ORIGINAL RESEARCH

Impact of a Reform Towards Shared Parental Leave on Continued Fertility in Norway and Sweden

Ann-Zofie Duvander[1] · **Trude Lappegard[2]** · **Mats Johansson[3]**

Abstract

It has been argued that a generous family policy aimed at a gender-equal division of childcare and economic responsibility will have a positive impact on childbearing. In this study, we investigate whether fathers' parental leave use is related to continued childbearing and whether there has been a policy effect on fertility behavior due to the introduction of the father's quota in Norway and Sweden. Fathers' parental leave use may affect fertility by easing women's work burden at home and thus enhancing the degree of compatibility between childrearing and female employment, and it may increase fathers' interest in children and childcare. To distinguish causality from selection in the effects observed, we use the natural experiment of the introduction of the father's quotas. The results indicate that the reforms did not influence fertility in Norway but that Swedish couples with a lower income had a temporary higher third-birth risk. Fathers in this group showed the greatest increase in leave use after the reform.

Keywords Parental leave · Fertility · Father's quota · Gender equality · Norway · Sweden

Introduction

It has been proposed that a generous family policy results in relatively high fertility, both in research noting the association and in concerned political circles (Gauthier 2007; Oláh and Bernhardt 2008; Ferrarini and Duvander 2010; Thevenon 2011; Luci-Greulich and Thévenon 2013; Mencarini 2018). In particular, family policy aimed at a gender-equal division of childcare and economic

✉ Ann-Zofie Duvander
Ann-zofie.duvander@sociology.su.se

1   Department of Sociology, Stockholm University, Stockholm, Sweden

2   Department of Human Geography and Scociology, Oslo University, Oslo, Norway

3   Swedish Ministry of Finance, Stockholm, Sweden

responsibility has been the focus. The Nordic countries are held up as prime examples, because of both their policy generosity and their focus on fathers' participation in childcare. Most notably, father's quotas in parental leave use are aimed at encouraging fathers' early involvement in childcare, with great success (Duvander and Johansson 2012; Duvander and Lammi-Taskula 2011; Lappegård 2008; Rostgaard and Lausten 2014). However, even if a general association between gender-equal policies and higher fertility has been asserted (Oláh 2011; Oláh and Bernhardt 2008), there is little knowledge on whether fathers' involvement in childcare (often measured by fathers' parental leave use) actually affects fertility. Here, we study two countries in which parental leave use by fathers is high, focusing on the father's quota reforms, to investigate the direct link between fathers' child care engagement and continued childbearing. In Norway, a quota of four weeks was introduced in 1993, and Sweden followed suit in 1995. In Norway, the quota was available to fathers of children whose mother was working, and parental leave was extended by one month at this time, while in Sweden, eligibility was not dependent on the other parent, and there was no accompanying extension of parental leave. By comparing these two relatively similar countries, we aim to isolate the importance of what might be seen as minor differences in policy setup and timing.

We investigate whether the father's quotas in Norway and Sweden affect continued childbearing by couples, measured here by second- and third-birth intensity. We aim to perform a causal analysis of the reform effects by focusing on the first couples affected by the reform. We thus take advantage of the fact that the reform applied only to children born after the reform, which creates a setup similar to that of a natural experiment. We use a clearly defined and narrow dimension of the association between fathers' childcare and continued fertility that will indicate the direct response to the reform at a particular point in time. Studies show that features encouraging the active participation of the father in childcare may stimulate fertility, as couples in which the father took parental leave with the first child are more likely to have another child (Oláh 2003; Duvander and Andersson 2006; Lappegård 2010; Duvander and Johansson 2019). This has been found in both Norway and Sweden, two countries with a generous family policy, high female labor force participation and relatively high fertility. In a comparative study of the two countries, it was found that the association between fathers' leave and continued childbearing was stronger in Norway than in Sweden, which may be explained by the greater variation in fathers' leave use in Norway than in Sweden (Duvander et al. 2010). In Norway there were fewer fathers using parental leave while it had become more common and ordinary in Sweden. In both countries, the quotas were introduced after some debate (Cedstrand 2011; Ellingsæter 2007). We argue that Norway introduced the father's quota as a radical reform at a time when almost no fathers used leave and when parental leave was constructed around mothers' rights (Ellingsaeter 2007). Indeed, at the time of the quota introduction, gender equality was not yet as dominant in Norwegian policy, and one may argue that Norway lagged behind Sweden in this regard. In Sweden, almost half of all fathers already used some leave at the time of the quota introduction, and the reform may have been most important for the groups most reluctant to use the leave. Thus, in Norway, it was the forerunners who started

to use the leave, while in Sweden, it was the laggards who were pushed into leave use.

We want to determine whether the father's quota reforms affected continued fertility differently in these two contexts. From earlier studies, we know that the introduction of the quotas had a direct impact on fathers' leave use (Duvander and Johansson 2012; Dahl et al. 2014) and that childcare during the preschool years was influenced (Duvander and Johansson 2019). We also know from an earlier Norwegian study that completed fertility on average does not seem to have been affected by the reform (Cools et al. 2015). In addition to the importance of nuancing these initial results by analyzing second- and third-birth intensity separately, we are specifically interested in comparing the two countries. Is there a different response in terms of fertility to a similar reform in contexts that are similar but at different stages in men's adoption of the parental leave policy? As the reform may be seen as more radical in Norway, the effect on behavior may be greater there; conversely, the effect may instead be greater in Sweden, as Swedish parents may have been more "ready" and prepared for a change. We start the paper by describing the parental leave system and its differences in the two countries before framing the study more broadly. We then proceed to explain the method and data used, followed by a presentation of the results. Finally, the results are discussed in the conclusion.

Two Nordic Countries

The Nordic countries are often characterized as belonging to the same welfare regime with policies supporting an earner-carer family model in which the earnings-related parental leave system is crucial (Ferrarini and Duvander 2010). Sweden was the first country in the world to introduce a gender-neutral parental leave scheme in 1974; this system gave parents the right to six months of paid leave after the birth of a child (Lundkvist 2011). Norway followed suit in 1978, giving working parents the right to 4.5 months of paid leave in connection to childbirth (Ellingsæter and Leira 2006; Duvander and Lammi-Taskula 2011). Subsequently, the leave lengths have been extended in a stepwise manner. In Sweden, the leave was prolonged to 15 months in 1989 and to 16 months in 2002. In Norway, it became 12 months in 1993 and was increased stepwise to almost 14 months in 2013. In both countries, the parental leave benefits are financed by the general state budget, with no direct costs to employers.

