How Does Daddy at Home Affect Marital Stability?*

Arna Olafsson[†] and Herdis Steingrimsdottir[‡]

March 1, 2018

Abstract

We investigate the effect of a law reform in Iceland that earmarked one third of the total parental leave to fathers on marital stability. This change was implemented in stages, and parents who had a child in 2001 were given the option to add one month of parental leave to the allotted six months but only if the additional month was used by the father. Fathers of children born before January 1, 2001 had no such separate or independent right to parental leave. The reform created substantial economic incentives for fathers to be more involved in caring for their children during their first months of life, and the take-up rate in the first year was 82.4%. We compare the relationship stability of couples who had children just before and just after the reform and find that parents who are entitled to paternity leave are less likely to separate during the first years of their child's life, the time in a relationship when the probability of a divorce is the highest.

JEL classifications: J12, J13, J16, J18

*This paper was partly completed during Arna's visiting years at UC Berkeley. We owe special thanks to David Card, Joshua Goodman, Magnus Johannesson, Kjell Salvanes, and Johannes Schmieder for their valuable comments. We also appreciate the helpful comments and suggestions made by participants in the Annual Meeting of the Royal Economic Society - RES, the Annual Meeting of the Society of Labor Economists - SOLE, the EALE conference, the EEA Congress, the 16th ZEW Summer Workshop for Young Economists, the Joint IZA/IFAU Conference on Labor Market Policy Evaluation, and the AEA Annual Meeting, and those by seminar participants at Copenhagen University, Copenhagen Business School, and the Stockholm School of Economics. Financial support from the Jan Wallander and Tom Hedelius Foundation is gratefully acknowledged.

[†]Department of Finance, Copenhagen Business School, 2000 Frederiksberg, Denmark. E-mail: ao.fi@cbs.dk

[‡]Department of Economics, Copenhagen Business School, 2000 Frederiksberg, Denmark. E-mail: hs.eco@cbs.dk

1 Introduction

Divorce can wreak havoc on the families in which it occurs. Marital dissolution has a strong negative effect on the mental and physical health of both spouses, and there is strong evidence of a close connection between growing up in a one-parent family and suffering long-term economic and social difficulties (McLanahan and Sandefur, 1994; Waite and Gallagher, 2000; Gottman, 1998; Burman and Margolin, 1992). However, growing up in a household in which the parents have marital problems can also adversely affect a child. Marital distress and conflicts are, for example, associated with anxiety, poor social competence, health problems, poor academic performance, and reduced cognitive performance among children (Dadds and Powell, 1991; Gottman, 1989; Ghazarian and Buehler, 2010; Hinnant et al., 2013). Therefore it would not necessarily be beneficial to lower the divorce rate, as it is doubtful whether much would be gained if the reduction simply resulted from more unhappy couples staying together. Although influencing marital satisfaction is usually thought to be outside the role of policy makers, the prevalence of marital conflicts and dissolutions makes their negative impact highly relevant to societal outcomes. A policy that could lower divorce rates by directly reducing household stress and conflicts could therefore be highly valuable.

A few countries have introduced paternity leave, or a "fathers' quota," into their parental leave systems to encourage fathers to take a greater part in childcare. One of the main motivations for these reforms is the idea that gender equality in the household is a necessary condition for gender equality in the labor market. Although these policies are not aimed at increasing marital stability as such, they do affect the division of labor in the household and may therefore affect marital discord. In this paper we examine the introduction of a fathers' quota in Iceland to investigate whether reserving part of the parental leave to fathers affects divorce risk. In Iceland three months of paternity leave were added to the existing six-month-long leave. The reform was implemented in stages, so that in 2001, one month of the parental leave was earmarked to fathers, which increased to two in 2002, and finally to three in 2003. We focus on the effect of the first month to be added, because the announcement of the reform occurred too late to affect the fertility choices of those parents who had children during the last months of 2000 and the first months of 2001. These parents make up our treatment and control groups.

The Icelandic policy reform is particularly interesting because it gave men the largest non-transferable share of parental leave (three months out of nine) in the world. Furthermore, Iceland and Sweden are the only countries that give equal non-transferable parental leave rights to mothers and fathers.[1] The take-up rate of the paternity leave in Iceland was also high, and the growth in men's share of the total parental leave taken has been much steeper there than in the other Nordic countries. Among fathers who had children

[1] In Sweden, men and women each get two non-transferable months out of 16 months total

in 2001, 82.4 % took paternity leave (Eydal and Gislason, 2008). The average paternitiy leave was 39 days, that is, slightly more than the one month earmarked to them. In 2003, when the paternity leave had been increased to 3 months, 86.6 % of fathers took leave, and the average length of the paternity leave was 97 days. In effect, the policy shifted fathers from taking 0% share to taking one third of the total leave.

We use a detailed, Icelandic register-based panel dataset, to identify the causal effects of the reform by comparing these two groups of parents, using both regression discontinuity and difference-in-differences method. Our identification strategy is based on the fact that parents who had their child after the reform date did receive a treatment, namely paternity leave, whereas parents who had their child before the reform did not. The analysis is based on the intention-to-treat. We do not observe who is treated in our sample, but as our data consists of the relevant population, we expect around 82.4 % of the fathers in our treatment group to have taken paternity leave. The policy process was very fast —the new law was passed on May 9, 2000, and went into effect January 1, 2001—as a result, parents who gave birth around the time of the reform could not have known about it at the time of conception. This allows us to assess whether a shift towards greater equality, by facilitating more equal sharing of responsibility for childcare and housework between men and women, makes marriages more stable.

Our results show that the introduction of the paternity leave had a significant and sizable effect on the probability that parents would stay together, in particular during the first years after their child was born. If we focus on the difference-in-differences estimates for couples, who had children twelve weeks before and twelve weeks after the reform, our results show that the paternity leave reduced the probability of parents' separation by 8.3 percentage points five years after having their child, and by 3.4 percentage points fifteen years after having their child. The main effect stems from parents who have the same level of education, or couples where the woman has higher level of education. On the other hand, the estimated long term effect on divorce probability is positive (although insignificant) when we look at couples where the father has a higher level of education than the mother.

To the best of our knowledge, this is the first paper to focus on the effect that paternity leave and greater equality in child-rearing have on divorce risk.[2] The paper draws on, and contributes to two strands of literature. The first is the growing literature on parental and paternity leave. A number of studies have looked at how parental leave (which in most cases is only used by mothers) affects parents and children (e.g., Lalive and Zweimüller, 2009; Carneiro et al., 2015; Dahl et al., 2013). On the other hand, only a handful of papers have investigated the causal impact of earmarking a portion of the

[2]One notable exception is Cools et al. (2015) who investigate the effect of the introduction of a four-week paternity leave in Norway in 1993 on various children's and parent's outcomes, including divorce when the children turn 14, but they find no significant effect.

parental leave for fathers. Among these is a paper by Johansson (2010) that investigates the effects on earnings of Swedish paternity leave reform in 1995 and 2002 using a difference-in-differences (DD) approach. Johansson fails to find any evidence that paternity leave affects mothers' and fathers' earnings. Rege and Solli (2010) estimate a DD model that exploits an exogenous variation in paternity leave in Norway provided by the introduction of a four-week paternity quota in 1993. They find that this paternity leave had a negative effect on fathers' earnings. Cools et al. (2015) confirm this by combining an instrumental variable (IV) approach with the DD approach to obtain the causal effect of the same reform, and they find that the reform had a negative impact on the earnings and employment of mothers as well, both in the medium and long term. Ekberg et al. (2013) find that incentives have strong short-term effects on male parental leave uptake, but find no significant effect on parents' long-term wages and employment. Furthermore, they find no significant effect on how parents split the household work, measuring the shares of household work by the shares of the leave taken for care of sick children. By contrast, Kotsadam and Finseraas (2011) apply a regression discontinuity (RD) approach to survey data to estimate the effect of the Norwegian parental leave reform and find that the "daddy quota" reduced conflicts over the division of household labor and led to more equal sharing of housework in the long run. In a recent study Patnaik (2017), estimates a DD model, using a policy reform in Canada, and finds that paternity leave had a large and persistent effect on domestic equality, as exposed fathers contribute more to home production, and exposed mothers spend more time at the workplace.

