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Effects of paternity leave reforms on family structure

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ABSTRACT

Parental and paternity leave policies have been used in developed countries to promote gender equality and curb the child penalty. However, these policies have a direct impact on how housework and childcare are organized within the household. Given the decline in fertility rates and the rise of single-parent households. I examine how the expansion and flexibilization of paternity leave affect union stability and future fertility. This study uses Finnish registry and social security data in a regression discontinuity setting to answer this question. The child's due date is used as the running variable because it cannot be precisely manipulated by parents. Four paternity leave reforms from the 2000s are analyzed. Each reform introduced different changes regarding leave-entitlement expansion, flexibility, and benefit-replacement rate. Results suggest that flexibility is important for leave take-up. The most flexible reform, from 2010, increased the duration of paternity leave. It had a positive impact on fertility and a transient increase in union stability for individuals younger than 30 years.

JEL Codes: J12, J13

Keywords:
Paternity leave, Fertility, Marriage, Union Stability

TIIVISTELMÄ

Isyysvapaauudistusten vaikutukset perherakenteeseen

Vanhempain- ja isyysvapaapolitiikkoja on teollistuneissa maissa käytetty sukupuolten tasa-arvon edistämiseen ja niin kutsutun *lapsirangaistuksen* lieventämiseen. Näillä politiikoilla on kuitenkin suora vaikutus siihen, miten kotityöt ja lastenhoito organisoidaan perheen sisällä. Kun otetaan huomioon syntyvyyden lasku ja yksinhuoltajaperheiden määrän kasvu, tutkin, miten isyysvapaan laajentaminen ja joustavoittaminen vaikuttavat parisuhteen kestävyyteen ja myöhempään hedelmällisyyteen.

Tässä tutkimuksessa hyödynnetään Suomen rekisteri- ja sosiaaliturva-aineistoja sekä *regression discontinuity* -asetelmaa tämän kysymyksen tarkasteluun. Lapsen laskettua aikaa käytetään jatkuvana muuttujana, sillä vanhemmat eivät voi sitä täsmällisesti manipuloida. Analyysissa tarkastellaan neljää 2000-luvulla toteutettua isyysvapaauudistusta, joista kukin sisälsi erilaisia muutoksia vapaaoikeuden laajentamisen, joustavuuden sekä etuuden korvausasteen osalta.

Tulokset osoittavat, että joustavuus on keskeinen tekijä isyysvapaan käyttöasteen kannalta. Joustavin uudistus, vuodelta 2010, lisäsi isyysvapaan kestoa ja vaikutti myönteisesti syntyvyyteen sekä väliaikaisesti lisäsi parisuhteiden kestävyyttä alle 30-vuotiaiden ryhmässä.

JEL koodit: J12, J13

Avainsanat:
isyysvapaa, hedelmällisyys, avioliitto, parisuhteen kestävyys

1 Introduction

Parental and paternity leave policies have been used in developed countries to promote gender equality and curb the child penalty(Kleven et al., 2019; Sieppi and Pehkonen, 2019). However, these policies may have an unintended effect on union stability and higher-order fertility since they affect the incentives that determine the division of housework and childcare responsibilities[1]. Union stability and overall family structure can have significant impacts on child development and well-being(Olafsson and Steingrimsdottir, 2020). The overall decline in fertility rates, together with an aging population, is a major concern for governments because it would further increase the pressure to finance retirement schemes and healthcare costs. This problem is especially relevant in Finland, which has had, since 2015, the lowest fertility rate among the Nordic countries, according to World Bank data.

I provide new causal evidence on the impact of four paternity-leave reforms implemented in Finland in 2001, 2003, 2007, and 2010. According to the government proposals, the goal of the reforms was to decrease gender inequalities in the labor market by encouraging fathers to take on more childcare responsibilities. I ask whether these reforms had unintended consequences on family structure by studying their effects on union stability and fertility.

Each of the four paternity leave reforms has a unique characteristic that can shed light on how parents react to these policy changes. The 2001 reform increased the flexibility in the number of leave spells fathers could take. The 2003 reform increased, in a very rigid manner, the number of leave days available. The 2007 reform increased the replacement rate for both parents and also increased flexibility by allowing fathers to use their leave up to 180 days after the end of the mother's leave. Lastly, the 2010 reform increased the number of leave days available for fathers while retaining the flexibility introduced by the previous reform.

Figure 1 shows in panel (a) the total fertility rates in Finland from 1950 to 2024. There is a marked reduction in fertility during the 2010s compared with the previous decade. The fertility rate falls from 3.16 in 1950 to 1.25 in 2024. Panel (b) displays the fertility rates for different age groups from 1990 onward, revealing that women are having children later in life. Before 2005, the 25–29 age group was the most fertile; after that, the 30–34 age group overtook it. In 2010, the 20–24 age group became the least fertile, replacing the 35–39 age group.

Panel (a) of Figure 2 presents the marriage and divorce rates for the total Finnish population from 1990 to 2020. There is a clear downward trend in the marriage rate, especially after 2008. The total divorce rate has remained constant throughout the series. However, Figure 3 tells a different story. The marriage rates for all age groups under 39 years old are falling, and the divorce rates have risen slightly for the same age groups. Panel (b) of Figure 2 presents the distribution of family types in Finland. The share of single parents (either mother or father) has increased from 20% in 1990 to 27.5% in 2024.

While the stylized facts suggest a decrease in fertility and marriage rates, summary statistics computed by the social insurance institution of Finland in Figure 4 show an increase in paternity leave days taken and also an increase in the number of recipients of leave normalized by the number of births. Figure 1, Figure 2, and Figure 4 demonstrate that there has been a significant change in fertility and family structure, and that the use of paternity leave has been growing in Finland. Therefore, it would be interesting to

[1]Union stability refers to the probability that parents remain either married or cohabiting

understand whether there is a causal relationship between these two trends. This study investigates whether paternity leave reforms and expansions can affect fertility decisions and union stability (marriage and cohabitation).

Parental leave reforms change how home production and, in particular, childcare are distributed between couples. Patnaik (2019) and Farré and González (2019) showed that the increase in paternity leave raised the amount of time fathers allocate to childcare. This could reduce gender disparities in childcare and housework, leading to a more stable relationship and higher fertility. On the other hand, there is evidence that the parental leave taken by mothers and fathers differs. While mothers' leave is tied to the time of birth of the child, fathers' leave is seasonal (Andresen and Nix, 2025; Carnicelli et al., 2024) and is mostly taken during the summer. Furthermore, González et al. (2024) showed that, in Spain, there was an increase in paternity leave taken during the World Cup.

There is a vast literature on the effects of maternity leave on fertility and marriage stability. For example, Dahl et al. (2016) showed that maternity leave expansions in Norway had no effect on marriage stability or fertility, and Lalive and Zweimüller (2009) found that a parental leave expansion in Australia increased the probability that a mother would have a second child. However, less is known about the impact of paternity leave expansions. Only a few articles have investigated the effects of paternity leave expansions on family structure, and the results are quite mixed.