In recent history, both Norway and Sweden have sought to alter gendered behavior within the family sphere by encouraging fathers to take parental leave (Duvander and Johansson 2012; Lappegård 2008). This has primarily been done by ear-marking part of the leave for the father, a benefit that is forfeited if not used by him. Norway was the first to introduce a father's quota of one month, on the 1st of April, 1993 (Ellingsæter 2007). At the same time, parental leave was extended by one month, which probably made the reform more popular. Sweden introduced the first month reserved for fathers on the 1st of January, 1995, without an accompanying extension of parental leave. The quotas in both Norway and Sweden have since been extended (Duvander and Johansson 2012). An earlier

study found that parental leave use among eligible fathers in Norway increased from almost 3 to 25% at the time of the introduction of the quota. Among leave users, the average leave use was 25 days, and most fathers took exactly the quota allotted. Only 10% of the fathers took more than the quota, but this percentage has increased over time (Cools et al. 2015). Another Norwegian study on the increase in fathers' parental leave use confirm these results and further found that the share of fathers using parental leave increased to 60% during the first five years after the reform and then to 70% in the following five years (Dahl et al. 2014). In Sweden, approximately half of all fathers used leave before the reform was introduced, and this increased to approximately 8 out of 10 fathers after the reform (Swedish Inspectorate of the Social Insurance 2012). All groups of fathers showed an increase in the number of leave days, but the trend was especially pronounced among those who did not use very much before. The groups not using leave before the reform were mainly fathers with low income or low education levels and foreign-born fathers, and their substantial increase resulted in a more equal distribution of leave use (Duvander and Johansson 2014). On average, the leave use increased from 30 to 45 days when fathers were followed until the child turned eight years old and the right to use leave expired. During the first two years of the child's life, fathers' leave increased from 25 to 35 days (Duvander and Johansson 2012). All these earlier studies used the same register data that this study builds on, and we can thus assume that the increase in fathers' leave use holds for this study.

Just as the parental leave schemes in both countries have a father's quota, they also have a mother's quota. In Sweden, the quotas are gender neutral, and mothers receive the same quota as fathers do. In 2012, the mother's quota became the same length as the father's quota in Norway, and all subsequent changes have been the same for mothers and fathers. Furthermore, in Sweden, half of the benefit days are formally assigned to the mother and the other half to the father. If one parent wants to use more than half of the leave days, the other parent has to sign an agreement. In Norway, any parent claiming leave will get it, which means that in practice, mothers may use the majority of the leave without consent from the father.

The parental leave systems in Norway and Sweden are thus broadly based on the same principles of protected leave with income replacement, but there are major differences in the organization of the programs. In Sweden, all parents permanently residing in the country and who have custody of their children are entitled to parental leave benefits. Parents who have not worked for eight months before childbirth receive a flat rate benefit. In Norway, eligibility for parental leave benefits requires employment during six of the ten months prior to the birth of a child. Fathers' right to benefits in Norway were, until 2000, solely based on mothers' eligibility. Thus, while practically all Swedish fathers (and mothers) have access to the quota, approximately one-fifth of Norwegian fathers were, prior to 2000, not eligible for parental leave because the mothers were not eligible.

Fertility in both Norway and Sweden is relatively high, but there is more variation across time in Sweden. In 1994, the total fertility rate was 1.87 in Norway and 1.88 in Sweden. Fertility was then relatively stable in subsequent years in Norway but declined in Sweden to 1.52 in 1997 (compared to 1.86 in Norway). The Swedish

fertility decline is often related to the economic crisis and educational expansion that occurred in the 1990s, which might have also had an impact on how parents responded to reforms.

Framing

Our point of departure is new gender practices and shifts in family dynamics, changes that first started in the Nordic countries. Gender practices with respect to work and unpaid work have changed over the decades, and in most western countries, there has been a shift from a traditionally male-breadwinner model towards various degrees of dual-earner models in which both men and women participate in the labor market. However, changes in employment have been more profound than changes in domestic responsibilities. This uneven development has been called the "stalled revolution", i.e., women increasingly share economic responsibilities with men, but men have not necessarily increased their share of domestic work accordingly (Hochschild 1989). This situation is also found in the Nordic countries, even though Nordic men share more of the domestic responsibilities than men in most other countries (Hook 2006). The father's quotas are directly aimed at changing the uneven division of work in the household. Whether they have actually changed the long-term division of labor market and household work is debated (Karimi et al. 2012; Duvander and Johansson 2012; Rege and Solli 2013; Schober 2014; Cools et al. 2015). The effect we are interested in is how such changes in the gender-equal division of labor market work and household work (including childcare) may affect continued childbearing by couples.

The main reason why fathers' use of parental leave is expected to increase fertility is that it is predicted to lead to a more equal division of labor in the household and thereby ease women's work burden. This would enhance the degree of compatibility between childrearing and female employment, thereby making it easier to realize childbearing plans (Duvander and Andersson 2006; Duvander et al. 2019). Parental leave taken by the father can, for example, facilitate a faster return to work for the mother. Fathers' parental leave also implies more shared responsibility for childcare during the child's first year(s), which may not only ease the woman's care burden but also stimulate men's interest in and orientation towards children. Though parental leave may have negative effects on men's careers (Rege and Solli 2013), it may enable and strengthen childbearing desires. Clearly, the opposite may also be true: shared caring may in some cases be a negative experience and inhibit further childbearing desires. A further argument regarding how fathers' leave may influence continued childbearing is that it may signal commitment to the union and to further sharing of childcare and household tasks later in the child's life (Duvander et al. 2019). However, this argument builds more on selection into parental leave than a causal effect of leave use and may thus be less relevant for this study. Here, we are interested in the direct effect of policy that encourages gender equality, and there are many studies on how gender equality and fertility are related. In general, both macro studies (Mc Donald 2000, 2013) and individual studies (Cooke 2004, 2009;

Goldscheider et al. 2013; Kato et al. 2018; Nagase and Brinton 2017; Dommer-muth et al. 2017) indicate a positive correlation between gender-equal sharing of household tasks, including childcare, and continued childbearing. However, there are important variations between contexts and socioeconomic groups and in how gender equality is measured. In this study, we seek to investigate the effect of social policy by using critical junctures (Neyer and Andersson 2008) when a major change in policy occurs—here, the introduction of the father's quota. As the reforms led large groups of fathers to use parental leave that might otherwise not have done so, we think that the potential effect of such leave is not based on selection into parental leave, that is, that no underlying factor will be found to influence both parental leave use and continued childbearing. We also study two similar countries to isolate minor differences that may be important. The major difference between Norway and Sweden at the time of the introduc-tion was that in Norway, very few fathers used parental leave before the quota was introduced, and even though dramatically more fathers started to use the leave, Norway did not, during the first years, reach the same levels as Sweden before the quota was introduced. In Sweden, before the quota, a large share of fathers used parental leave, and this dramatically increased to the majority of fathers after the quota was implemented. In other words, the quota became more universal in Sweden than in Norway. The main reason to compare the two coun-tries is to determine whether a parental leave policy that reaches the most dedi-cated fathers and a parental leave policy that reaches all fathers affect fertility differently.