The second strand is the empirical literature on the causes and consequences of marital dissolutions. Recent studies have identified a number of factors that increase the probability of divorce. In addition to those discussed previously in this section—children, wives' relative wages' and wives' labor market participation—negative financial shocks have been found to increase the probability of a divorce. Rainer and Smith (2010), for example, find that negative home-price shocks increase the risk of separations, and Rege and Solli (2010) find that plant closures significantly increase the risk of marital dissolutions among workers in the affected plants. In addition, Tjøtta and Vaage (2008) find that governmental support for children and for divorced families increases the probability of divorces, and Dahl and Moretti (2008) find that parents in the U.S. are more likely to divorce if their firstborn child is a girl than if it is a boy. Furthermore, previous studies (e.g., Wolfers, 2006) suggest changing divorce laws can only have a minor role for changing divorce rates. Our study adds significantly to this literature by looking at a policy that affects divorce rates by incentivizing couples to change their division of labor in the household.

Our findings are policy relevant for a number of reasons. The effects of changes to parental leave schemes on marital stability may either exacerbate or dampen the financial and welfare costs associated with having a baby. In addition, externalities of marital dissolution in our setting may be substantial because children are involved. Given the high level of current interest in policy to equalize parental leave and create a level playing field for men and women in the workplace, it is worth better understanding the broader consequences of such policy.

The rest of the paper is organized as follows: in Section 2 we discuss the theory of marital stability, in Section 3 we describe the institutional setting and the reform we are examining, in Section 4 we describe our data and the outcome variables under consideration, in Section 5 we present our empirical approach, and in Section 6 we present our main results. Section 7 concludes the paper.

2 Theory of Marital Stability

Becker (1973) was the first one to provide a theoretical framework for studying the institution of marriage, and Becker et al. (1977) were the first to provide a theoretical analysis of marital dissolution. Their economic approach to the family interprets such behaviors as childbearing, marriage, and divorce as active choices made by maximizing individuals. According to this view, the marriage institution is a highly efficient setup for individuals in which one partner specializes in market work while the other specializes in domestic work.

As a consequence, if partners "invade" each other's territories, their specialization is reduced and the gains to be made from the marriage decline. Furthermore, the decision to stay married depends on a comparison between the utility associated with being married and the utility associated with the outside option of a divorce, so this decline reduces the desirability of staying married. Because men generally have greater attachment to the labor force and higher wages, whereas it is unavoidable that women take care of carrying and breastfeeding their children, the most stable marriages are said to be those in which the husband exchanges economic support for his wife's household tasks, and vice versa. Some evidence has been offered in support of this view, showing that men and women have preferences for traditional gender roles and that a woman's financial dependence on her spouse is itself an important contributor to marital stability; in particular, divorce is more likely if a woman's income exceeds her husband's (Bertrand et al., 2015; Heckert et al., 1998; Jalovaara, 2003; Liu and Vikat, 2004).

A growing literature looks at the role of gender identity on family formation and marital stability. Bertrand et al. (2015) show that societal norms, such as the idea that wives should not earn more than their husbands, affect the formation of marriages. Moreover, couples in which the wives earn more than the husbands tend to be less satisfied with their marriages and are more likely to divorce. Finally, women who earn more than their husbands have also been found to carry out a greater share of the household chores than women whose partners earn more than them. This contradicts the Beckerian view, which holds that benefits of marriage stem from specialization and predicts a negative relationship between one's share of the households tasks and the share of the household income one provides.

However, a number of recent studies find that shared responsibility for bringing home the bacon makes relationships more robust. Cohabiting couples in the U.S. have been found to be more stable when the partners are more equal in terms of household chores and income (Brines and Joyner, 1999). Schoen et al. (2006) find that wives' full-time employment is associated with increased marital stability, and the findings of Sayer and Bianchi (2000) and Sayer et al. (2011) suggest that the economic independence of women is not the cause of marriage dissolutions but rather allows already unhappy wives to leave. Furthermore, Sigle-Rushton (2010) finds divorce rates to be lower in families in which husbands take a greater part in the housework, shopping and childcare.

Other empirical findings have also been used to cast doubt on the Becker (1973) view. Contrary to the his predictions, people do engage in positive assortative mating by wages, other things equal, which suggests that the gains from marriage are not brought about just by specialization. Lam (1988) offers one explanation for this documented regularity. He develops a model in which the joint consumption of public goods is an important source of gains from marriage, and shows that this generates a tendency toward positive assortative mating by wages because spouses have similar demands for public goods.

The Beckerian model was heavily criticized by Oppenheimer (1994, 1997) on both theoretical and empirical grounds. She provides an alternative view, often referred to as the flexibility model, that makes different predictions about the effects of female employment on marital stability. One of her main criticisms is directed at the unrealistic assumption of lifelong employment, and she argues that a high degree of specialization puts relationships at risk because any temporary or permanent incapacity of a specialized agent would result in functions vital to the household not being carried out. In contrast with the Beckerian view, the flexibility model predicts that shared responsibility for both income and housework makes marriages more robust by reducing income risk and securing greater financial stability.

The inner workings of the household have changed considerably in the last decades, for multiple reasons. It has become easier to control pregnancy, there are more laborsaving devices in the home, and there is more work outside the home. This has led the share of married women in the U.S. who are employed to rise from 6% in 1900 to 30% in 1960 and 70% today. As a result, couples have more time and money, and it has become more important to individuals to have partners they enjoy sharing these with. It can therefore be argued that marriage today is fundamentally different from what it was 50 or 60 years ago. It has moved from a factory model in which husbands are breadwinners and wives are homemakers —that is, a model with production complementarities —to a hedonic model with consumption complementarities.

There have been other changes during this period. Stevenson and Wolfers (2007) have documented a declining trend in both marriages and divorces in the U.S. over the last 30 years, meaning that a greater proportion of today's marriages will remain intact 30 years into the future. This raises the question whether public-goods and risk-sharing channels are more important for marital stability than specialization, and whether greater equality among men and women makes for greater marital stability. However, the fact that gradual increase in equality among couples has coincided with a trend toward more stable marriages does not mean that the former caused the latter. In this paper, we investigate whether such a causal link exists by taking advantage of an unexpected parental leave reform aimed at equalizing the labor market prospects and the childcare responsibilities of men and women. The reform thereby provides us with a setting where we can test the predictions of Becker vs Oppenheimer.