Farré and González (2019) using an RDD showed that the introduction of a two-week paternity leave scheme in Spain led to a delay in subsequent fertility. Using the same methodology, Hart et al. (2022) showed that the expansion of paternity leave entitlement in Norway had no impact on marriage dissolution or on future fertility[2]. The same results were found in Cools et al. (2015) for Sweden. If paternity leave expansion affects fertility decisions, then it can also indirectly affect the labor market, since Cools et al. (2017) showed that having more children has a significant negative impact on mothers' labor supply. Household income is also an important factor in fertility decisions. González and Trommlerová (2023) showed that the introduction of an unconditional child benefit resulted in a temporary fertility increase in Spain. Avdic and Karimi (2018), using an RD-DD methodology, showed that an increase in paternity leave usage in Sweden led to higher divorce rates. By contrast, Olafsson and Steingrimsdottir (2020), examining a reform in Iceland, found that paternity leave expansion decreases the probability of divorce. Ekberg et al. (2013) showed that the increase in paternity leave entitlement in Sweden had no impact on the share of fathers who took leave when a child was sick. The results presented below corroborate the findings of studies on paternity leave expansion in the Nordic countries regarding union stability but add that couples of different age groups may be affected differently by the increase in paternity leave take-up. Furthermore, the fertility results appear to be consistent with Farré and González (2019) for older mothers.

Paternity leave expansions had a positive effect on take-up according to Ekberg et al. (2013), Patnaik (2019), and Tamm (2019). These reforms can affect leave decisions at the time the reform is implemented, but their impacts can also strengthen later through peer effects. Dahl et al. (2014), Carlsson and Reshid (2022), and Casarico et al. (2025) showed that siblings and co-workers can influence the duration of one's leave. Paternity leave can also affect aspects beyond family structure and the labor market. Korsgren and van Lent (2020) showed that earmarked paternity expansions can increase both fathers' and mothers' life satisfaction. Räsänen et al. (2022) found a negative relationship between paternity leave and mothers' antidepressant use.

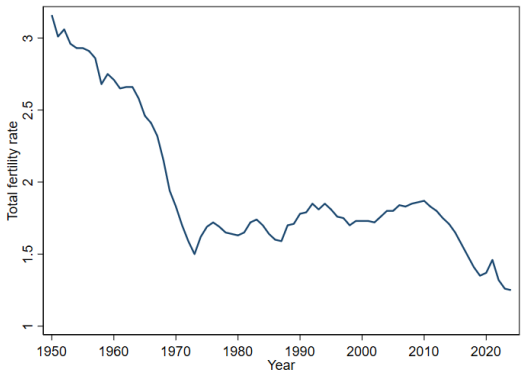
[2]For a review of the literature on modeling fertility decisions, see Doepke et al. (2022)

I contribute to the literature by showing that the flexibility of when fathers can take leave is an important driver of the effectiveness of reforms aimed at increasing paternity leave uptake. The 2003 reform, which added two weeks of leave but imposed a strict timing requirement on when those weeks could be taken, had no effect on the total length of leave actually used. In contrast, the 2010 reform also increased the entitlement by two weeks, but allowed fathers up to 180 days to take the leave. This greater flexibility resulted in an additional eight days of leave taken without the mother. Consequently, pooling reforms together and using the number of days added as a source of variation may be misleading if the timing flexibility of paternity leave differs across reforms. Finally, I extend the existing literature by demonstrating that, overall, expanding paternity leave does not affect fertility or union stability at the aggregate level. Nevertheless, the impact of these reforms can vary by age: younger mothers may experience higher fertility and greater union stability, whereas older mothers might see longer birth intervals that could ultimately reduce fertility.

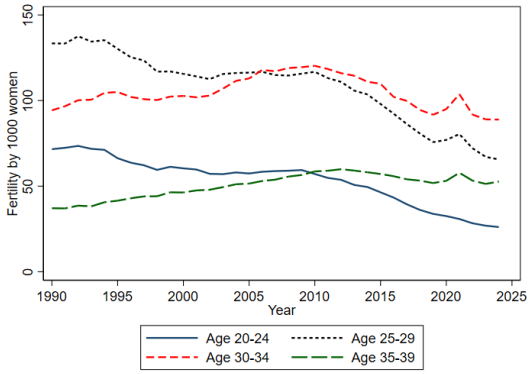
Section 2 describes the institutional setting in Finland, Section 3 outlines the research design, Section 4 presents the data, and Section 5 discusses the results. The conclusion appears in Section 6.

Figure 1: Fertility in Finland

(a) Total fertility



(b) Fertility by age



Note: Panel (a) presents the total fertility rate in Finland. Panel (b) presents the fertility per 1000 women by age.

2 Institutional setting

Finland has a long history of parental leave benefits and rights, dating back to 1917. Maternity, paternity, and parental leave benefits are earnings-related, with a minimum benefit for low earners and a diminishing average replacement rate.

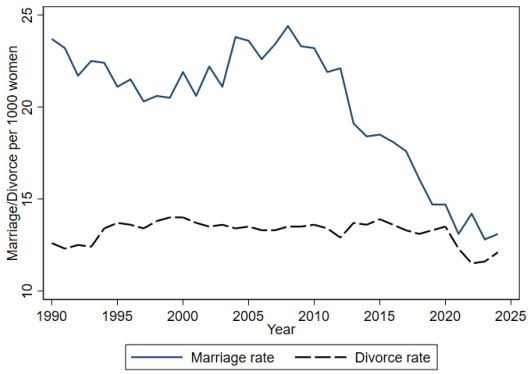
During the 2000s, the decade when the reforms studied took place, mothers were entitled to 105 working days of maternity leave, 30 of which had to be taken before the pregnancy's due date. Furthermore, parents had an additional 158 working days of sharable parental leave. However, in practice, these parental leave days were taken almost exclusively by mothers.

This article analyzes the paternity leave reforms of 2001, 2003, 2007, and 2010. Before 2001, fathers were entitled to 12 working days of leave after the child was born[3]. An extra

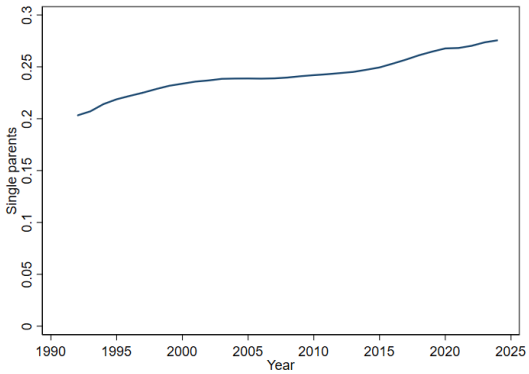
[3]Working days include Saturdays.

Figure 2: Family structure

(a) Marriage and divorce rate



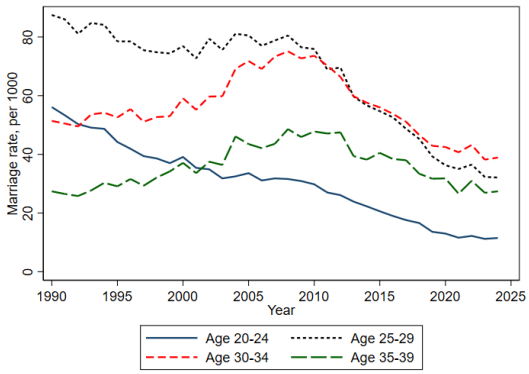
(b) Family composition



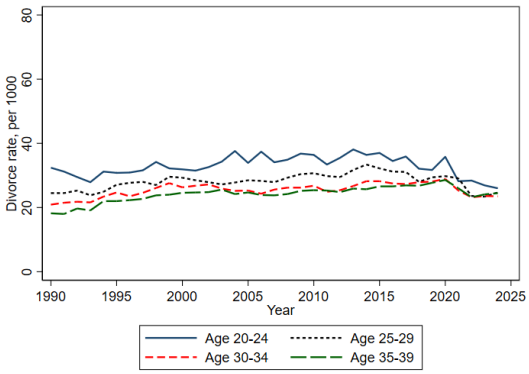
Note: Panel (a) presents marriage and divorce rates per 1000 women. Panel (b) presents the share of households with a single parent.