The literature on how policy affects fertility often concerns cash transfers and allowances that may have a larger impact on the finances of low-income than higher-earning households (for a review, see Ang 2015, and for an example, see Garganta et al. 2017). Indeed, the effect is likely to vary along the income distribution (Cygan-Rehm 2016). Often, the intention of family policy is not to increase fertility but to ameliorate the economic situation of low-income house-holds. Similarly, the father's quota is not aimed at increasing fertility but at increasing gender equality in households and in the labor market. The potential change in fertility can here be seen as an unintended consequence, and it is likely that it will appear in the groups of parents that are most affected by the policy. Therefore, we may expect different patterns in Norway and Sweden. In Norway, the quota reached a select group of dedicated fathers, perhaps forerunners, while in Sweden, these fathers already took parental leave, and instead, the fathers with the highest barriers to leave-taking were reached. Our alternative hypotheses are thus that the forerunners in Norway also changed their childbearing patterns or that the least likely users in Sweden were most affected. Parental leave entailed a change from traditional gendered patterns, and the argument that this would influence Norway most is premised on the fact that Norway at the time was more traditional in both behavior and attitudes (Bernhardt et al. 2008). However, in Sweden, it was the fathers with a low education level and low income who were affected by the reform, and less educated individuals are often seen as more tra-ditional than highly educated individuals (Geisler and Kreyenfeld 2019). The observed differences between the countries may thus go either ways.

Method and Model Specification

While previous analyses capture the association between parental leave use and childbearing, the present study attempts to isolate the causal effect of leave use on continued childbearing. Men who take parental leave, especially those who take extensive leaves, will ease women's care burden and make continued childbearing more feasible. These fathers may also become more child-oriented, and it is therefore also conceivable that such fathers become more interested in having more children. However, they might also have been child-oriented before taking leave. To distinguish causality from selection and disentangle such relationships, we will use the natural experiment of the introduction of the father's quotas in Norway and Sweden.

We are able to apply a "quasi-experimental" (or "treatment effects") approach (e.g., Angrist and Pischke 2009) in this study because both Sweden and Norway have experienced major, isolated changes in their parental leave system, that is, the introduction of the father's quota. In the "quasi-experimental" approach, we assume that families are randomly assigned to a "treatment" (father's quota) group or a "control" group (no father's quota). After some time, we can then compare fertility outcomes for the "treatment" and "control" groups and draw conclusions about the effect of increased leave use among fathers. Assuming that inclusion in the pre- and post-reform populations is largely random or exogenously determined, comparison of outcomes between pre- and post-reform families would allow us to draw stronger conclusions about the true effects of leave-taking than would be the case with a standard correlation study, where fathers may be self-selected into parental leave use.

Empirically, we make use of the fact that both quotas were introduced for children born after a specific date, that is, the 1st of April, 1993, in Norway, and the 1st of January, 1995, in Sweden. From the register data, all parents with children born from 25 days before to up to 25 days after each reform are sampled, and subsets of parents of children born before (control group) and after (treatment group) each of the reforms are constructed. We deliberately limited our sample to parents with children born 25 days before and after the reform, as in larger samples, the parents in the control and treatment groups seem to differ, as found in Johansson (2010) for Sweden. In particular, differences in the mothers' age between the control and treatment groups exist when the sample is extended to one month before and after but disappear when we limit the sample.

We use Cox regressions to investigate the effect of the reforms during the years following the reforms. The outcome is birth intensities, also divided into second and third-birth intensities. The model can be described accordingly:

$$y = \alpha + X_i'\beta + \gamma \text{ Year} + \delta \text{ Month} + \lambda \text{ Treatment}$$

where y is the dependent variable and X_i is a vector of individual characteristics of the mother and the father, including the mother's and father's age at birth, the mother's and father's age squared, the birth order of the child, the mother's and father's income, the mother's and father's education level, and the immigration status, geographical region and union status at birth. The variables "Year" and "Month" are

dummy variables indicating the year and month of the birth of the child, where "Year" is one for children born at the introduction of each reform and zero for children born a year later/earlier. The variable "Month" assumes the value one for the month in which each of the reforms was introduced and zero for the month before the reform. The potential impact of the reforms is measured by the variable "Treatment", an interaction variable of Year × Month indicating that the mother and father belong to the treatment group.

In essence we are using a difference in difference approach to make sure we are controlling for any potential systematic differences between the control and treatment groups, that is, in this case differences between parents to children born in December and January. Normally, a difference in difference study would include parents with children born one year before the introduction of each of the reforms in the sample, but in Norway, the year before included reforms that extended the parental leave length, which we think may have affected the fertility. Therefore, we chose to run models including parents of children born in the same periods the year *after* the reform, that is, 1995 in Norway and 1996 in Sweden. There may, however, be a change in the composition of parents due to the reform, which makes a comparison with the year after the reform difficult as well. We find no such compositional changes in the descriptive statistics for Norway and Sweden, but there may of course be unmeasured changes. As a sensitivity test, we run models including the parents of children born one year *before*, that is, 1993 in Norway and 1994 in Sweden. If we find similar results with these models, they can be considered more robust.

Couples are censored at separation or divorce, that is, these couples are followed until a dissolution is observed, as their risk of continued childbearing will be minimal after such dissolution. For Norway, we include only couples in which the mother is eligible to leave according to the labor market criteria because these couples are the only ones affected by the reform. As another sensitivity test, we ran models with all Norwegian parents, including couples in which the mother was not eligible to leave, but this did not change the results of the study.