2.1 Children, Fathers' Quota, and Marital Stability

In traditional economic models, children stabilize marriages. Becker (1991) views the production and rearing of children as the main purpose of marriages and families. Children are a long-term marital-specific investment and make specialization even more beneficial. The value of children is not fully realized if the marriage breaks up and children therefore make the value of marriage higher and thus make divorce more costly. Economic theory furthermore suggests that the more stable their marriage is, the more likely a couple is to invest in children and become parents (see, e.g., Becker, 1973; Becker et al., 1977; Weiss, 1997). Although a number of studies have found a positive correlation between children and marital stability, a recent analysis by Svarer and Verner (2008) shows that when correcting for couples' self-selection into parenthood, this relationship disappears. This suggests that the observed correlation is mainly due to happier couples having children, rather than children stabilizing marriages.

In contrast to economic theory, there is an extensive literature within psychology and sociology on the ways in which children decrease marital satisfaction and increase divorce risk. Twenge et al. (2003) summarize the explanations given for this negative association, which can be grouped into four theoretical models: (1) the role conflict model, (2) the restriction of freedom model, (3) the sexual dissatisfaction model, and (4) the financial cost model. According to the role conflict model, parenthood leads to a reorganization of social roles along more traditional lines. This can cause stress and conflicts when the parents do not prefer traditional roles, for example when the woman does not want to give up her career. The restriction of freedom model emphasizes the fact that children require time and attention, and that childcare responsibilities must interfere with and compete with the parents' pursuit of their own pleasures.[3] In the sexual dissatisfaction model

[3]The authors note that this is similar to the role conflict model in many ways and that empirically it

marital problems stem from the fact that the presence of children decreases the parents' opportunities for sexual intimacy, and in the financial cost model, children bring about marital conflicts through the stress they put on family finances. Empirically, Twenge et al. (2003) find that the restriction of freedom model and the role conflict model are the most important in explaining the destabilizing effect of children. The negative effect of children on marriages is more severe among high socioeconomic groups, younger birth cohorts, and in more recent years.

Introducing father's quota to a parental leave system increases domestic equality. Arnalds et al. (2013) use time use surveys to compare parents who had children before the policy reform in Iceland, to parents who had children after the reform, and find that children born after the change received considerable more care from their fathers. Looking at a policy reform in Canada, Patnaik (2017) also finds that paternity leave had a large and persistent effect on domestic equality, as exposed fathers contribute more to home production, and exposed mothers spend more time at the workplace. In a Beckerian world, this would decrease the value of marriage, because specialization would be reduced. According to the flexibility model, however, the value of a marriage increases when the parents share their responsibilities more equally. Moreover, in the psychology models, in which children increase divorce risk, a fathers' quota is predicted to increase marital satisfaction and stability, and a policy that encourages fathers to participate in childcare may be of particular importance in the role conflict model.

3 Institutional Setup

3.1 The Parental Leave Scheme

In the year 2000, the Icelandic Act on Parental Leave underwent significant changes. A paternity quota was introduced to the country's paid parental leave beginning January 1, 2001. One month of the seven total months of paid parental leave was reserved exclusively for the father. This month was not transferable, so if it was not taken by the father the couple would lose it. Importantly, the right to parental leave in Iceland does not depend on the marital/cohabitation status, and a non-custodial parent has a right to maternity/paternity leave if the custodial parent consents (see Act on Maternity/Paternity Leave and Parental Leave No. 95/2000, Article 8), whereas even a sole custodian may not use the leave earmarked for the other parent.[4]

The new law makes it clear that gender equality was given serious consideration (Act on Maternity/Paternity Leave and Parental Leave, No. 95/2000) in its formulation. The

can be difficult to separate the two mechanisms.

[4]The only case in which the earmarked leave can be used by the other parent is when one of the parents dies before the child reaches the age of 18 months

law's stated main goals are (1) to ensure that children get to spend time with both parents and (2) to enable men and women to balance work and family life. Furthermore, even though this was not explicitly said to be a main goal, the law also mentions that the division of childcare between the parents is a prerequisite for their equality in the labor market.

The new paternity leave accompanied an increase in the total amount of parental leave from six to nine months. Iceland thereby gave men the largest non-transferable share of parental leave (three months out of nine) in the world. Parents who were active in the labor market were paid 80% of their average salaries while on leave.

Prior to this reform, there was a six month long paid parental leave. The first month of the leave could only be used by the mothers, while in theory the remaining five months could be divided between the parents as they preferred. Importantly though, fathers did not have a separate or independent right to paternity leave, and in practice, only a negligible percentage of parents used their right to share the parental leave under the old law.

The case of Iceland is quite unique even among the Nordic countries. First, although paid parental leave has a long history in the other Nordic countries, such laws were enacted much later in Iceland.[5] Furthermore, as can be seen from Figures 1 and 2, the trend in Iceland when it comes to parental leave has also deviated quite strongly from the other Nordic countries in recent years. For a long time, men took almost none of the parental leave (their share was 0.1% in 1995), but after the reform in 2001 the growth in men's share of the total leave time has been quite steep. In 2000 their share was still fairly low (3.3%), but in 2001, after men received the non-transferable right to a one-month-long paternity leave, the percentage of total leave days used by fathers reached 11.5%. In 2002, men had the right to a two-month-long paternity leave, and their leave accounted for 19.6% of all parental-leave days used. In 2005, three years after men received the non-transferable right to a three-month-long paternity leave, this number had reached 32.7%. Since 2002, Icelandic men have used the largest share of total parental leave among men in the Nordic countries.

3.2 Households

In our analysis we do not differentiate between married and cohabiting couples, and a divorce is defined as the separation of parents, that were either married or cohabiting. There is little difference between cohabiting and married couples in the Nordic countries socially, culturally, or legally, and cohabitation is very common in all of them, including Iceland. At the time of the reform, 41% of individuals aged 25-40 were married, while

[5] the first parental leave laws were enacted in 1901 in Denmark, in 1917 in Finland, in 1892 in Norway, and in 1900 in Sweden, but not until 1946 in Iceland.

21% were cohabiting.

According to the OECD (2012), Iceland has the highest share of children born out of wedlock among the OECD countries, around 64%.[6] This is not due to a high rate of teenage pregnancies, as the same report notes that Iceland falls in the middle of the ranking distribution of OECD countries for this. Numbers from Statistics Iceland show that cohabitation is common among people who have children. Between 2001 and 2006, 57% of firstborn children and 50% of second children were born to cohabiting parents, while the numbers born to married parents were 19% and 39%, respectively.

Fertility rates in Iceland are also high relative to other developed countries, as can be seen in Figure 3, and divorce and union dissolution are common.[7] In 2001, 32.7% of divorces and terminations of cohabitation occurred among couples without children. Furthermore, most children are under the age of seven at the time of their parents' divorce or termination of cohabitation.

4 Data

We use a rich register-based panel dataset comprising the population of Icelandic couples who had children between 2000 and 2001. For our sample we compiled data of income and demographic characteristics from Statistics Iceland into a panel covering the parent in our sample over a period of 27 years (1990-2016). The demographic data includes information on age, gender, marital status, education, dummies for whether the individual lives in the capital city or other urban areas, the number of children the individual has, and spouse identifiers. The education variable specifies the highest level of education the individual has completed, whether this is compulsory education, high school, or university. Income is reported by individual source and is divided into three categories: income from employment, capital income, and other income.