Figure 3: Marriage and divorce rates by age

(a) Marriage rate by age



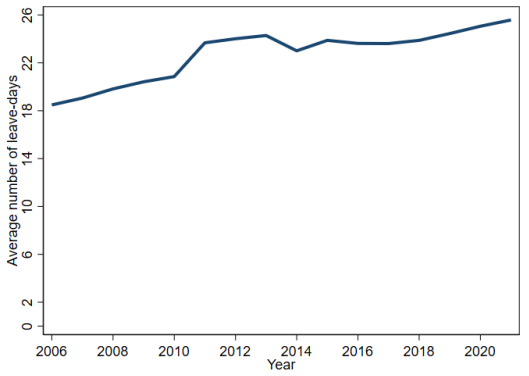
(b) Divorce rate by age



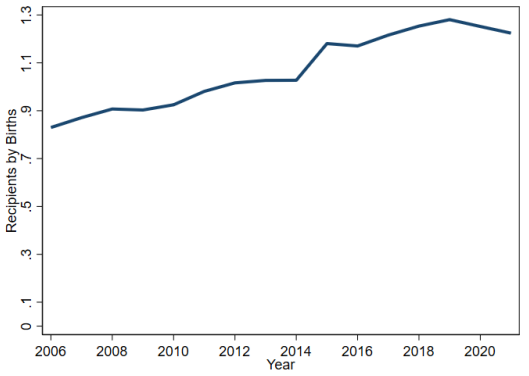
Note: Panel (a) presents marriage rate by age. Panel (b) presents divorce rate by age.

Figure 4: Stylized facts about paternity leave

(a) Average total days of leave



(b) Recipients by birth



Note: Panel (a) presents the average number of leave days taken by fathers. Panel (b) shows the total number of fathers receiving leave benefits divided by the number of births. The value can exceed one since fathers may take leave in different years.

6 days of leave were also possible during the parental leave period. The 2001 reform made the use of father's leave more flexible. Consequently, they could choose how to allocate their leave in up to four spells. The reform was first discussed in Parliament in October 2000 and was implemented a year later.

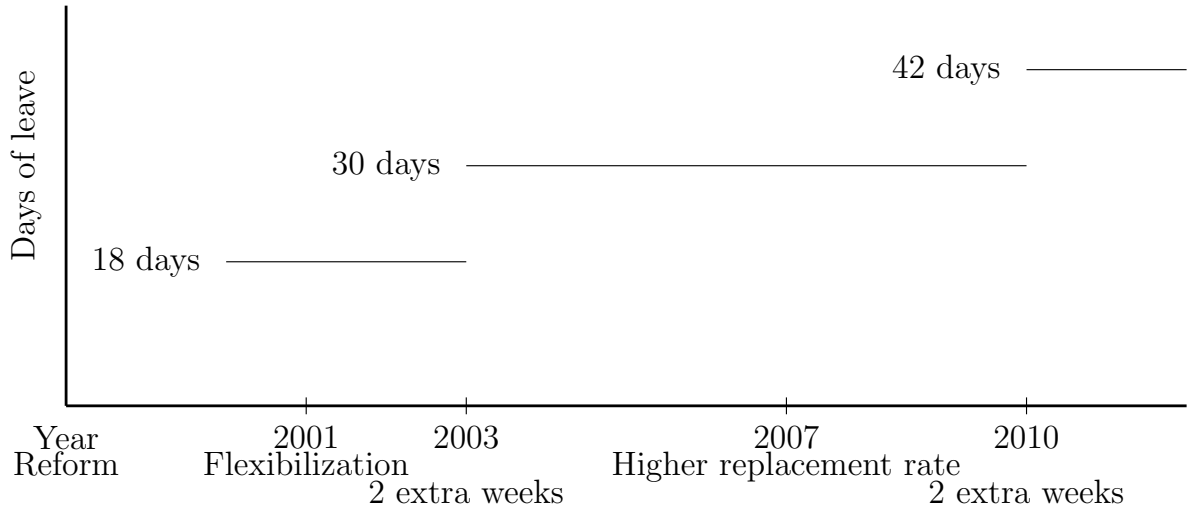
The 2003 reform increased the paternity leave entitlement by 12 working days to a total of 30 working days. However, these extra days could only be used if the father had used the last 12 days of the shareable parental leave. The reform came to Parliament in September 2002, and was quickly accepted and enforced.

The 2007 reform increased the replacement rate for all the parental leave benefits. Furthermore, the strict timing rules to use the paternity leave were relaxed. With the reform, a father had 180 days to use his leave once the mother had finished her parental leave.

The 2010 reform also increased the total number of paternity leave days by 12 working days. However, contrary to the 2003 reform, fathers now had 180 days to decide when to take these extra 24 days of leave. The reform came to Parliament in September 2009 and was quickly enforced.

Figure 5 summarizes the sequence and main features of the reforms—showing how Finland progressively expanded both the length and flexibility of paternity leave. Father's leave can be divided into leave with and without the mother. Leave taken with the mother normally occurs at the time of the child's birth, when the mother is also on leave. Leave taken without the mother refers to periods when the father takes leave while the mother is not on leave.

Figure 5: Timeline of paternity leave reforms



3 Research design

This study exploits the timing of the policy implementation in a regression discontinuity design (RDD)[4]. The four reforms studied affected all parents whose child was born after 1st October 2001, 1st January 2003, 2007, and 2010. However, exceptions were made for parents who had already been receiving some kind of parental leave benefit. Therefore, given the maternity and parental leave schemes of the time and the wording of the laws,

[4]For a review of the regression discontinuity design, see Cattaneo and Titiunik (2022)

the effective implementation date or cut-off date of the reform was shifted to the 28th of March 2002 and to the 1st of October 2002. The cut-off dates of the 2007 and 2010 reforms were moved forward to February 7, 2007, and February 8, 2010. Since mothers must begin maternity leave 30 working days before the pregnancy's due date, the new parental leave scheme was applied to those whose benefits began to be paid on 1st January of the respective reform year.

At the first prenatal visit, doctors determine the pregnancy's due date. This date serves as a reference point for medical staff to make decisions should any problem arise during the pregnancy. Therefore, parents cannot manipulate the exact due date. The identifying assumption of the regression discontinuity design in this context is that the due date is random and cannot be manipulated by parents.

The following regression discontinuity design is estimated:

$$Y_{it} = \alpha + \beta T_{it} + \gamma_1 d + \gamma_2 d T_{it} + \delta X_{it} + \epsilon_{it} \tag{1}$$

where Y_{it} is the outcome variable (the employment rate or earnings of mothers and fathers). T_{it} is the treatment indicator; d is the running variable, i.e., the pregnancy's due date. Finally, X_{it} is a set of controls, including dummy variables for parents' age at birth, their education level, region, and language. All regressions are weighted with a triangular kernel. In this way, more weight is given to the observations close to the cut-off date.

Two types of bandwidths were used to estimate the RD model's results. First, I averaged the optimal bandwidths using the robust bias-corrected (RBC) methodology. Specifically, I averaged the optimal bandwidths computed according to Calonico et al. (2020) for each outcome variable, considering all post-reform years for the marriage-stability outcome and for each fertility-related outcome variable. However, sometimes the computed optimal average bandwidth turns out to be unreasonably large, raising concerns about its economic plausibility. For the two groups to be comparable, the interval separating the due date of the first family in the control group from that of the last family in the treatment group should be sufficiently narrow. Occasionally, this distance can be greater than six months. Moreover, because the average optimal bandwidth is calculated separately for each outcome variable, the resulting samples differ, making cross-outcome comparisons difficult. For these reasons, I also report results from an RDD regression that uses a fixed bandwidth of 90 days(Ekberg et al., 2013), which yields more comparable estimates across reforms.