Data and Descriptive Statistics

In Norway, data are gathered by Statistics Norway and include information from the national population registers covering the whole population. We are able to link data from different administrative registers because each person has a unique identification number. For the Swedish analyses, register data from the Swedish Social Insurance Agency (2012, 2014) are used. Data are assembled from administrative records and cover the entire Swedish population. They contain detailed information on the starting date of parental leave, the number of days (fractions of days if not a full day) and the benefit amount per day. They also include parents' individual characteristics, such as gender, date of birth, birth order of the child, region of residence, earnings, educational level and country of birth. We have taken great care to make the data comparable. Age of parents, educational level, and regional residence of parents are defined at the birth of the child. Income level, which includes social transfers, is taken from the year before the birth to avoid the effect of the use of parental

leave. Income is categorized into quintiles, education is categorized into three levels and an "unknown" category, immigrant status is defined as either born in Norway/ Sweden or elsewhere, and region of residence is categorized based on the standard regions in the two countries.

As we do not want the trend of increasing age at first birth to affect the difference between the control and treatment groups, we limit the sample to those with children born 25 days before and after reform. We include parents for whom the birth is the first or second birth of the mother and the father. In the descriptive statistics for Norway (Table 7 in "Appendix"), there are no significant differences between the control and treatment groups. For Sweden (Table 8 in "Appendix"), we find that the control group includes more first children (in December) than the treatment group (in January). The difference is significant at the 5% level, but when a difference in difference approach is applied and seasonal variations are controlled, the difference in birth order composition is no longer significant. That is, the pattern of more first births taking place in December compared to January is true for the years of the reforms and the control year. Additionally, slight differences between the control and treatment groups in terms of for example civil status and region of residence exist before a difference in difference approach is applied. The difference between the control and treatment groups is a strong argument for using a difference in difference approach and not just comparing groups before and after the reform. For various reasons, one may expect greater differences between parents of children born in December and January (control and treatment group in Sweden) than between parents of children born in March and April (control and treatment group in Norway) because, for example, it may be advantageous to be among the oldest in a school class.

Parents of children born four days before or after the reform are excluded to eliminate the risk of including planned deliveries. In a study from Norway, a change in birth pattern was found in which births shifted to after the reform (Cools et al. 2015). The 1st of April in 1994 was a Friday, and we believe that excluding four days is reasonable because it is possible to postpone planned caesarians to the next working day, that is, Monday the 4th of April. As the *F*-tests (see Tables 7, 8 in "Appendix") are not significant in either Norway or Sweden, we feel confident that the control and treatment groups do not differ in ways that may influence the results regarding the effects of the reform in either country.

It should be mentioned that the reforms in Norway and Sweden differed on two major points. In Norway, the quota was an extension of parental leave; thus, one month was added to the leave. In Sweden, the quota was established within the existing leave length. In Sweden, the quota also coincided with a reduction of the earnings replacement from 90% of prior earnings to 80%. This applied to the whole leave except the father's and mother's quota.

Our next step is to descriptively compare the continued fertility in the control and treatment groups. We investigate ocularly the share of parents who gave birth just before or after the reform who had another child within the full observation period of 10 years and created a division between the first 1–4 years and the last 5–10 years after the reform for both second and third births (Tables 9, 10, 11, 12 in "Appendix"). The Norwegian pattern seems to be more or less random, with the shares of

parents who have a second and a third child varying across years. The tables for Sweden, however, show some interesting patterns. First, it seems that parents of first children born in January more often go on to have a second child within ten years. Second, among parents with two children, it seems that the parents of children born in December are more likely to have a third child within the 10-year period in all years except the reform year, when it is the parents of January children who more often have a third child. The difference is mainly found in the first 1–4 years, and though the reform comparison indicates more births to December parents in the first 1–4 years after the reform, the difference between parents of December and January children is considerably smaller than in the years before and after.

Results

We follow parents 10 years after the father's quota was introduced in Norway and Sweden. Models are constructed including all parents, and separate models are constructed for the propensity to continue childbearing with a second and a third child. Tables 1 and 2 present the main results for Norway and Sweden, where Model 1 includes no control variables and Model 2 includes a number of controls common in childbearing analyses. Minor changes are observed in the models when controls are added due to the differences between the control and treatment groups mentioned above and likely to some minor differences in characteristics that are not significant.

The first row in the table represents a model in which the propensity to continue childbearing is calculated for the whole period of 10 years. The analyses of the Norwegian data show no effect over the all years for all one-child or two-child couples. Additionally, when the period is divided into the 1–4 years and 5–10 years after the reform and birth, no effect is found.

For Sweden, there are no effects in the models including all parents or in the models for one-child parents. However, in the models for two-child parents, there is

Table 1 Risk of continued childbearing for parents with children born just before and after the father's quota reform. Odds ratios. Norway. Seasonal variation controlled by a sample from the year after (93 vs 94). Only eligible parents

	All		One-child couples		Two-child couples	
	Model I	Model II	Model I	Model II	Model I	Model II
10 years	0.98 (0.060)	0.96 (0.060)	0.99 (0.072)	0.98 (0.071)	0.90 (0.100)	0.94 (0.105)
1–4 years	0.96 (0.068)	0.94 (0.066)	0.97 (0.079)	0.97 (0.079)	0.84 (0.123)	0.87 (0130)
5–10 years	1.03 (0.122)	1.02 (0.121)	1.05 (0.173)	1.03 (0.168)	0.99 (0.168)	1.04 (0.175)

Model I includes no control variables. Model II includes the following control variables: mother's and father's age at birth and age squared, mother's and father's education level, mother's and father's income, immigration status, union status at birth and geographical region. Model II for all also includes the birth order of the child. All risks are for the treatment group relative to the control group

Table 2 Risk of continued childbearing for parents with children born just before and after the father's quota reform. Odds ratios. Sweden. Seasonal variation controlled by a sample from the year after (95 vs 96)

	All		One-child couples		Two-child couples	
	Model I	Model II	Model I	Model II	Model I	Model II
10 years	1.01 (0.048)	1.02 (0.048)	0.94 (0.051)	0.95 (0.051)	1.22** (0.120)	1.19 (0.117)
1–4 years	0.99 (0.055)	0.99 (0.054)	0.94 (0.057)	0.95 (0.057)	1.30 (0.174)	1.26 (0.171)
5–10 years	1.07 (0.100)	1.06 (0.098)	0.94 (0.114)	0.99 (0.118)	1.15 (0.168)	1.13 (0.163)

Model I includes no control variables. Model II includes the following control variables: mother's age at birth, mother's age squared, age difference in the couple, birth order of the child, mother's and father's education level, immigration status, union status at birth and geographical region. Model II for all also includes union status at birth. All risks are for the treatment group relative to the control group

**$p < 0.05$

an increased risk of a third child in the model without controls. The increased risk of a third birth is not significant after introducing controls, and conclusions should be drawn cautiously.