Our data are taken from the Icelandic Longitudinal Income Database (ICELID), maintained by Statistics Iceland, which has gathered it from different sources, mainly administrative registers. Because Icelandic residents are taxed on their income Statistics Iceland has a parliamentary mandate to collect extensive information on the finances of every individual in the country. Because the data are collected by a single, central agency, and are used for tax purposes, we believe that our data set is of a very high quality. Furthermore, because the data are register-based and cover a large and representative sample of the population, results drawn from them will not be influenced by self-selection biases.

Table 1 provides summary statistics on the variables we use in this study. We show

[6]Out-of-wedlock births are defined as those in which the parents are neither married nor living in a comparable legal partnership during the year in which the birth occurs.

[7]According to Statistics Iceland, the incidence of divorces among married individuals in 2000, just before the reform, was 40% . In 2011, the incidence was 34%.

separate statistics for men and women in the treatment group, defined as couples who has children in the twelve weeks after the policy reform (columns (i) and (ii)), and the control group , defined as couples who had children in the last twelve weeks before the new parental leave system took effect (columns (iii) and (iv)).

5 Empirical Framework

To estimate the intention-to-treat effect of the parental leave reform on marital stability we combine a discontinuity design with a difference-in-differences approach. Access to paternity leave depends on the child's date of birth. No couple who had a child in the period before the policy reform had access to the new parental leave system, and all parents who had a child after 1st of January 2001 had access. We therefore compare parents' who had children just before, and just after, the policy reform. Our outcome variable is marital status for couple i at time t, and is denoted D_{it}. The outcome variable takes value one if the couple has separated, and zero if they are still married or cohabiting. We let $T = 1$ for those individuals who had a child after the policy reform became effective and $T = 0$ for those who had children before the policy reform. Our assignment variable is child's week of birth.

Having access to paternity leave is therefore a deterministic and discontinuous function of the week of birth, w_i, and we use a sharp regression discontinuity (RD) approach to estimate the impact of the daddy quota. The assignment variable is centered at zero for 1^{st} of January 2001, which yields the following:

$$T_i = \begin{cases} 0 & \text{if} \quad w_i < 0 \\ 1 & \text{if} \quad 0 \leq w_i \end{cases}$$

The key assumption behind our analysis is that the relationship between w_i and marital stability is smooth around the threshold so that any discontinuity at the threshold can safely we interpreted as the causal effect of the parental leave reform. The idea behind the RD design is that by comparing observations that are sufficiently close to the threshold the discontinuity sample will be a close approximation to a randomized trial and therefore it should be unnecessary to include a covariates or trends in the estimation. However, because there are relatively few observations in a local neighbourhood of the assignment threshold in our data, we use control function approach as the preferred method in our RD analysis. We estimate a model of the form:

$$D_i = \alpha + \beta X_i + \tau T_i + f(w_i) + \gamma w_i T_i + \epsilon_i, \tag{1}$$

where effect of week of birth is captured by the function $f(w_i)$, i.e. it is supposed to be an adequate description of $E[D_{0itc}|w_i]$. If the correct specification of the control function, $f(w_i)$, is used, i.e. the true conditional mean function $E[\omega_i|w_i]$, it will capture all dependence between T_i and ϵ_i so that the conditional mean independence assumption will hold, i.e.,

$$E[\epsilon_i|T_i] = 0.$$

This procedure will therefore render the OLS estimates consistent and even unbiased in the case of linear control functions[8], i.e., the causal effect of the treatment variable, T, on the outcome variable, D, will be captured by β. The problem is that this regression-based estimation approach requires a specification of the functional form $f(\cdot)$ and a misspecified control function is likely to produce inconsistent estimates. By including the interaction term between week of birth and the treatment dummy, we allow the slope coefficients to differ on each side of the threshold. We furthermore check whether our estimates are robust to allowing different functional forms of the control function.

There is a trade-off between having groups that are as similar as possible (obtained by reducing the time window around the reform) and having a larger sample size (by widening the window). We therefore also report our findings for several time windows, and by using the MSE and CER-optimal bandwidth estimators suggested by Calonico et al. (2017).

Finally, in order to confront the inference problem arising in the case of childbirth-period specific random effects we cluster standard errors by the child's calendar week of birth when looking at larger bandwidths.

5.1 Threats to Identification

One threat to the identification of causal effects is endogenous sorting: parents may have planned the time of birth in anticipation of the policy. Although parents may have had an incentive to affect the date of birth, children born close to the treatment determining threshold were already in utero when the law was passed on May 9^{th} 2000 so parents who had children close to the threshold, January 1^{st} 2001, did not know about the reform at the time of the conception. Furthermore, it is evident from news coverage that the new law did not reach widespread public awareness until the late fall of 2000, and there appears to have been a substantial level of uncertainty with regards to the implementation of the reform. This adds further support to our choice of treatment group because it implies that it is unlikely that the policy affected timing of births until late spring or summer of 2001. A related concern is whether couples expecting a child around the threshold date would still be able to manipulate the date of birth. In general, postponing births is more difficult than advancing the time of birth. However, we cannot rule out the possibility

[8]See Hahn, Todd, and van der Klaauw, 2001

that the parental leave reform impacted the date of birth for scheduled inductions and c-sections. To check whether our results are robust to parents possibly manipulating the day of birth around the threshold, we also show estimates where we exclude births in the two weeks before, and two weeks after 1st of January 2001.

Another concern, is that even without the parental leave reform, parents who have their children at the end of the year are different from parents who have their children early in the year. In their study, Buckles and Hungerman (2013), find that maternal characteristics vary by the month of birth. Mothers who give birth during the winter months are younger, less likely to be married, and less educated, than mothers who have their children at other time or the year. We take several measures to address this.

First, in order to know whether the parents in our control group, and our treatment group resemble each other on potentially confounding variables, we compare the mean values of these variables for the two groups of parents in Table 1. There is a slight imbalance in people's level of education but overall the treatment and control groups do not differ greatly and the sample selection appears successful in minimizing confounding factors.

Second, since the groups may still differ on unobservable characteristics we use data from the previous year to look at a placebo treatment effect, i.e., we estimate Equation (1), using births around 1st of January, 2000, i.e., when no parental leave reform took place.

Finally, we estimate a difference-in-differences model using the placebo group, and for our main sample. This approach renders a valid estimate if without the treatment the differences between the couples that have children late in the year, and the couples that have children early in the year would follow the same pattern for main sample and the placebo group. We estimate a model of the form:

$$\begin{aligned} D_{i,t=1} = \gamma_0 + \gamma_1 T + \gamma_2 NotPlacebo + \gamma_3 z + \gamma_4 [z \times T] \\ + \gamma_{DD} [NotPlacebo \times T] + X_i \delta + \epsilon_{i,t=1} \end{aligned} \tag{2}$$

where $NotPlacebo$ is a dummy variable that takes value one if the birth is around the policy change, i.e., 1st of January 2001, and zero if the birth is in the months before and after 1st of January 2000 , T is a dummy that equals one if the child is born after 1st of January (either in 2000 or 2001), and z is the week of birth .

A final potential concern is that other policies are also related to the same date cutoffs. To the best of our knowledge, however, there were no other policy reforms taking place around the same time that could be confounding in our analysis..

6 Results

The first change in the parental leave system took place on January 1, 2001, when the total leave was extended from six months to seven, with one of the seven months earmarked to the father. The following section details our results, using a sample of 600 families that had children in the three months before and three months after this cutoff date.