4 Data

This study uses registry data from Statistics Finland covering the years 1995–2019. The database contains the date of birth for all persons living in Finland. It also contains information on individuals' educational status, income, language, region of residence, and family characteristics. The other key data originate from the LAPE 1 and LAPE 2 databases produced by Kela, the Social Insurance Institution of Finland. The LAPE 1 dataset contains a sample of 60% of all births from 1999 to 2010. It contains the due date of the pregnancy, which we use as the running variable for the RDD. It also contains information on all maternity, paternity, and parental leave spells for that period, with information about the start and end dates of each spell as well as the amount paid for each respective benefit.

Data collection for the LAPE 1 database ended in December 2010. Hence, any leave

taken by parents after this date was not recorded, even if the birth occurred before December 2010. For that reason, the LAPE 2 dataset is used to study the 2010 reform. This dataset contains the same variables as LAPE 1. However, it contains a sample of 70% of total births in the period.

Families whose biological mother and father are both present in the database are included in the sample. Since the focus of this article is on parents' union stability and fertility, single parents are excluded from the main sample. Children from same-sex couples and adoptions are also dropped from the sample, since there are different parental leave rules in those cases and the assumptions of the RDD are not satisfied. All parents present in the sample are used to study marital decisions, but only first-time parents are included when analyzing subsequent fertility. That is, only parents who had their first child around the cut-off dates of the reform are included.

Married and cohabiting couples are treated similarly. The binary variable indicating whether a couple is married or cohabiting takes the value 1 if the child's parents live in the same home and 0 otherwise. There are minor legal differences between being married and cohabiting, but in practice, they do not affect the decisions studied here. That is, getting married or divorced and having another child are major life decisions, and the differences between being married and cohabiting are insufficient to affect these decisions.

Table 1: Balance of the 2001 reform

Fathers	Treated	Control	Difference
Bachelor's degree	0.381	0.379	-0.00190
	(0.486)	(0.485)	(0.00964)
Age	32.16	32.06	-0.0991
	(5.875)	(5.777)	(0.119)
Earnings	22293.7	22162.9	-130.9
	(14307.6)	(13526.6)	(288.4)
Employed	0.811	0.812	0.000669
	(0.391)	(0.391)	(0.00776)
Mothers			
Bachelor's degree	0.344	0.336	-0.00823
	(0.475)	(0.472)	(0.0094)
Age	30.01	29.80	-0.208
	(5.618)	(5.388)	(0.111)
Earnings	14138.4	13958.0	-180.3
	(10306.9)	(10111.9)	(220.2)
Employed	0.688	0.684	-0.00435
	(0.463)	(0.465)	(0.00922)
N	4815	5359	10174

Note: The table presents summary statistics for mothers and fathers in the treated and control groups for the 2001 reform, using a 90-day bandwidth. Standard errors are presented in parentheses. The third column presents the difference between groups.

Parents cannot manipulate the pregnancy's due date to fall on either side of a reform's cut-off date. Table 1, Table 2, Table 3, and Table 4 present summary statistics for the treated and control groups, using a 90-day bandwidth around each reform's cut-off date,

Table 2: Balance of the 2003 reform

Fathers	Treated	Control	Difference
Bachelor's degree	0.383	0.387	0.00398
	(0.486)	(0.487)	(0.00971)
Age	32.04	32.14	0.102
	(5.870)	(6.051)	(0.122)
Earnings	24058.7	24138.4	79.780
	(14640.4)	(14651.2)	(303.4)
Employed	0.834	0.841	0.007
	(0.372)	(0.365)	(0.00736)
Mothers			
Bachelor's degree	0.367	0.356	-0.0112
	(0.482)	(0.479)	(0.00959)
Age	29.88	29.81	-0.072
	(5.475)	(5.575)	(0.112)
Earnings	14990.2	15034.1	43.940
	(10980.5)	(11059.3)	(240.4)
Employed	0.693	0.693	0.001
	(0.461)	(0.461)	(0.00921)
N	5176	4872	10048

Note: The table presents summary statistics for mothers and fathers in the treated and control groups for the 2003 reform, using a 90-day bandwidth. Standard errors are presented in parentheses. The third column presents the difference between groups.

Table 3: Balance of the 2007 reform

Fathers	Treated	Control	Difference
Bachelor's degree	0.453	0.428	-0.0256*
	(0.498)	(0.495)	(0.0113)
age	32.03	32.27	0.236
	(6.258)	(6.190)	(0.147)
Earnings	26929.8	27772.4	842.5
	(18946.9)	(21819.9)	(470)
Employed	0.834	0.844	0.0104
	(0.372)	(0.362)	(0.00839)
Mothers			
Bachelor's degree	0.491	0.483	-0.00796
	(0.500)	(0.500)	(0.0114)
age	29.71	29.86	0.154
	(5.379)	(5.425)	(0.127)
Earnings	15256.3	15667.2	410.9
	(13211.1)	(13911.4)	(309.9)
Employed	0.723	0.727	0.00323
	(0.447)	(0.446)	(0.0102)
N	3868	3793	7661

Note: The table presents summary statistics for mothers and fathers in the treated and control groups for the 2007 reform, using a 90-day bandwidth. Standard errors are presented in parentheses. The third column presents the difference between groups.

Table 4: Balance of the 2010 reform

Fathers	Treated	Control	Difference
Bachelor's degree	0.469	0.461	-0.00857
	(0.499)	(0.498)	(0.00866)
Age	32.12	32.03	-0.0860
	(6.170)	(6.275)	(0.112)
Earnings	33828.4	33164.9	-663.5
	(19886.9)	(19394.3)	(352.2)
Employed	0.859	0.854	-0.00436
	(0.348)	(0.353)	(0.00609)
Mothers			
Bachelor's degree	0.530	0.531	0.000767
	(0.499)	(0.499)	(0.00866)
Age	29.63	29.59	-0.0433
	(5.350)	(5.421)	(0.0964)
Earnings	21455.6	21387.1	-68.58
	(15022.1)	(14735.4)	(275.2)
Employed	0.766	0.775	0.00893
	(0.423)	(0.418)	(0.0073)
N	6391	6907	13298

Note: The table presents summary statistics for mothers and fathers in the treated and control groups for the 2007 reform, using a 90-day bandwidth. Standard errors are presented in parentheses. The third column presents the difference between groups.

to verify that the pre-cut-off control group and the post-cut-off treatment group are similar in observable characteristics. The reported averages of the covariates correspond to fathers' and mothers' values one year before the discontinuity date. The tables indicate that the variables are well-balanced. Furthermore, for the union stability analysis, the RDD results will illustrate differences in the outcome variables several years prior to the reform date.

5 Results

5.1 Effects on take-up

To affect union stability or fertility, each of the studied reforms must influence parental leave-taking behavior. If the parental leave reforms had no effect on the duration of parental leave taken, it would be difficult to explain how the reforms could influence the outcome variables. For that reason, this section presents results on whether the studied parental leave reforms increased either the share of fathers taking leave or the number of parental leave days taken.