To determine whether the third-birth risk is especially altered for any specific subgroup of parents, we ran the same models separately for parents with low and high income. Income is divided into low income (quintiles 1 to 3) and high income (quintiles 4 to 5). Again, for Norway, we find no effects of the reform in any of the models (Tables 3, 4). For Sweden (Tables 5, 6), we find that in cases of a father with a low income, the risk of a third birth is increased after the reform is introduced (Table 6). This applies in models with and without controls.

We performed a number of sensitivity analyses, some of which can be found in the "Appendix". When running identical models using the year before the reform as a control for seasonal variation, we find a negative effect on the second birth risk among Norwegian parents. As this is the only model in which such an effect appears, we refrain from interpreting it, especially as we have reason to believe that controlling for the year before the reform may be problematic (Table 13 in "Appendix"). In the Swedish model, we find no significant effect when using the year before for comparison, which gives us reason to be cautious when interpreting the elevated third-birth risks found in the main models. However, our visual comparison found in Tables 9, 10, 11 and 12 in the "Appendix" indicates that the years before reform (1993–1994) are exceptional in that the difference between December and January is small (Table 14 in "Appendix"). When the sample is divided based on whether the father has low or high income, the reform year stands out for both groups, with more January parents having a child after the reform in this year, whereas in most other years it is the December parents who more often have another child. We run tests that do not censor parents after separation and that do not include only couples living together the year of the childbirth, and we again find no effect for Norway. For Sweden, these sensitivity tests do not change the elevated third-birth risk for fathers with low income. We also perform analyses with all Norwegian parents, including couples in which the mother is not eligible for leave, but find no effect. Likewise,

Table 3 Risk of continued childbearing for parents with children born just before and after the father's quota reform by mother's income. Odds ratios. Norway. Seasonal variation controlled by a sample from the year after (93 vs 94). Only eligible parents

| | Parity 1 | | | | Parity 2 | | | |
| | Mother low income | | Mother high income | | Mother low income | | Mother high income | |
	Mod I	Mod II	Mod I	Mod II	Mod I	Mod II	Mod I	Mod II
10 years	1.02 (0.088)	1.00 (0.085)	0.98 (0.098)	0.99 (0.250)	1.02 (0.091)	1.07 (0.096)	0.95 (0.113)	0.96 (0.114)
1–4 years	1.00 (0.101)	0.98 (0.098)	0.96 (0.108)	0.98 (0.110)	1.01 (0.109)	1.04 (0.114)	0.88 (0.122)	0.89 (0.125)
5–10 years	1.09 (0.181)	1.05 (0.174)	1.07 (0.234)	1.02 (0.220)	1.03 (0.165)	1.11 (0.178)	1.19 0.277	1.15 (0.266)

Model I includes no control variables. Model II includes the following control variables: mother's and father's age at birth and age squared, mother's and father's education level, father's income, immigration status, union status at birth and geographical region. All risks are for the treatment group relative to the control group

Table 4 Risk of continued childbearing for parents with children born just before and after the father's quota reform by father's income. Odds ratios. Norway. Seasonal variation controlled by a sample from the year after (93 vs 94). Only eligible parents

| | Parity 1 | | | | Parity 2 | | | |
| | Father low income | | Father high income | | Father low income | | Father high income | |
	Mod I	Mod II	Mod I	Mod II	Mod I	Mod II	Mod I	Mod II
10 years	0.92 (0.073)	0.89 (0.071)	1.11 (0.126)	1.13 (0.129)	0.94 (0.085)	0.83 (0.084)	1.01 (0.127)	1.00 (0.128)
1–4 years	0.95 (0.087)	0.93 (0.086)	1.02 (0.132)	1.04 (0.135)	0.87 (0.094)	0.87 (0.093)	1.00 (0.149)	0.99 (0.150)
5–10 years	0.82 (0.132)	0.77 (0.124)	1.50 (0.356)	1.54 (0.363)	1.12 (0.190)	1.11 (0.186)	1.02 (0.239)	1.01 (0.236)

Model I includes no control variables. Model II includes the following control variables: mother's and father's age at birth and age squared, mother's and father's education level, mother's income, immigration status, union status at birth and geographical region. All risks are for the treatment group relative to the control group

Table 5 Risk of continued childbearing for parents with children born just before and after the father's quota reform by mothers' income. Odds ratios. Sweden. Seasonal variation controlled by a sample from the year after (95 vs 96)

| | Parity 1 | | | | Parity 2 | | | |
| | Mother low income | | Mother high income | | Mother low income | | Mother high income | |
	Mod I	Mod II	Mod I	Mod II	Mod I	Mod II	Mod I	Mod II
10 years	0.99 (0.075)	1.00 (0.075)	0.89 (0.068)	0.92 (0.070)	1.24 (0.141)	1.21 (0.137)	1.15 (0.228)	1.16 (0.231)
1–4 years	0.95 (0.082)	0.96 (0.083)	0.92 (0.078)	0.94 (0.080)	1.30 (0.202)	1.26 (0.197)	1.29 (0.344)	1.28 (0.348)
5–10 years	1.15 (0.186)	1.15 (0.185)	0.74 (0.136)	0.81 (0.146)	1.20 (0.201)	1.17 (0.195)	0.99 (0.296)	1.02 (0.301)

Model I includes no control variables. Model II includes the following control variables: mother's and father's age at birth and age squared, mother's and father's education level, mother's income, immigration status, union status at birth and geographical region. All risks are for the treatment group relative to the control group

Table 6 Risk of continued childbearing for parents with children born just before and after the father's quota reform by father's income. Odds ratios. Sweden. Seasonal variation controlled by a sample from the year after (95 vs 96)

	Parity 1				Parity 2			
	Father low income		Father high income		Father low income		Father high income	
	Mod I	Mod II	Mod I	Mod II	Mod I	Mod II	Mod I	Mod II
10 years	0.93 (0.064)	0.95 (0.065)	0.94 (0.082)	0.95 (0.081)	1.28** (0.161)	1.28** (0.161)	1.11 (0.176)	1.10 (0.175)
1–4 years	0.93 (0.073)	0.94 (0.073)	0.94 (0.090)	0.95 (0.091)	1.33 (0.231)	1.31 (0.229)	1.24 (0.262)	1.23 (0.263)
5–10 years	0.93 (0.138)	0.98 (0.144)	0.95 (0.200)	0.97 (0.199)	1.24 (0.226)	1.26 (0.229)	0.98 (0.238)	0.97 (0.234)

Model I includes no control variables. Model II includes the following control variables: mother's and father's age at birth and age squared, mother's and father's education level, mother's income, immigration status, union status at birth and geographical region. All risks are for the treatment group relative to the control group

$**p < 0.05$

placebo effects are not apparent for either country. To test for placebo effects, we use the exact same models but test the difference between the propensity for childbearing just before and after the same time that the reform was introduced but one year later (April 1994 and 1995 for Norway and January 1995 and 1996 for Sweden).