6.1 Graphical Illustrations

The top panel of figure 5 shows the evolution of the cumulative divorce hazard in couples that had a child within a three-month time window around the implementation of the parental leave reform in 2001 and those that had a child within the same window the previous year. The couples that had a child after January 1, 2001, were entitled to paternity leave, while those who had a child before were not. There are some noteworthy patterns. The graph suggests that paternity leave is associated with a reduction in the number of divorces immediately after the child is born. Figure 5 also indicates that the drop in divorces is not just transitory, but rather appears to be a permanent one, as the difference in the proportion of couples divorced remains throughout the fifteen-year period that we follow them.

When we compare (a) those who were entitled to a paternity leave to those who had a child in the same period the year before, and (b) those who had a child just before the reform to those who had a child in the same period the year before, we find added support for our conclusion that the paternity leave reduced the number of divorces among people who were entitled to it. Looking at the share of couples that divorced within ten years after their child was born, we see that there are fewer divorces among those entitled to paternity leave than among those who had a child in the same period the year before. In the bottom panel of Figure 5 we compare parents who had a child in the same period the year before, and find no such difference.

In Figure 6 we look at the dynamics of divorce risk, by the age of their child. We can see that for both the control group and the treatment group the divorce risk is highest when the child is small. This is furthermore the period where we see the largest differences between the two groups. The evidence from Figures 5 and 6 therefore suggests that the parental leave reform decreased divorce risk, in particular in the first years after the child was born, and that the impact has a persistent effect on the average family structure in the two groups.

6.2 The Effect on Marital Stability

In Table 2, we present our results estimating the effect of the introduction of the paternity leave on marital stability. More specifically, we look at the probability that parents are separated, comparing the couples whose children were born just after and just before the law changed. We start by comparing observations close to the threshold (columns (i)-(iv)). While these estimates are imprecise they suggest that there is a persistent negative effect on divorce probabilities among parents who had children after the policy reform. In columns (v)-(x) we extend the window around the threshold and use local linear methods to control for a possible underlying relationship between the dependent variable and the week of birth. We see large significant effect on cumulative divorces. Our results imply that if the couples who had children just before the reform would also have had the opportunity for one month of paternity leave, the number of divorces in the next fifteen years would have been significantly lower. To be more specific, five years after the birth of the child, the effect is large and significant, showing that if the control group had had access to the same paternity leave, the divorce rate in that group would have been 6.5-8.2 percentage points lower. The long term estimates are less precise, but suggest that the differences in divorce rates are persistent.

To address the concern that our findings are due to seasonality in the data, or due to unobserved difference between parents who have children in the beginning of the year, and at the end of the year, we we repeat the regressions we carried out in Table 3, as if the reform had taken place exactly one year earlier. The estimates in columns (i)-(iv) suggest that it is important to control for dependance between the divorce rates and week at birth, even when on looks at observations close to the threshold. The estimates in columns (v)-(x), where we control for local linear trends on each side of the threshold, are negligible and not significant under any specification. This implies that our estimated effect of the introduction of a father's quota in columns (v)-(x), Table 5, can plausibly be interpreted as causal relationships.

To further check the robustness of our findings we estimate the treatment effect, using the MSE and CER-optimal bandwidth estimators suggested by Calonico et al. (2017). When we assume that the control function is linear (columns (i) and (ii), Table 4) the optimal bandwidth is estimated to be between 9,4 and 15. As in Table 2 we see a large negative effect on divorce probabilities among the parents who had their child after the policy reform.

Finally, we estimate a difference-in-differences model, described in Equation 2, and find treatment effect very close to those estimated 2 (see Table 5, i.e., we find large and significant effect on divorces in the first five years after the child was born, and evidence that there is a persistent long-run effect as well. In Table 6, we estimate Equation 2, excluding births close to the threshold (two weeks before, and two weeks after), to alleviate the concern that there is a selection into treatment among those who had due dates close to 1st of January. This does not impact our findings.

6.3 Heterogeneity in the Effect

In columns (i)-(iv) in Table 7 we look at whether the treatment effect is driven by less experienced parents, i.e. parents who just had their first child, or those who have older children. We find that the paternity leave causes a reduction in divorce rates among both groups, and that in the short run the largest impact is on the more experienced parents.

Our hypothesis is that the paternity leave affected marital stability as it increased domestic equality, and therefore alleviated the shock on the division of labor within households that takes place when couples have children. One implication of our hypothesis is that the positive effect of the paternity leave on marital stability, should be strongest among parents who aim for equal division of labor at home, rather than those who prefer to specialize. We have no information on parents' preferences but in Columns (v)-(x) in Table 7 we separate parents by their relative education, i.e., we look separately at parents who have the same level of education (columns (v) and (vi)), parents' where he mother has higher level of education (columns (vii) and (viii)), and parents where the father has higher level of education (columns (ix) and (x)). The idea is that education as a rough measure of labor market specialization. For parents who have the same level of education, the effect is strong and significant, both in the short run, and in the long run. For this group, having access to paternity leave reduces divorce risk by ten percentage points. Among parents with the same level of education, 37 % are separated fifteen years after the birth of their child. According to the point estimates, the daddy month could have reduced the ratio to 27 %. The estimated treatment effect for couples where the mother has higher education are also large and significant, when we look at divorce rates five years after the birth of the child. In contrast, the results for the sample where fathers have higher level of education than the mothers imply no effect in the short run, and an increase in divorce probability in the long run.

7 Conclusions

Parental policy has been under debate in recent years. With the growing number of dual-earner families in the US, there has been an increased demand for a universal paid parental leave. There is little agreement, though, on the optimal system in terms of length, form, or payments. While longer maternity leaves have been found to increase women's labor market participation, they have also been found to have a negative effect on women's earnings (Ruhm, 1998), and still other papers suggest that this only holds in the short run (Lalive and Zweimüller, 2009; Lalive et al., 2013). In response to this evidence, and in an attempt to narrow the gender gap in the labor market, several countries have earmarked part of their parental leave for fathers. Families have to forgo this parental leave if it is not used by the father, which creates strong economic incentives for fathers to take part in caring for their children during their first months. However, few attempts have been made so far to evaluate how well these policies work. Furthermore, the main emphasis in evaluations of parental leave policies has so far been on labor market outcomes, for example, wages and labor market participation. Our results show that the impact of such policies is not restricted to labor market outcomes.

It is well established that the presence of young children is a risk factor for marital dissolution, and a number of studies have found that having children significantly decreases marital happiness, and increases divorce risk (Svarer and Verner, 2008; Lawrence et al., 2007, 2008). We find that the addition of one month of paternity leave to an existing six-month parental leave in Iceland significantly decreased divorce rates among parents of young children. Parents who had their children right after the policy was implemented were considerably less likely to divorce than parents who had their child just before the paternity leave was introduced. The effect is sizable and indicates that if the control group had been subject to the new parental leave policy, their rate of separations within the following five years would have been reduced by around thirty percent. Even ten years after the birth of their children, there is still a substantial difference between couples in the two groups, indicating that around twenty percent of the separations in the control group would have been avoided had their children been born after the reform took effect. These results suggest that engaging fathers in childcare has a substantial long-term effect on marital stability.

We find that the effect of the paternity leave is especially strong among parents where the mother's education is equal to, or greater education than, the father's. In contrast, the effect on couples, where the father has higher level of education than the mother, is negligible, or even positive. In societies where women are becoming more career oriented, a parental leave system, that encourages both parents to participate, may decrease the divorce risk by easing couples' transition into parenthood. Women have significantly increased their education levels and labor market participation in recent decades, but have at the same time remained the main caretakers in the household. In particular, when children are born, couples often reorganize their social roles towards more traditional family patterns according to which men are the breadwinners and women take care of the home and children. This shift in household responsibilities is likely to be more dramatic and cause more stress and conflicts, among couples where specialization is not expected.