Table 5 shows how the 2001 and 2003 reforms affect the share of fathers taking any leave (with the mother, without the mother, and overall) in columns 1, 2, and 3, respectively. The share of fathers is computed by dividing the number of fathers taking leave on a given day by the number of eligible fathers. According to the results, the 2001 reform had no effect on the share of fathers taking paternity leave. According to the estimation using the optimal bandwidth of 165 days, the 2003 reform increased the share of fathers taking any type of leave by 5.7%. However, the 165-day optimal bandwidth may be too large for the treatment and control groups to be comparable. Furthermore, no effect was observed when using the 90-day bandwidth. Hence, there is little evidence supporting the idea that the 2003 reform increased the share of fathers taking leave.

Table 5: Share of fathers taking paternity leave around the reforms cut-off dates

	(1) With mother	(2) Without mother	(3) Total
2001			
Share	0.009	0.003	0.014
	(0.025)	(0.006)	(0.025)
Bandwidth	135	135	135
Control average	0.75	0.04	0.75
N	268	219	269
Share	-0.032	0.001	-0.028
	(0.047)	(0.012)	(0.046)
Bandwidth	90	90	90
Control average	0.74	0.04	0.74
N	179	145	179
2003			
Share	0.064***	0.007	0.057***
	(0.020)	(0.006)	(0.021)
Bandwidth	165	165	165
Control average	0.72	0.04	0.72
N	327	288	328
Share	0.039	0.011	0.037
	(0.031)	(0.012)	(0.032)
Bandwidth	90	90	90
Control average	0.71	0.04	0.71
N	177	153	178

Note: The table presents RDD results of the share of fathers taking leave for the 2001 and 2003 reforms using the optimal bandwidth. * p<0.10, ** p<0.05, *** p<0.01

Table 6: Paternity leave around the reforms cut-off dates

	(1) With Mother	(2) Without mother	(3) Total
2001			
Days of leave	0.532***	-3.888	0.154
	(0.196)	(16.489)	(0.802)
Bandwidth	96	96	96
Control average	13.20	76.85	15.41
N	6668	206	6696
Days of leave	0.174	-13.206	-0.959
	(0.285)	(22.316)	(1.090)
Bandwidth	90	90	90
Control average	13.24	76.32	15.43
N	6178	189	6202
2003			
Days of leave	-0.105	-34.938*	-1.038
	(0.246)	(19.084)	(1.206)
Bandwidth	68	68	68
Control average	14.65	86.73	17.60
N	4511	173	4528
Days of leave	-0.224	-35.510	-1.065
	(0.308)	(24.423)	(1.577)
Bandwidth	90	90	90
Control average	14.69	83.23	17.46
N	5992	246	6016

Note: The table presents RDD results of the length of paternity leave, in days, taken by fathers for the 2001 and 2003 reforms using the optimal bandwidth. * p<0.10, ** p<0.05, *** p<0.01

Table 6 presents the number of leave days taken by fathers around the dates of the 2001 and 2003 reforms. For the 2001 reform, the results show that leave taken with the mother increased by 0.53 days, from an average of 13.2 days. The results for the 2003 reform, which increased the paternity-leave entitlement by two weeks, show that the reform had no effect on the total length of paternity leave. Note that the estimate in column 2 is underpowered given the small number of observations, and it is not possible to assert that the reform decreased the number of leave days taken without the mother.

Table 7 shows that the 2007 reform, which increased flexibility and the replacement rate, raised the share of fathers taking leave without the mother by 7.3%. This result suggests that either the increased flexibility or the higher replacement rates are important for parents. There is no indication that the 2010 reform, which increased the duration of leave without the mother by two weeks, raised the share of fathers taking leave.

Table 8 shows the estimated effects of the 2007 and 2010 reforms on the duration of paternity leave. Column 3 shows that the average total duration of leave increased by 3

days after the 2007 reform. The reform also increased fathers' average independent-leave duration by 6.3 days. The 2010 reform increased the total duration of leave by 2.7 days and the leave taken without the mother by 8.2 days.

Table 7: Share of fathers taking paternity leave around the reforms cut-off dates

	(1) With mother	(2) Without mother	(3) Total
2007			
Share	-0.002	0.073***	0.016
	(0.026)	(0.019)	(0.024)
Bandwidth	158	158	158
Control average	0.80	0.21	0.81
N	296	317	296
Share	0.006	0.112***	0.041
	(0.048)	(0.037)	(0.042)
Bandwidth	90	90	90
Control average	0.80	0.21	0.81
N	170	179	169
2010			
Share	0.022	-0.021	0.014
	(0.032)	(0.031)	(0.033)
Bandwidth	62	62	62
Control average	0.71	0.26	0.72
N	123	123	123
Share	0.023	-0.029	0.016
	(0.037)	(0.036)	(0.038)
Bandwidth	90	90	90
Control average	0.73	0.26	0.73
N	179	179	179

Note: The table presents RDD results of the share of fathers taking leave for the 2007 and 2010 reforms using the optimal bandwidth. * p<0.10, ** p<0.05, *** p<0.01

Table 8: Paternity leave around the reforms cut-off dates

	(1) With Mother	(2) Without mother	(3) Total
2007			
Days of leave	-0.116	6.378*	3.098***
	(0.131)	(3.258)	(0.998)
Bandwidth	158	158	158
Control average	15.20	36.57	22.30
N	11263	2505	11390
Days of leave	0.412*	11.184*	5.265***
	(0.246)	(6.016)	(1.916)
Bandwidth	90	90	90
Control average	15.37	36.46	22.17
N	6185	1322	6254
2010			
Days of leave	0.306*	8.290***	2.759***
	(0.159)	(0.961)	(0.879)
Bandwidth	74	42	56
Control average	16.83	18.46	23.13
N	5833	1295	4558
Days of leave	0.305	8.631***	2.376**
	(0.200)	(0.928)	(0.971)
Bandwidth	90	90	90
Control average	16.88	17.78	23.00
N	7025	2647	7109

Note: The table presents RDD results of the length of paternity leave, in days, taken by fathers for the 2007 and 2010 reforms using the optimal bandwidth. * p<0.10, ** p<0.05, *** p<0.01

5.2 Fertility and Union stability

This section presents the RDD results for the four reforms analyzed with respect to fertility and union stability. The regression sample that analyzes fertility decisions includes only first-time parents, whereas the regressions on union stability use the full sample. Following the insight of Farré and González (2019), I also present results that divide the sample between mothers who had their first child before age 30 and those who had their first child at age 30 or older.

Table 9 presents the effects of the 2001 reform on total fertility (column 1), spacing (column 2), and the probability of having another child (column 3). The reform had no significant impact on total fertility or birth spacing. However, there is a modest suggestion that it increased the probability of having another child. This result appears to be driven by mothers over age 30, whose probability of subsequent fertility increases

by 9% according to Table A1. Mothers who had their first child before age 30 did not react to the reform. The results presented in Table 10 and Table A2 indicate that the 2003 reform had no impact on the fertility behavior of first-time parents.

Table 9: Effect of 2001 reform on fertility

Optimal	Number of children	Distance between birth(years)	Probability another child
2001 reform	0.0824	-0.2457	0.0584*
	(0.0627)	(0.1769)	(0.0313)
Bandwidth	96	96	96
Control average	1.88	3.01	0.60
N	4799	1974	4799

90-day	Number of children	Distance between birth(years)	Probability another child
2001 reform	0.0430	-0.1937	0.0278
	(0.0887)	(0.2395)	(0.0447)
Bandwidth	90	90	90
Control average	1.87	3.03	0.60
N	4461	1834	4461

Note: The table presents RDD estimates of the 2001 reform's impact on fertility, using the optimal bandwidth in the first block and a 90-day bandwidth in the second block. * p<0.10, ** p<0.05, *** p<0.01

Table 11 and Table A3 show that, even though the 2007 reform had a positive effect on take-up, there was no change in fertility patterns. Table 12 presents the results of the 2010 reform's effects on fertility. The results are not statistically significant.