Lastly, we perform the analysis separately for mothers' and fathers' educational level. For Norway, there are no effects. For Sweden, we find an elevated third-birth risk among couples where the mother has a low education level. This group overlaps to a great extent with the group of fathers with low income, who also had a higher risk of a third birth. We conclude, but with some caution, that families with low incomes or low education levels had an elevated third-birth risk because of the reform. Such a conclusion is also in line with the visual investigation, and even though there is a risk of randomness in the results when testing subgroups, we find that there is strong support for this interpretation of the results. It is these groups whose parental leave use pattern was most changed by the reform, that is, the father did not use the leave before the reform but did so after the reform. It is thus likely that this group is also most influenced in terms of fertility.

Discussion

This study focuses on identifying a causal effect on continued fertility for the parental couples who were the first to be affected by the introduction of the father's quota in Norway and Sweden. This investigation of the reform concludes that there was an unintended effect of higher third-birth risks in Sweden for families in which the father had low income. We believe that such a finding may also be indicative of gradual changes that are harder to quantify.

Though minor effects can be expected, as reforms may take time to change behavior, the strong influence of the reforms on fathers' use of parental leave days in Norway and Sweden makes it worth investigating the reforms' impact on family dynamics. In addition, the association found earlier between parental leave use and continued childbearing prompts further investigation.

The difference between Norway and Sweden should be interpreted in light of differences in the policy systems, in the contexts at the time of the introduction of the reform and in who actually responded to the reform. In Norway, it was the highly educated fathers who started to use the parental leave. In Sweden, these fathers already used parental leave when the reform was implemented. Instead, in Sweden, it was the fathers with low education levels and low income who started to use the leave and who had not used very much leave before the reform. The reform radically changed their leave use pattern, and this study indicates that increased fathers' leave use also had effects on continued childbearing. As the two-child norm is strong in Sweden, a shift toward higher parity was expected, and this is what we found. Among Swedish families in which the father had low income, the propensity to have a third child increased after the reform. The same was found in cases in which the mother had a low education level. We believe that the father's quota reform was most important for couples with low income or education levels, as it

made it possible for them to share more of the childcare in the household. This may have encouraged not only fathers' child orientation but also, as the leave was used by the very large majority, the acceptance of fathers' absence by employers. In addition, for the mothers in these couples, the fathers' participation in childcare and perhaps other domestic work may have made the prospect of more children more realistic and desired due to a lightened work burden and more understanding within the couple. The same group of fathers in Norway did not have the same chance to participate in childcare. A considerable share of them did not have access to the father's quota because the mother of their children was not eligible. Those who started to use the leave were mainly highly educated fathers with relatively high income, and this may not have been sufficient to change other behavior. Norwegian fathers with low education used the leave far less frequently, leading to little change in the division of childcare; consequently, continued childbearing may not have been enabled. In addition, as parental leave in Norway was extended by a month when the father's quota was introduced, it might also have had less impact on couples' decisions regarding both leave use and continued childbearing, that is, it did not affect the mother as much whether the father took leave or not. The results indicate that not only do the details of the reform, the context, and who takes it up matter in terms of potential effects but so does when it is introduced. It seems that Sweden was ready for a change to a general norm of one month of leave for all fathers at the time the quota was introduced. For the couples where the fathers were then enabled to participate in childcare, they also seem to have been more able to have a third child. It is very likely that this is a temporary effect: the Swedish third-birth pattern has not radically changed and has even declined somewhat as childbearing in general is postponed. The temporary upswing may have contributed to a continued positive association between shared parental leave, interpreted as part of the norm of gender equality, and a relatively high fertility rate in Sweden.

Appendix

See Tables 7, 8, 9, 10, 11, 12, 13, 14.

Table 7 Descriptive statistics for parents with children born just before and after the father's quota reform. Norway, only eligible parents

	(1)		(2)		(3)		(4)	
	Pre-reform		Post-reform		Difference		Diff-in-diff	
	Mean	SE	Mean	SE	Estimate	SE	Estimate	SE
Mean age mothers	28.2	0.101	28.0	0.089	− 0.19	0.135	− 0.19	0.188
Mean age fathers	30.5	0.114	30.5	0.107	− 0.04	0.157	− 0.11	0.218
Union status at birth								
% Cohabiting	0.40	0.012	0.40	0.011	0.00	0.017	0.01	0.023
% Married	0.60	0.012	0.60	0.011	− 0.00	0.017	− 0.01	0.023
Birth order of child								
% First child	0.52	0.012	0.51	0.012	− 0.01	0.017	0.02	0.024
% Second child	0.48	0.012	0.49	0.012	0.01	0.017	− 0.02	0.024
Mother's education level								
% Lower sec. or less	0.06	0.006	0.06	0.006	0.01	0.008	0.01	0.011
% Upper secondary	0.62	0.012	0.63	0.011	0.00	0.016	0.01	0.023
% Higher ed	0.32	0.011	0.31	0.010	− 0.01	0.016	− 0.01	0.022
Father's education level								
% Lower sec. or less	0.10	0.007	0.10	0.007	0.00	0.004	0.01	0.014
% Upper secondary	0.62	0.012	0.62	0.011	− 0.00	0.016	0.02	0.023
% Higher ed	0.27	0.011	0.27	0.010	− 0.00	0.015	− 0.03	0.021
Mother's income								
% 1st quintile	0.20	0.010	0.20	0.009	0.00	0.014	0.00	0.020
% 2nd quintile	0.20	0.010	0.20	0.009	− 0.00	0.014	0.00	0.019
% 3rd quintile	0.20	0.010	0.20	0.009	− 0.00	0.014	0.00	0.019
% 4th quintile	0.20	0.010	0.20	0.009	0.00	0.014	− 0.00	0.019
% 5th quintile	0.20	0.010	0.20	0.009	− 0.00	0.014	− 0.00	0.019
Father's income								
% 1st quintile	0.20	0.010	0.20	0.009	0.00	0.014	0.00	0.019
% 2nd quintile	0.20	0.010	0.20	0.009	− 0.00	0.014	− 0.00	0.019
% 3rd quintile	0.20	0.010	0.20	0.009	0.00	0.013	0.00	0.019
% 4th quintile	0.20	0.010	0.20	0.009	− 0.00	0.014	− 0.00	0.019
% 5th quintile	0.20	0.010	0.20	0.009	0.00	0.014	0.00	0.019
Mother's immigration status								
% Born abroad	0.05	0.005	0.05	0.005	− 0.01	0.007	− 0.00	0.011
% Born in NO	0.95	0.005	0.95	0.005	0.01	0.007	0.00	0.011
Father's immigration status								
% Born abroad	0.06	0.006	0.05	0.005	− 0.00	0.008	0.01	0.010
% Born in NO	0.94	0.006	0.95	0.005	0.00	0.008	− 0.01	0.011
Geo. region in year of child's birth								
% Oslo and Akershus	0.24	0.010	0.25	0.010	0.01	0.014	0.03	0.020
% Hedmark and Oppland	0.08	0.007	0.08	0.006	− 0.00	0.009	− 0.01	0.012
% South Eastern Norway	0.18	0.009	0.19	0.009	0.01	0.013	0.01	0.018
% Agder and Rogaland	0.15	0.009	0.15	0.008	− 0.00	0.012	− 0.00	0.017

