.002661	0.001693
Mean of control	0.012093	0.014178	0.015430	0.015847	0.015430

Table 2: Reform 2000 (low-income sample): Effect on Employer Continuity

	1	2	3	4	5
t × treat	27.36081	22.65865	20.00914	22.46410	8.30597
Std. Error	2.92658	4.06613	6.31923	8.09574	10.68091
Mean of control	49	56.7	74.6	73.5	86.8

Table 3: Reform 2000 (low-income sample): Effect on Monthly Earnings

	1	2	3	4	5
t × treat	0.016639	0.021188	0.022256	0.027729	0.030074
Std. Error	0.000474	0.003089	0.003635	0.002769	0.004780
Mean of control	0.071855	0.083528	0.096757	0.100908	0.107912

Table 4: Reform 2000 (high-income sample): Effect on Employment

	1	2	3	4	5
t × treat	0.010824	0.013522	0.013760	0.015793	0.013386
Std. Error	0.002684	0.005247	0.004746	0.004824	0.006030
Mean of control	0.052140	0.060441	0.069001	0.070817	0.076524

Table 5: Reform 2000 (high-income sample): Effect on Employer Continuity

	1	2	3	4	5
t × treat	6.7973	7.1594	2.4354	9.9667	16.7749
Std. Error	12.7172	15.0770	13.8234	17.6769	18.3550
Mean of control	180	193	249	252	272

Table 6: Reform 2000 (high-income sample): Effect on Monthly Earnings

8.3 Results tables - Reform of 2010

The following four tables report the coefficients of interest (month interacted with treatment) for the months 2 to 11 after birth (the coefficient for the first month after birth is not shown, because it is mostly insignificant due to the fact that most mother are still on maternity leave - working is mostly forbidden), standard errors (clustered at the birth month level) and the mean of the outcome in the control group. The high-income sample is restricted to mothers with pre-birth earnings high enough to ensure income-related parental leave benefits of at least €1,500 per month (8,535 individuals). The outcomes considered are: employment (earnings in that calendar month above the minor employment threshold - e.g. €366.33 in 2010), employment during parental leave, employer continuity (pre-birth employer defined as the employer 12 months before birth) and monthly earnings.

	2	3	4	5	6	7	8	9	10	11
t × treat	-0.039799	-0.058241	-0.058319	-0.047447	-0.048623	-0.053654	-0.063306	-0.062914	-0.068982	-0.070726
Std. Error	0.007173	0.008535	0.005358	0.004994	0.005437	0.006171	0.006735	0.007975	0.007013	0.006248
Mean of control	0.099141	0.141350	0.121472	0.094233	0.092270	0.103804	0.119510	0.130552	0.141104	0.150920

Table 7: Reform 2010 (high-income sample): Effect on Employment

	2	3	4	5	6	7	8	9	10	11
t × treat	-0.032971	-0.051184	-0.053779	-0.043919	-0.041659	-0.047461	-0.057103	-0.058763	-0.062986	-0.065233
Std. Error	0.006311	0.007521	0.004489	0.004637	0.004030	0.004259	0.005679	0.007694	0.006044	0.006202
Mean of control	0.081227	0.115583	0.098896	0.075583	0.070184	0.080245	0.093252	0.102086	0.109448	0.117301

Table 8: Reform 2010 (high-income sample): Effect on Employment during PL

	2	3	4	5	6	7	8	9	10	11
t × treat	-0.038808	-0.061501	-0.053299	-0.040680	-0.041398	-0.041564	-0.049265	-0.051149	-0.057420	-0.057319
Std. Error	0.006475	0.008877	0.006223	0.004462	0.005207	0.006238	0.006782	0.007012	0.005869	0.006672
Mean of control	0.105521	0.145031	0.117546	0.085644	0.080982	0.088098	0.099387	0.108221	0.118528	0.125153

Table 9: Reform 2010 (high-income sample): Effect on Employer Continuity

	2	3	4	5	6	7	8	9	10	11
t × treat	-93.292	-162.592	-159.655	-116.660	-113.866	-122.047	-137.963	-131.095	-140.723	-140.156
Std. Error	20.1105	20.0958	18.1550	11.8361	15.9104	21.4634	18.8511	17.8896	15.2798	12.7440
Mean of control	217	384	345	252	243	266	292	311	328	349

Table 10: Reform 2010 (high-income sample): Effect on Monthly Earnings

8.4 Comparison of treatment and control group - Reform of 2000/2002

	Dec	Jan	Feb
Treatment	712	786	734
Control	769	830	799

Table 11: Reform 2000 (low-income sample): Sample sizes per birth-month

	Treatment	Control
Age at birth	25.8	25.8
White Collar	48.4%	49.2%
Tenure (days)	552	593
Experience (days)	1,597	1,654
Unemployment (days)	244	249
Cumulative income in the years 2&3 before birth	23,130	23,986
Daily wage in the 2nd year before birth	48.8	48.5

Table 12: Reform 2000 (low-income sample): Overview - characteristics of mothers (mean or share; note that income data is reported in 2020 prices)

	Dec	Jan	Feb
Treatment	1230	1228	1179
Control	1305	1285	1265

Table 13: Reform 2000 (high-income sample): Sample sizes per birth-month

	Treatment	Control
Age at birth	29.2	29.1
White Collar	80.2%	80.6%
Tenure (days)	1,790	1,785
Experience (days)	3,286	3,229
Unemployment (days)	109	110
Cumulative income in the years 2&3 before birth	64,957	63,923
Daily wage in the 2nd year before birth	93.4	91.8

Table 14: Reform 2000 (high-income sample): Overview - characteristics of mothers (mean or share; note that income data is reported in 2020 prices)

8.5 Comparison of treatment and control group - Reform of 2010

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Treatment	428	442	435	446	530	482	559	572	566
Control	419	356	412	439	450	438	490	524	547

Table 15: Reform 2010 (high-income sample): Sample sizes per birth-month

	Treatment	Control
Age at birth	32.1	32.0
White Collar	97.9%	97.8%
Tenure (days)	1,864	1,855
Experience (days)	3,580	3,591
Unemployment (days)	83.8	84.1
Cumulative income in the years 2&3 before birth	88,098	85,303
Daily wage in the 2nd year before birth	127	124

Table 16: Reform 2010 (high-income sample): Overview - characteristics of mothers (mean or share; note that income data is reported in 2020 prices)