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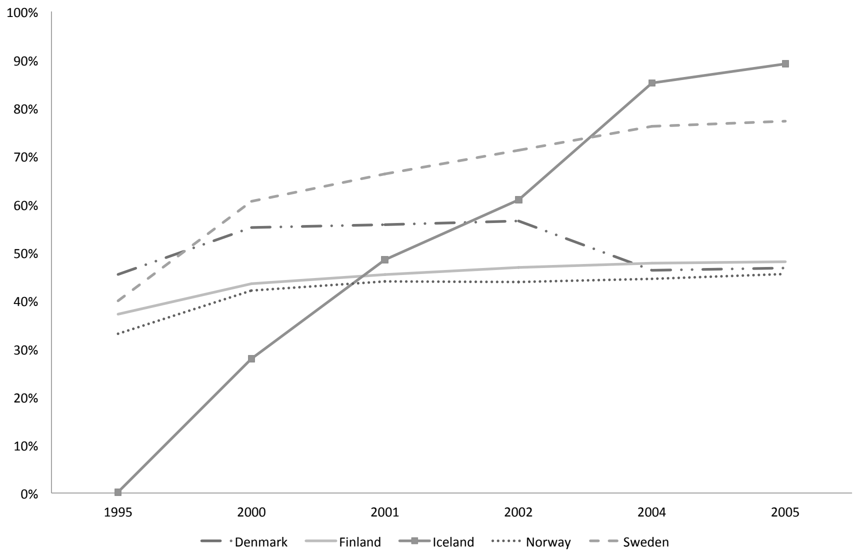


Figure 1: Share of men relative to women receiving parental leave in the Nordic countries

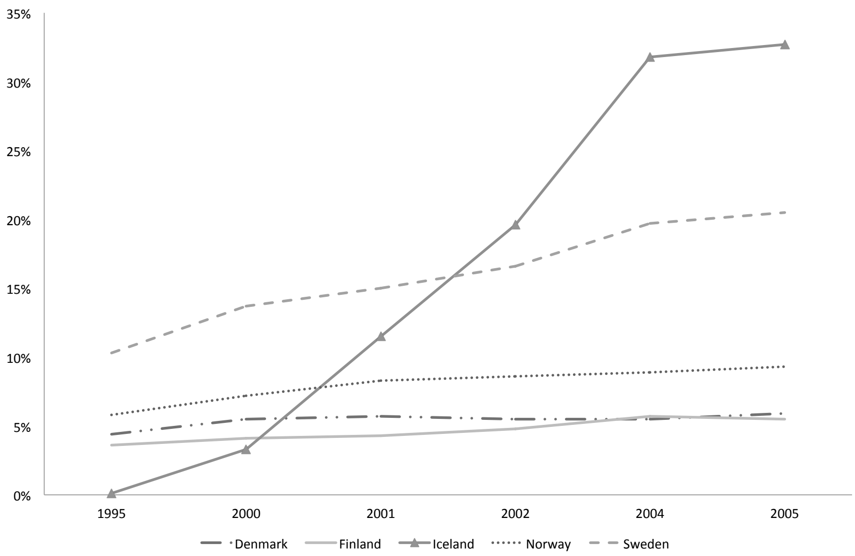


Figure 2: Share of parental leave days used by men in the Nordic countries

Figure 3: Fertility in Iceland 1990-2010

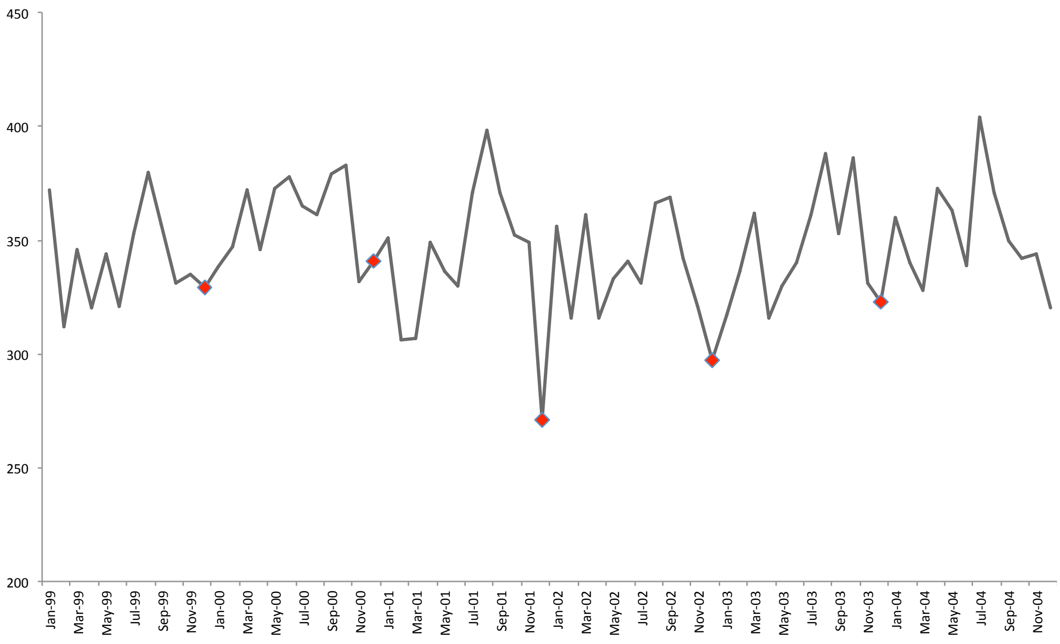
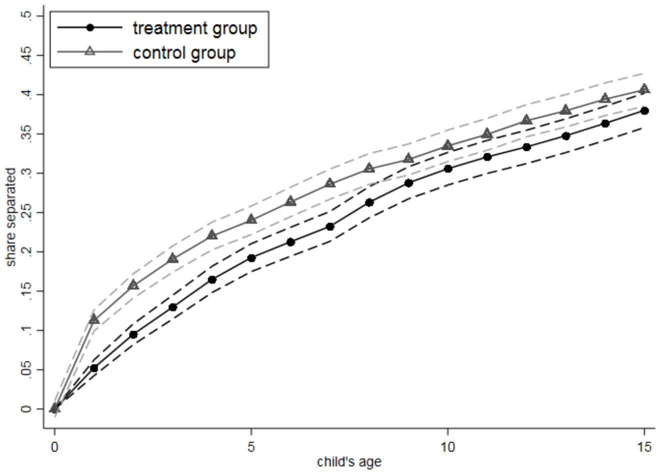


Figure 4: Monthly fertility in Iceland 1999-2004



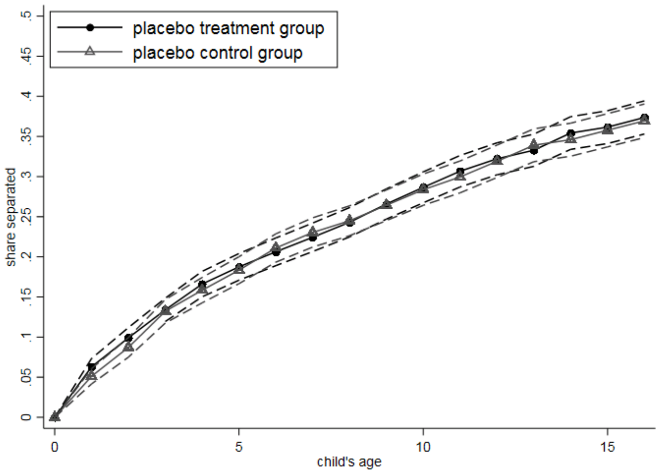


Figure 5: Comparision of cumulative divorce hazard (with 95% CI) for the treatment and control group (top panel), and for the placebo treatment and placebo control groups (bottom panel).