Table 7 (continued)

	(1)		(2)		(3)		(4)	
	Pre-reform		Post-reform		Difference		Diff-in-diff	
	Mean	SE	Mean	SE	Estimate	SE	Estimate	SE
% Western Norway	0.16	0.009	0.15	0.008	− 0.02	0.012	− 0.03	0.017
% Trøndelag	0.10	0.007	0.09	0.007	− 0.01	0.010	− 0.01	0.013
% Northern Norway	0.09	0.007	0.10	0.007	0.00	0.010	0.01	0.014
N	1668		1838		3506		7193	

Observations for education are taken from the year before the child's birth. Age categories are based on parents' age at birth of child included in the study. The sample is the couples' first or second child born during the 42 days surrounding April 1, 1993, excluding 4 days before and after April 1, divided into those born during the 21 days preceding the reform (1) and those born during the 21 days after the reform (2)

F-test: $F(29,608,190) = 193.76$

Table 8 Descriptive statistics for parents with children born just before and after the father's quota reform, Sweden

	(1)		(2)		(3)		(4)	
	Pre-reform		Post-reform		Difference		Diff-in-diff	
	Mean	SE	Mean	SE	Estimate	SE	Estimate	SE
Mean age mothers	28.0	0.079	27.9	0.075	0.04	0.109	0.07	0.160
Mean age fathers	30.5	0.090	30.6	0.084	− 0.02	0.123	0.03	0.180
Union status at birth								
% Cohabiting	0.57	0.008	0.55	0.008	0.01	0.012	0.02	0.017
% Married	0.43	0.008	0.45	0.008	− 0.01	0.012	− 0.02	0.017
Birth order of child								
% First child	0.55	0.008	0.52	0.008	0.03*	0.012	0.01	0.017
% Second child	0.45	0.008	0.48	0.008	− 0.03*	0.012	− 0.01	0.017
Mother's education level								
% Lower sec. or less	0.13	0.006	0.13	0.005	0.00	0.008	− 0.01	0.011
% Upper secondary	0.57	0.008	0.57	0.008	− 0.01	0.012	0.01	0.017
% Higher ed	0.30	0.008	0.29	0.007	0.01	0.011	− 0.01	0.016
% ed. unknown	0.01	0.001	0.01	0.001	0.00	0.002	0.00	0.003
Father's education level								
% Lower sec. or less	0.16	0.006	0.15	0.006	0.01	0.008	0.02	0.012
% Upper secondary	0.55	0.008	0.56	0.008	− 0.01	0.012	0.00	0.017
% Higher ed	0.29	0.008	0.29	0.007	0.00	0.011	− 0.02	0.016
% ed. unknown	0.01	0.001	0.01	0.001	0.00	0.002	− 0.00	0.003
Mean income mothers	118.5	1.059	121.1	1.050	− 2.6	1.495	− 0.3	2.203
Mean income fathers	160.6	1.299	159.5	1.255	1.1	1.808	2.4	2.685
Mother's income								
% 1st quintile	0.20	0.007	0.20	0.006	0.00	0.009	− 0.00	0.014
% 2nd quintile	0.20	0.007	0.20	0.006	0.00	0.009	0.00	0.014
% 3rd quintile	0.20	0.007	0.20	0.006	0.00	0.009	− 0.00	0.014
% 4th quintile	0.20	0.007	0.20	0.006	0.00	0.009	0.00	0.014
% 5th quintile	0.20	0.007	0.20	0.006	0.00	0.009	− 0.00	0.014
Father's income								
% 1st quintile	0.20	0.007	0.20	0.006	0.00	0.009	0.00	0.014
% 2nd quintile	0.20	0.007	0.20	0.006	0.00	0.009	− 0.00	0.014
% 3rd quintile	0.20	0.007	0.20	0.006	0.00	0.009	0.00	0.014
% 4th quintile	0.20	0.007	0.20	0.006	0.00	0.009	− 0.00	0.014
% 5th quintile	0.20	0.007	0.20	0.006	0.00	0.009	0.00	0.014
Mother's immigration status								
% born abroad	0.16	0.006	0.16	0.006	0.00	0.009	− 0.01	0.012
% born in SE	0.84	0.006	0.84	0.006	0.00	0.009	0.01	0.012
Father's immigration status								
% born abroad	0.17	0.006	0.17	0.006	0.00	0.009	− 0.02	0.013
% born in SE	0.83	0.006	0.83	0.006	0.00	0.009	0.02	0.013

Table 8 (continued)

	(1) Pre-reform		(2) Post-reform		(3) Difference		(4) Diff-in-diff	
	Mean	SE	Mean	SE	Estimate	SE	Estimate	SE
Geo. region in year of child's birth								
% Stockholm	0.24	0.007	0.22	0.007	0.02	0.010	0.02	0.014
% East Middle Sweden	0.17	0.006	0.18	0.006	− 0.01	0.009	− 0.00	0.013
% Småland and the islands	0.09	0.005	0.09	0.005	0.00	0.007	− 0.00	0.009
% South Sweden	0.14	0.006	0.13	0.006	0.00	0.008	− 0.01	0.012
% West Sweden	0.20	0.007	0.20	0.007	− 0.01	0.009	0.01	0.014
% North Middle Sweden	0.07	0.004	0.08	0.004	0.00	0.006	− 0.00	0.009
% Middle Norrland	0.04	0.003	0.04	0.003	0.00	0.005	− 0.01	0.007
% Upper Norrland	0.06	0.004	0.05	0.004	0.00	0.005	0.00	0.008
	3449		3814		7263		13,830	