The age-specific analysis of the 2010 reform, shown in Table A4, yields interesting insights. Younger mothers increase the probability of having another child by 10.7%, resulting in an increase of 0.16 in total fertility. The spacing between children in that age group is reduced by 0.09 years, but the estimates are not statistically significant. The results for the subsample of mothers over age 30 show an increase in spacing of 0.65 years and a negative, but not statistically significant, effect on total fertility.

Figure 6 shows the proportion of married and cohabiting couples in the control group, using a 90-day bandwidth, five years before and ten years after the four studied reforms. Five years before the reforms, around 60% of the parents were living together. The peak share of married or cohabiting parents is reached around the time of the child's birth. After that, there is a steady decline in the share of married or cohabiting couples.

Table 10: Effect of 2003 reform on fertility

Optimal	Number of children	Distance between birth(years)	Probability another child
2003 reform	0.0280	0.1957	-0.0189
	(0.0643)	(0.1852)	(0.0331)
Bandwidth	99	99	99
Control average	1.84	2.56	0.59
N	4477	1919	4477

90-day	Number of children	Distance between birth(years)	Probability another child
2003 reform	-0.0005	-0.2429	-0.0183
	(0.0932)	(0.2827)	(0.0475)
Bandwidth	90	90	90
Control average	1.84	2.52	0.59
N	4032	1727	4032

Note: The table presents RDD estimates of the 2003 reform's impact on fertility, using the optimal bandwidth in the first block and a 90-day bandwidth in the second block. * p<0.10, ** p<0.05, *** p<0.01

Table 11: Effect of 2007 reform on fertility

Optimal	Number of children	Distance between birth(years)	Probability another child
2007 reform	0.0138	0.1183	-0.0063
	(0.04)	(0.12)	(0.03)
Bandwidth	138	138	138
Control average	1.73	2.98	0.55
N	6871	3612	6871

90-day	Number of children	Distance between birth(years)	Probability another child
2007 reform	-0.0683	0.2074	-0.0256
	(0.0745)	(0.2020)	(0.0434)
Bandwidth	90	90	90
Control average	1.74	2.90	0.56
N	4406	2332	4406

Note: The table presents RDD estimates of the 2007 reform's impact on fertility, using the optimal bandwidth in the first block and a 90-day bandwidth in the second block. * p<0.10, ** p<0.05, *** p<0.01

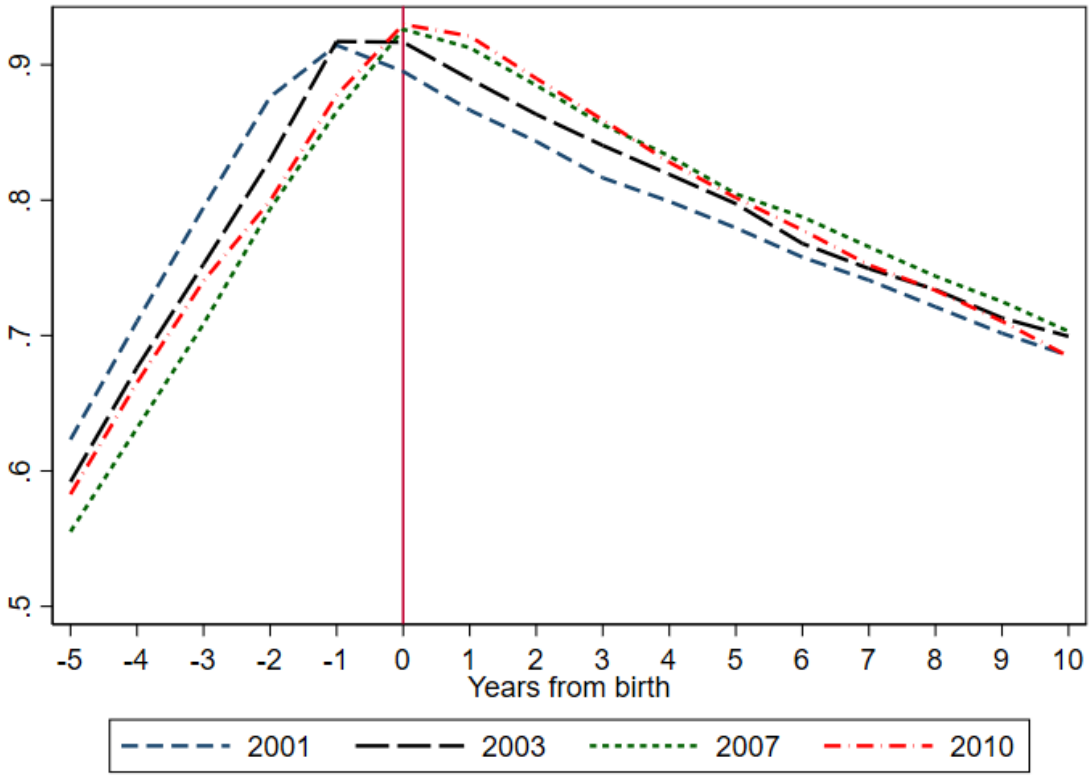
Table 12: Effect of 2010 reform on fertility

Optimal	Number of children	Distance between birth(years)	Probability another child
2010 reform	0.054	0.127	0.041
	(0.057)	(0.154)	(0.038)
Bandwidth	58	58	58
Control average	1.71	2.95	0.57
N	3337	2161	3337

90-day	Number of children	Distance between birth(years)	Probability another child
2010 reform	0.060	0.099	0.042
	(0.064)	(0.173)	(0.042)
Bandwidth	90	90	90
Control average	1.70	3.12	0.56
N	4915	3148	4915