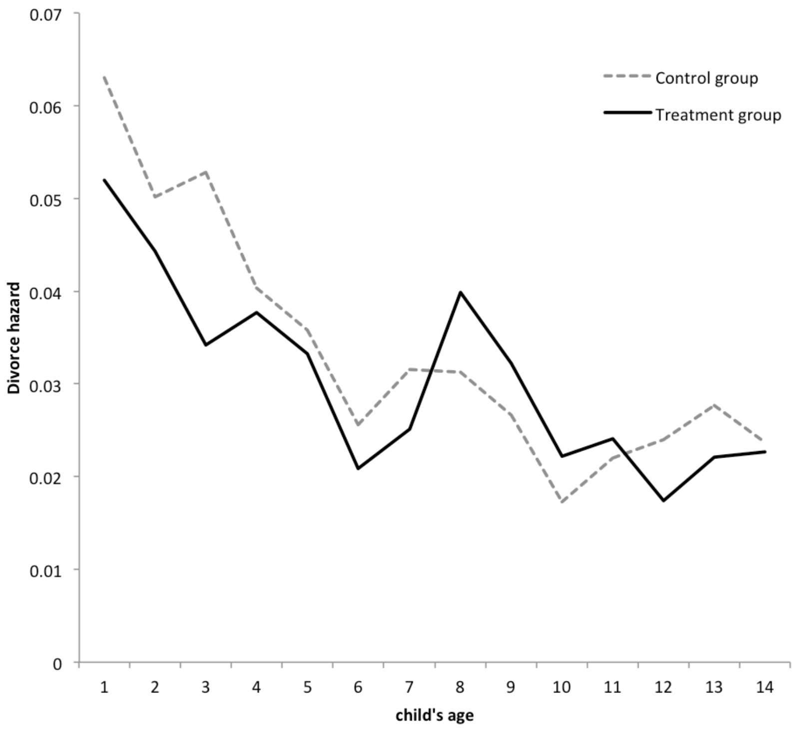


Figure 6: Comparing divorce risk for the treatment and control group, by the age of the child

Table 1: Summary Statistics for Treatment and Control Group

	Treatment group		Control group		Difference	
	Men	Women	Men	Women	Men	Women
	(i)	(ii)	(iii)	(iv)	(v)	(vi)
Birth year	1968.8	1971.2	1968.4	1970.9	0.4	0.3
Elementary school	0.33	0.36	0.33	0.32	0.00	0.04*
High school	0.44	0.38	0.39	0.40	0.04*	-0.02
University	0.21	0.25	0.27	0.27	-0.05**	-0.02
First child dummy	0.37	0.39	0.35	0.39	0.02	0.00
#of older children	1.02	0.96	1.07	0.94	-0.05	0.00
Earnings 1999	2,631,189	1,169,693	2,645,733	1,207,217	-14,544	-37,523
Capital income 1999	94,191	74,490	123,416	86,352	-29,225	-11,862
Couple's earnings gap 1999	1,439,858	1,439,858	1,366,746	1,366,746	73,112	181,696
Married Couples	0.50		0.47		0.03	
Cohabiting Couples	0.50		0.53		-0.03	
Separated in 2002	0.05		0.11		-0.06***	
Separated in 2003	0.09		0.16		-0.08***	
Separated in 2004	0.11		0.18		-0.08***	
Separated in 2005	0.13		0.21		-0.08***	
Separated in 2006	0.17		0.23		-0.06***	
Separated in 2007	0.19		0.25		-0.06***	
Separated in 2008	0.22		0.28		-0.07***	
Separated in 2009	0.25		0.30		-0.06**	
Separated in 2010	0.27		0.31		-0.04*	
Separated in 2011	0.29		0.33		-0.04*	
Separated in 2012	0.31		0.34		-0.03	
Separated in 2013	0.32		0.36		-0.04*	
Separated in 2014	0.33		0.37		-0.03	
Separated in 2015	0.35		0.39		-0.04*	
Separated in 2016	0.37		0.40		-0.03	
#observations	585		608			

Note: * $p<0.1$ ** $p<0.05$ *** $p<0.01$. Treatment group refers to those couples that had children in the 12 weeks after the policy change, and the control group includes couples that had children in the 12 weeks before the policy change.

Table 2: The effect of paternity leave on parental separations: regression discontinuity estimates

	Discontinuity at threshold				Local linear method					
window	+/-2 weeks		+/- 1 week		+/- 52 weeks		+/-24 weeks		+/-12 weeks	
	(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)	(viii)	(ix)	(x)
5 years after birth	-0.049	-0.026	-0.102	-0.076	-0.082***	-0.079***	-0.070**	-0.065**	-0.069*	-0.071
	(0.053)	(0.053)	(0.083)	(0.086)	(0.029)	(0.028)	(0.038)	(0.039)	(0.052)	(0.054)
10 years after birth	-0.053	-0.059	-0.088	-0.095	-0.052*	-0.052*	-0.023	-0.021	-0.061	-0.065
	(0.064)	(0.066)	(0.098)	(0.109)	(0.029)	(0.028)	(0.038)	(0.039)	(0.052)	(0.054)
15 years after birth	-0.083	-0.079	-0.093	-0.058	-0.046*	-0.041	-0.027	-0.015	-0.104**	-0.101**
	(0.067)	(0.069)	(0.101)	(0.110)	(0.027)	(0.027)	(0.039)	(0.039)	(0.041)	(0.043)
Number of observations	209	207	100	100	5,425	5,327	2,459	2,413	1,193	1,177
Controls	no	yes	no	yes	no	yes	no	yes	no	yes

Each entry is a separate regression and presents the estimated discontinuity in the probability that a couple is separated, five, ten, and fifteen years after the birth of their child. Controls include mothers' and fathers' year of birth, education, parents' income, number of older children in the household, and an urban dummy. Specifications (v)-(x) control for local linear trends and standard errors are clustered by week of birth. * $p<0.1$ ** $p<0.05$ *** $p<0.01$

Table 3: Placebo analysis: regression discontinuity estimates for the previous year

	Discontinuity at threshold				Local linear method					
window	+/-2 weeks		+/- 1 week		+/- 52 weeks		+/-24 weeks		+/-12 weeks	
	(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)	(viii)	(ix)	(x)
5 years after birth	-0.027	-0.009	-0.034	-0.053	0.005	-0.002	0.009	-0.001	-0.015	-0.003
	(0.054)	(0.056)	(0.067)	(0.074)	(0.021)	(0.022)	(0.028)	(0.029)	(0.038)	(0.042)
10 years after birth	-0.060	-0.052	-0.098	-0.114	-0.004	-0.008	-0.009	-0.017	-0.036	-0.019
	(0.064)	(0.067)	(0.084)	(0.089)	(0.021)	(0.022)	(0.028)	(0.029)	(0.038)	(0.042)
15 years after birth	-0.059	-0.021	-0.126	-0.0100	0.005	0.002	-0.001	-0.010	-0.054	-0.038
	(0.069)	(0.073)	(0.093)	(0.104)	(0.028)	(0.029)	(0.039)	(0.039)	(0.054)	(0.056)
Number of observations	198	191	111	109	5,441	5,421	2,532	2,529	1,206	1,206
Controls	no	yes	no	yes	no	yes	no	yes	no	yes