Observations for education are taken from the year before the child's birth. Age categories are based on parents' age at birth of child included in the study. The sample is the couples' first or second child born during the 50 days surrounding January 1, 1995, excluding 4 days before and after January 1, divided into those born during the 25 days preceding the reform (1) and those born during the 25 days after the reform (2). *$p < 0.05$

$F(28, 13{,}799) = 0.66$

Table 9 Share of parents having another child whose first child was born 25 days before or 25 days after the introduction of the reform or during the same time in surrounding years, Norway

	10 years		1–4 years		5–10 years	
	March	April	March	April	March	April
1991	77.7	*78.8*	59.1	*61.1*	*18.6*	17.7
1992	80.2	*81.3*	61.6	*64.2*	*18.6*	17.1
1993	*81.1*	79.7	*64.3*	63.9	*16.8*	15.8
1994	*83.5*	81.6	66.0	*66.1*	*17.5*	15.5
1995	82.3	*82.4*	64.1	*65.6*	*18.2*	16.8
1996	79.9	*80.5*	64.6	*64.8*	15.3	*15.7*
1997	*83.9*	82.2	67.2	*65.9*	*16.8*	16.3

Numbers in italics are indicating the higher share of parents having another birth to facilitate the identification of patterns in whether the trend shows systematic differences between the before and after groups

Table 10 Share of parents having another child whose second child was born 25 days before or 25 days after the introduction of the reform or during the same time in surrounding years, Norway

	10 years		1–4 years		5–10 years	
	March	April	March	April	March	April
1991	39.7	*41.9*	23.4	*25.0*	16.3	*16.9*
1992	*40.5*	36.8	*22.2*	20.8	*18.3*	16.0
1993	*39.1*	37.3	*21.9*	19.8	*18.5*	17.5
1994	36.2	*37.5*	21.1	*22.4*	*15.1*	15.0
1995	*42.4*	37.4	*21.2*	21.1	*21.1*	16.2
1996	*38.1*	33.0	*24.9*	19.9	*13.2*	13.1
1997	*37.4*	34.1	*23.5*	22.3	*13.9*	11.8

Numbers in italics are indicating the higher share of parents having another birth to facilitate the identification of patterns in whether the trend shows systematic differences between the before and after groups

Table 11 Share of parents having another child whose first child was born 25 days before or 25 days after the introduction of the reform or during the same time in surrounding years, Sweden

	10 years		1–4 years		5–10 years	
	Dec	Jan	Dec	Jan	Dec	Jan
1992/1993	74.6	*76.6*	62.6	*63.1*	12.0	*13.6*
1993/1994	73.5	*76.6*	60.8	*61.7*	12.7	*14.9*
1994/1995	73.8	*75.1*	59.9	*60.3*	13.9	*14.8*
1995/1996	73.2	*74.1*	57.6	*58.9*	*15.5*	15.3
1996/1997	74.7	*76.1*	59.5	*59.8*	15.2	*16.3*
1997/1998	75.9	*76.8*	59.2	*60.8*	*16.7*	16.0
1998/1999	*75.0*	74.7	*59.8*	58.9	15.2	*15.7*
1999/2000	74.5	*75.3*	*60.1*	59.8	14.5	*15.5*

Numbers in italics are indicating the higher share of parents having another birth to facilitate the identification of patterns in whether the trend shows systematic differences between the before and after groups

Table 12 Share of parents having another child whose second child was born 25 days before or 25 days after the introduction of the reform or during the same time in surrounding years, Sweden

	10 years		1–4 years		5–10 years	
	Dec	Jan	Dec	Jan	Dec	Jan
1992/1993	*30.5*	27.7	*20.2*	17.5	*10.4*	10.2
1993/1994	*30.4*	29.2	*18.3*	17.3	*12.1*	12.0
1994/1995	26.4	*27.9*	*15.1*	14.7	11.3	*13.2*
1995/1996	*28.3*	25.1	*16.3*	12.1	12.1	*13.0*
1996/1997	*28.3*	24.6	*15.5*	13.8	*12.9*	10.8
1997/1998	*28.1*	27.4	*16.0*	14.8	12.2	*12.6*
1998/1999	*29.7*	27.3	*18.8*	15.8	10.8	*11.5*
1999/2000	*30.8*	26.8	*17.2*	15.6	*13.6*	11.1

Numbers in italics are indicating the higher share of parents having another birth to facilitate the identification of patterns in whether the trend shows systematic differences between the before and after groups

Table 13 Risk of continued childbearing for parents with children born just before and after the father's quota reform. Odds ratios. Norway. Seasonal variation controlled by a sample from the year before (93 vs 92). Only eligible parents

	All		One-child couples		Two-child couples	
	Model I	Model II	Model I	Model II	Model I	Model II
10 years	0.91 (0.057)	0.91 (0.057)	0.86** (0.064)	0.87 (0.064)	1.02 (0.115)	1.04 (0.117)
1–4 years	0.89 (0.065)	0.90 (0.065)	0.88 (0.073)	0.89 (0.074)	0.92 (0.141)	0.94 (0.145)
5–10 years	0.97 (0.114)	0.93 (0.110)	0.78 (0.129)	0.78 (0.128)	1.15 (0.190)	1.17 (0.194)

Model I includes no control variables. Model II includes the following control variables: mother's and father's age at birth and age squared, mother's and father's education level, mother's and father's income, immigration status, union status at birth and geographical region. Model II for all also include birth order of the child. All risks are for the treatment group relative to the control group

**$p < 0.05$

Table 14 Risk of continued childbearing for parents with children born just before and after the father's quota reform. Odds ratios. Sweden. Seasonal variation controlled by a sample from the year before (94 vs 93)

	All		One-child couples		Two-child couples	
	Model I	Model II	Model I	Model II	Model I	Model II
10 years	0.96 (0.044)	0.99 (0.045)	0.94 (0.049)	0.96 (0.049)	1.11 (0.102)	1.10 (0.100)
1–4 years	0.95 (0.050)	0.95 (0.050)	0.96 (0.055)	0.97 (0.056)	1.01 (0.123)	1.01 (0.123)
5–10 years	1.01 (0.093)	0.99 (0.090)	0.86 (0.104)	0.90 (0.108)	1.24 (0.175)	1.22 (0.170)

Model I includes no control variables. Model II includes the following control variables: mother's and father's age at birth and age squared, mother's and father's education level, mother's and father's income, immigration status, union status at birth and geographical region. Model II for all also include birth order of the child. All risks are for the treatment group relative to the control group

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