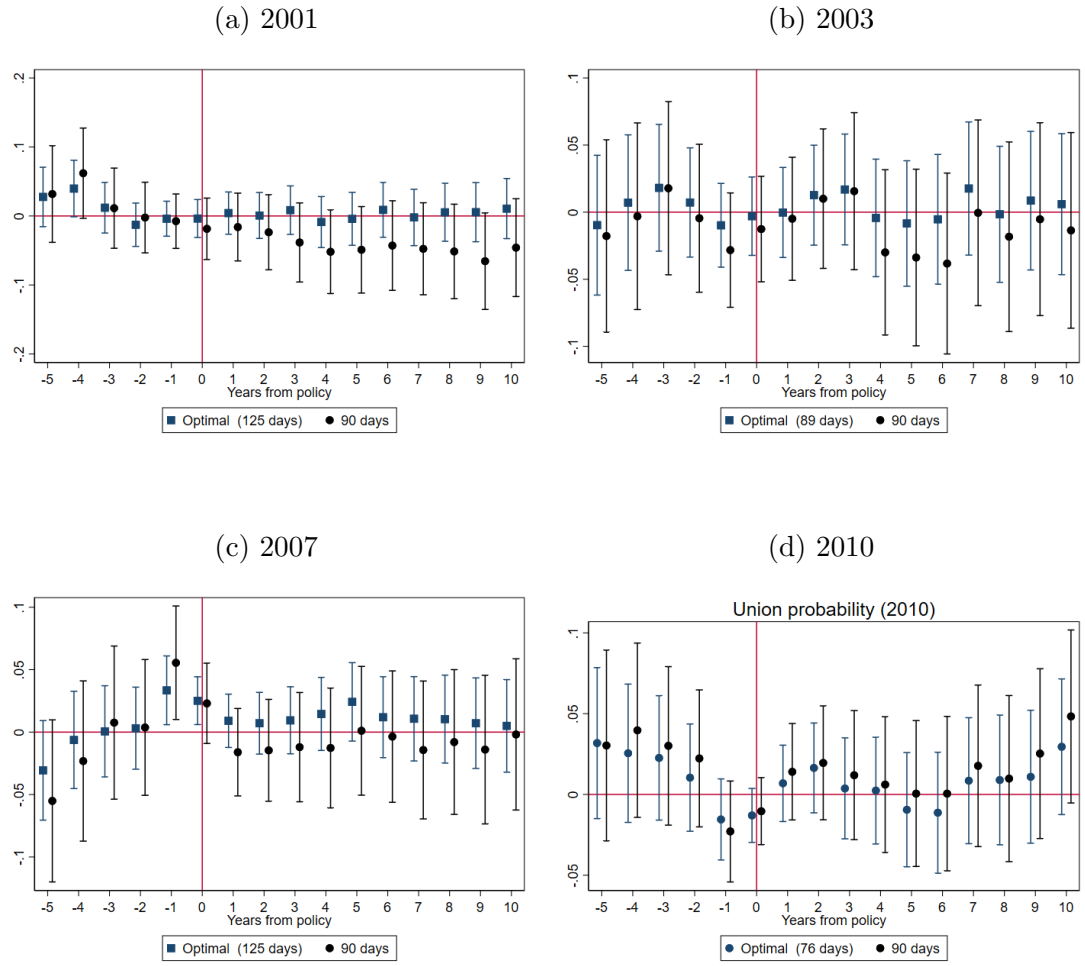
Note: The table presents RDD estimates of the 2010 reform's impact on fertility, using the optimal bandwidth in the first block and a 90-day bandwidth in the second block. * p<0.10, ** p<0.05, *** p<0.01

Figure 6: Share of married/cohabiting couples in the control group



Note: The figure shows the percentage of couples in the control group that are married or cohabiting. The control group was constructed using a 90-day bandwidth.

Figure 7: Union probability



Note: The figures present RDD estimates of the four reforms' effects on union probability (that is, the likelihood that a couple remains married or cohabiting). Blue squares denote estimates based on the optimal bandwidth, while the black circle denotes the estimate using a 90-day bandwidth. The vertical lines describe the 95% confidence interval.

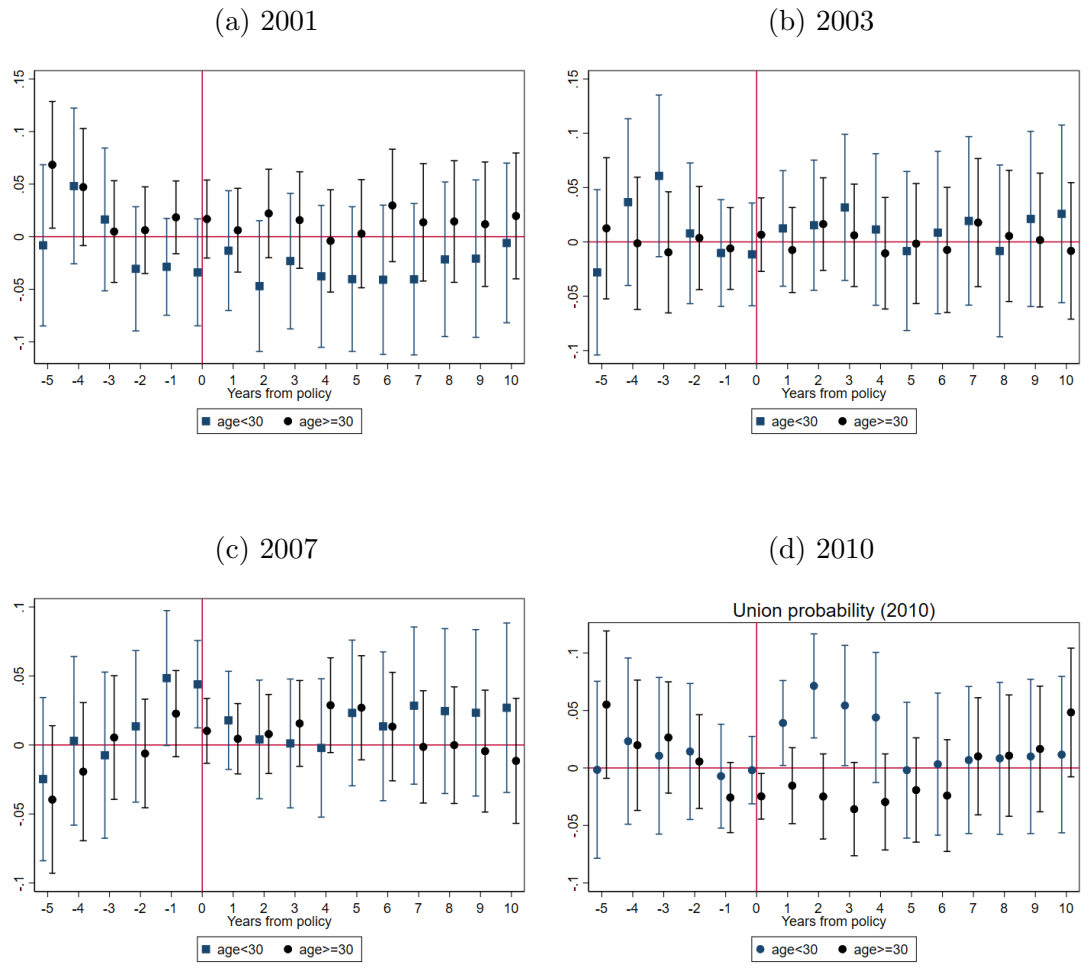
Figure 7 shows the regression results for the effects of the reforms on the probability that couples stay together for the four studied reforms. There is no evidence that the studied paternity-leave reforms had any effect on couples' decisions to stay together.

Figure 8 shows that the 2001, 2003, and 2007 reforms had no effect on union stability in any of the studied age groups. However, Figure 8d shows that couples whose mother was below the age of 30 experience an increased probability of staying together up to four years after the birth of their first child. In contrast, Olafsson and Steingrimsdottir (2020) showed a persistent drop in separations after the expansion of paternity leave in Iceland. Figure A1 shows the regression results using a 90-day bandwidth. The results of the 2010 reform in Figure A1d show a similar pattern to the preferred estimation with the optimal bandwidth. The results for the 2001 reform, in Figure A1a, show a decrease in union stability for the younger cohort. This is at odds with the optimal-bandwidth results, which show no effect of the reform.

Overall, these results are consistent with research from other Nordic countries showing that expansions of paternity leave do not affect fertility behavior. Moreover, the findings suggest a link between fertility and union stability, because the only group that

experienced an increase in union stability also showed a rise in fertility. Nonetheless, the direction of causality cannot be established within this framework.

Figure 8: Union probability by age



Note: The figures present RDD estimates of the four reforms' effects on union probability (that is, the likelihood that a couple remains married or cohabiting) using the optimal bandwidth. Blue squares indicate estimates for mothers younger than 30, while the black circle indicates the estimate for mothers aged 30 and older. The vertical lines describe the 95% confidence interval.