Each entry is a separate regression and presents the estimated discontinuity in the probability that a couple is separated, five, ten, and fifteen years after the birth of their child. Controls include mothers' and fathers' year of birth, education, parents' income, number of older children in the household, and an urban dummy. Specifications (v)-(x) control for local linear trends and standard errors are clustered by week of birth.
* p<0.1 ** p<0.05 *** p<0.01

Table 4: The effect of paternity leave on parental separations - regression discontinuity: estimating polynomial models using optimal bandwidths

	(i)	(ii)	(iii)	(iv)	(v)	(vi)
5 years after birth	-0.036	-0.043	-0.025	-0.061	-0.054	- 0.138**
	(0.044)	(0.047)	(0.061)	(0.061)	(0.070)	(0.063)
Bandwidth	11.9	9,4	15,7	12,1	17,9	26,7
Effective obs.	1,135	946	1,984	1,226	1,792	1,350
10 years after birth	-0.046	-0.026	-0.031	-0.010	-0.010	-0.014
	(0.052)	(0.059)	(0.067)	(0.077)	(0.080)	(0.087)
Bandwidth	15.0	11,9	19,6	15,0	24,8	19,1
Effective obs.	1,446	1,135	1,984	1,569	2,503	1,984
15 years after birth	-0.087**	-0.074*	-0.092**	-0.071	-0.052	-0.036
	(0.039)	(0.040)	(0.045)	(0.048)	(0.056)	(0.076)
Bandwidth	13,1	10,4	20,2	15,5	19,6	15,21
Effective obs.	1,350	1,042	2,080	1,569	1,984	1,569
Polynomial order	First	First	Second	Second	Third	Third
Optimal bandwidth estimator	MSE	CER	MSE	CER	MSE	CER

Each entry is a separate regression and presents the estimated discontinuity in the probability that a couple is separated, five, ten, and fifteen years after the birth of their child. The full sample includes births in the 52 weeks before and after the policy reform, that is, 5,425 observations. The estimates employ a triangular kernel, and use an MSE-optimal and a CER-optimal bandwidth estimators suggested by Calonico et al. (2017) . Standard errors are clustered by week of birth.
* p<0.1 ** p<0.05 *** p<0.01

Table 5: The effect of paternity leave on parental separations: difference-in-differences

window	+/-12 weeks		+/-8 weeks		+/-4 weeks	
	(i)	(ii)	(iii)	(iv)	(v)	(vi)
5 years after birth	-0.097***	-0.083***	-0.086**	-0.087**	-0.072	-0.081*
	(0.027)	(0.028)	(0.032)	(0.032)	(0.046)	(0.042)
10 years after birth	-0.040	-0.024	-0.035	-0.033	-0.024	-0.028
	(0.026)	(0.026)	(0.030)	(0.031)	(0.054)	(0.052)
15 years after birth	-0.053	-0.034	-0.049	-0.045	-0.093*	-0.096*
	(0.033)	(0.033)	(0.037)	(0.039)	(0.050)	(0.044)
Number of observations	2,399	2,367	1,567	1,545	795	785
Controls	no	yes	no	yes	no	yes

Each entry is a separate regression and presents the estimated treatment effect of paternity leave on the probability that a couple is separated, five, ten, and fifteen years after the birth of their child. The 12 week sample include all births 12 weeks before and after 1st of January 2000 and 1st of January 2001, 8 week sample include all births 8 weeks before and after 1st of January 2000 and 1st of January 2001, etc. All specifications include calendar week of birth dummies. Controls include mothers' and fathers' year of birth, education, parents' earnings, number of older children in the household, and an urban dummy. Standard errors are clustered by week of birth. * $p<0.1$ ** $p<0.05$ *** $p<0.01$

Table 6: The effect of paternity leave on parental separations - difference-in-differences - excluding the two weeks before and after 1st of January

window	+/-12 weeks		+/-8 weeks		+/-4 weeks	
	(i)	(ii)	(iii)	(iv)	(v)	(vi)
5 years after birth	-0.116***	-0.092***	-0.111***	-0.106**	-0.142***	-0.151***
	(0.029)	(0.032)	(0.035)	(0.038)	(0.024)	(0.025)
10 years after birth	-0.049*	-0.029	-0.047	-0.041	-0.055	-0.051
	(0.027)	(0.029)	(0.029)	(0.034)	(0.076)	(0.073)
15 years after birth	-0.057	-0.029	-0.053	-0.045	-0.156*	-0.169*
	(0.039)	(0.040)	(0.046)	(0.053)	(0.067)	(0.071)
Number of observations	1,992	1,950	1,160	1,134	388	383
Controls	no	yes	no	yes	no	yes

Each entry is a separate regression and presents the estimated discontinuity in the probability that a couple is separated, five, ten, and fifteen years after the birth of their child. Controls include mothers' and fathers' year of birth, education, parents' income, number of older children in the household, and an urban dummy. All specifications control for local linear trends and standard errors are clustered by week of birth..
* p<0.1 ** p<0.05 *** p<0.01

Table 7: The effect of paternity leave on parental separations - heterogeneity in difference-in-differences estimates

	First child dummy				Parents' education					
	= 1		= 0		Fathers = Mothers		Fathers < Mothers		Fathers > Mothers	
	(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)	(viii)	(ix)	(x)
5 years after birth	-0.063	-0.061	-0.106***	-0.092***	-0.112**	- 0.103**	-0.152**	- 0.125**	-0.016	-0.001
	(0.056)	(0.052)	(0.030)	(0.030)	(0.052)	(0.050)	(0.058)	(0.056)	(0.040)	(0.035)
10 years after birth	-0.010	0.001	-0.047	-0.037	-0.059	-0.052	-0.070	- 0.044	0.030	0.063
	(0.051)	(0.045)	(0.036)	(0.035)	(0.051)	(0.051)	(0.082)	(0.080)	(0.048)	(0.045)
15 years after birth	-0.063	-0.046	-0.036	-0.022	-0.104*	-0.093*	-0.043	- 0.012	0.039	0.071
	(0.054)	(0.053)	(0.044)	(0.045)	(0.058)	(0.054)	(0.085)	(0.082)	(0.054)	(0.058)
Number of observations	930	909	1,469	1,458	1,140	1,127	603	593	656	647
Controls	no	yes	no	yes	no	yes	no	yes	no	yes

Each entry is a separate regression and presents the estimated treatment effect of paternity leave on the probability that a couple is separated, five, ten, and fifteen years after the birth of their child. All estimates are based on a sample that includes all births in the 12 weeks before, and 12 weeks after 1st of January 2000 and 1st of January 2001. Controls include mothers' and fathers' year of birth, education, parents' earnings, number of older children in the household, and an urban dummy. All specifications include calendar week of birth dummies. Standard errors are clustered by week of birth. * $p<0.1$ ** $p<0.05$ *** $p<0.01$