6 Conclusion

Finland made four paternity leave reforms during the 2000s with the goal of reducing gender inequality. The above analysis investigated whether those reforms had unintended effects on union stability and fertility decisions of couples using a regression discontinuity design. The first reform, from 2001, made taking paternity leave more flexible, but the number of days available for fathers was still small. The 2003 reform increased the maximum number of paternity leave days available by 12 working days. The 2007 reform increased the benefit replacement rate for both parents and made the timing of paternity leave taking more flexible. This reform increased the share of fathers taking independent leave by 7.3% and increased the average leave duration by 3 days. The 2010 reform also had a positive impact on fathers' paternity leave take-up. The reform increased the pa-

ternity leave entitlement by 12 working days while retaining the flexibility introduced by the previous reform. Reforms that let fathers choose more freely when to take their leave were more effective at increasing take-up. This result brings attention to the fact that the implementation details of parental leave expansion in general are important, and paying attention only to the number of extra days given might be insufficient.

Results showed that the 2010 reform had a positive effect on fertility and a short-run positive effect on union stability for the cohort of mothers under the age of 30. The older group presented an increase in spacing between births and some indication of a negative effect on fertility, similar to the findings in Farré and González (2019) for Spain. The reforms do not seem to have had long-lasting adverse effects on fertility or union stability. Hence, from a policy perspective, paternity leave reforms should not be used to change incentives regarding fertility.

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Appendix

Table A1: Effect of 2001 reform on fertility by age group

Age< 30	Number of children	Distance between birth(years)	Probability another child
2001 reform	0.0814	-0.3704	0.0042
	(0.0968)	(0.2404)	(0.0472)
Bandwidth	75	75	75
Control average	1.88	3.14	0.64
N	1954	1075	1954

Age≥ 30	Number of children	Distance between birth(years)	Probability another child
2001 reform	0.0761	-0.0528	0.0902**
	(0.0877)	(0.2601)	(0.0447)
Bandwidth	102	102	102
Control average	1.87	2.82	0.58
N	2440	653	2440

Note: The table presents RDD estimates of the 2001 reform's impact on fertility by age, using the optimal bandwidth * p<0.10, ** p<0.05, *** p<0.01

Table A2: Effect of 2003 reform on fertility by age group

Age< 30	Number of children	Distance between birth(years)	Probability another child
2003 reform	0.0268	0.0488	0.0162
	(0.1066)	(0.2552)	(0.0521)
Bandwidth	85	85	85
Control average	1.8944	2.6523	0.6216
N	1739	991	1739

Age≥ 30	Number of children	Distance between birth(years)	Probability another child
2003 reform	0.0695	0.2199	-0.0244
	(0.0906)	(0.3346)	(0.0479)
Bandwidth	87	87	87
Control average	1.8013	2.2771	0.5675
N	2143	667	2143

Note: The table presents RDD estimates of the 2003 reform's impact on fertility by age, using the optimal bandwidth * p<0.10, ** p<0.05, *** p<0.01

Table A3: Effect of 2007 reform on fertility by age group

Age< 30	Number of children	Distance between birth(years)	Probability another child
2007 reform	0.0119	0.2516	-0.0101
	(0.0761)	(0.1678)	(0.0388)
Bandwidth	113	113	113
Control average	1.8465	3.0000	0.6146
N	2950	1839	2950

Age≥ 30	Number of children	Distance between birth(years)	Probability another child
2007 reform	-0.0361	0.0826	-0.0280
	(0.0578)	(0.2084)	(0.0403)
Bandwidth	120	120	120
Control average	1.6010	2.9143	0.4778
N	2823	1179	2823

Note: The table presents RDD estimates of the 2007 reform's impact on fertility by age, using the optimal bandwidth * p<0.10, ** p<0.05, *** p<0.01

Table A4: Effect of 2010 reform on fertility by age group

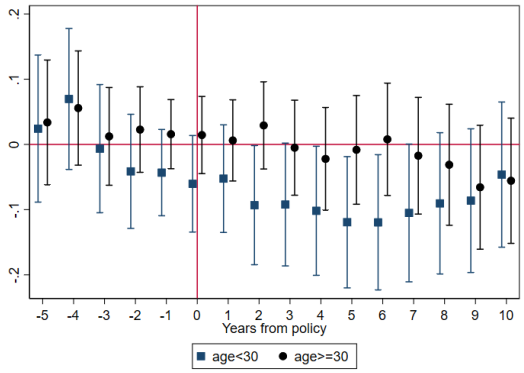
Age< 30	Number of children	Distance between birth(years)	Probability another child
2010 reform	0.160**	-0.089	0.107**
	(0.071)	(0.175)	(0.044)
Bandwidth	71	71	71
Control average	1.81	3.14	0.62
N	2416	1747	2416

Age≥ 30	Number of children	Distance between birth(years)	Probability another child
2010 reform	-0.123	0.653**	-0.082
	(0.081)	(0.255)	(0.061)
Bandwidth	57	57	57
Control average	1.58	2.70	0.51
N	1276	669	1276

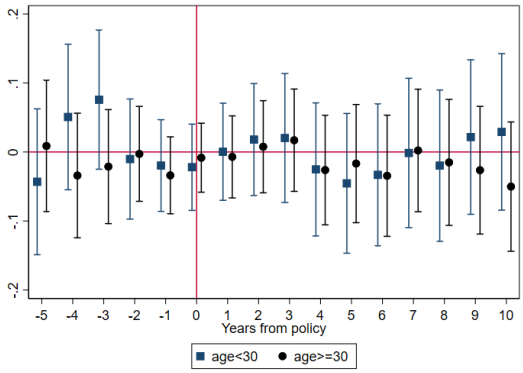
Note: The table presents RDD estimates of the 2010 reform's impact on fertility by age, using the optimal bandwidth * p<0.10, ** p<0.05, *** p<0.01

Figure A1: Union probability by age: 90-day bandwidth

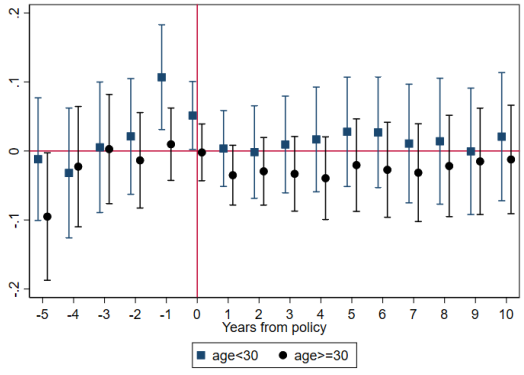
(a) 2001



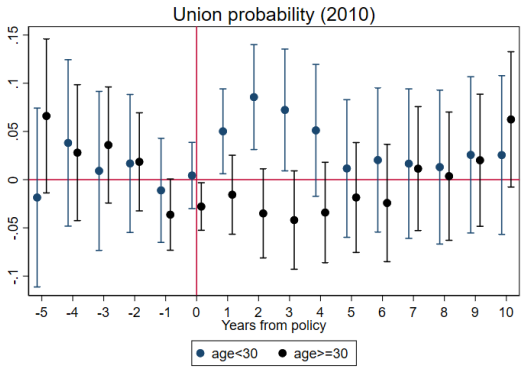
(b) 2003



(c) 2007



(d) 2010



Note: The figures present RDD estimates of the four reforms' effects on union probability (that is, the likelihood that a couple is married or cohabiting) using a 90-day bandwidth. Blue squares indicate estimates for mothers younger than 30, while the black circle indicates the estimate for mothers aged 30 and older. The vertical lines describe the 95% confidence interval.

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