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# Family Policy Reform Impact on Continued Fertility in the Nordic Countries

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**Abstract:** It has been argued that generous family policy aiming at a gender equal division of childcare and economic responsibility will have a positive impact on childbearing. In this study we ask whether different usages of parental leave are related to continued childbearing and whether there has been a policy effect on fertility behaviour from introducing the father's quota in Norway and Sweden. The major argument for why gender equality in parental leave use would increase fertility is that a more equal division in the household would ease women's work burden at home and thus enhance the degree of compatibility between childrearing and female employment, thereby making it easier to realize childbearing plans. In order to distinguish causality in effects from selection 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 couples with lower income had a temporary higher third birth risk in Sweden. This group was the one most affected by the reform.

**Keywords:** Parental leave, fertility, father's quota, gender equality, Norway, Sweden

## **Introduction**

It has been argued that a generous family policy results in relatively high fertility, both by research noting the association, and by political concern (Gauthier, 2007; Olah and Bernhardt, 2008; Ferrarini and Duvander, 2010; Thevenon, 2011; Luci-Greulich and Thévenon, 2013). Especially family policy aiming at a gender equal division of childcare and economic responsibility has been in focus. The Nordic countries are given as the prime examples, both because their policy generosity and their focus on fathers' participation in childcare. Most notably, father's quotas in the parental leave use are aimed at encouraging fathers' early involvement, with great success (Duvander and Johansson, 2012; Duvander and Lammi-Taskula, 2011; Lappegard, 2008; Rostgaard and Lausten, 2015). However, even if a general association between gender equal policies and higher fertility has been argued (Olah, 2011; Olah and Bernhardt, 2008), there is little knowledge about whether father's involvement in childcare actually affects fertility. Here we study two of the countries with high parental leave use by fathers and we focus on the father's quota reforms to investigate the direct link between fathers' child care engagement and continued childbearing. The results for the two countries may isolate differences between countries that are of similar welfare systems, and it may give stronger, or cast doubt, on any potential effects.

We ask whether the father's quotas in Norway and Sweden affect continued childbearing in the couple. We aim at a causal analysis of the reform effects by focusing on the first couples to meet the reform. This is a clearly defined and narrow dimension of the association between fathers' childcare and continued fertility which will indicate something of the direct responses to the reform at a particular point in time. Studies show that features encouraging an active participation from the father in childcare may stimulate fertility, as couples are more likely to have another child if the father took parental leave with the first child (Olah, 2003; Duvander and Andersson, 2006; Lappegard, 2010). This is found in both Norway and Sweden, two countries with generous family policy, high female labour 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, something that may be explained by that there is greater variation in fathers' leave use in Norway than in Sweden (Duvander, Lappegard and Andersson, 2010). There are thus larger differences between various groups of fathers in Norway while in Sweden the norm of an involved father reaches all fathers and almost all fathers use some leave (Swedish Social Insurance Agency, 2012). Regarding the quotas, they were in both countries introduced after

some debate (Cedstrand, 2011; Ellingsæter, 2007). However, with a more nuanced picture of the country contexts we may expect different outcomes of the reforms. We argue that Norway introduced the father's quota as a radical reform where almost no fathers used leave and where parental leave was constructed around mothers' rights (Ellingsæter, 2007). In Sweden at the time of the introduction almost half of all fathers already used some leave and the reform may more be seen as one of many encouragements towards gender equality which gave parents a "push" in this direction. So while Sweden for a long time has had a coherent policy towards earner-carer families (Ferrarini and Duvander, 2010), Norway has more ambivalent elements, which may encourage choice of different ways of combining work and childcare in the family. Gender equality had at the time of the quota-introduction not yet been as dominant in the Norwegian policy and one may argue that Norway was lagging behind Sweden.

We want to find out whether the reforms of father's quota matter differently for continued fertility 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, Løken and Mogstad, 2012). Do we get a different response on fertility to a similar reform in contexts that are similar but at different stages in men's adaptation of the parental leave policy? We start the paper by a description of the parental leave system and its differences in the two countries before we frame the study more broadly. We then proceed with explaining the method and data used before we continue with our results. Eventually they will be 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 (Ferrarini and Duvander, 2010). The earnings-related parental leave system is crucial to this setup. Sweden was the first country in the world to introduce a gender-neutral parental leave scheme in 1974, which then gave the right to six months of paid leave after the birth of a child (Lundqvist, 2011). Norway followed suite 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). From the beginning the replacement level in Sweden was dependent on that the mother had worked and in Norway parents only had access to leave if the mother had worked before childbirth. This changed to an individual set-up in Sweden in 1986 (Swedish Social Insurance Agency, 2014),

and in Norway, much later in 2000. Still in Norway, fathers have restricted rights to the father's quota when the mother is not eligible.

Subsequently, the leave lengths have been stepwise extended. 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 stepwise increased to almost 14 months in 2013. In both countries, the parental leave benefits are financed through the general state budget with no direct costs to employers.

While the leave first was aimed at making it possible for women to combine responsibility over children and work, in the recent history both Norway and Sweden aim at altering the gendered behaviour within the family sphere by encouraging fathers to take parental leave (Duvander and Johansson, 2012; Lappegård, 2008). This has primarily been done by earmarking part of the leave to the father, a benefit which will be forfeited if not used by him. Norway was first to introduce a father's quota of one month the 1<sup>st</sup> of April 1993 (Ellingsæter, 2007). At the same time the leave was extended with one month which probably made the reform more popular. Sweden introduced the first month reserved for fathers the 1<sup>st</sup> of January 1995, and the leave was not extended at the same time. The quotas have in both Norway and Sweden thereafter been extended (Duvander and Johansson, 2012). The development has to some degree been contested and parental choice has been contrasted to the goal of gender equality (Ellingsæter, 2014)

An earlier study found that the parental leave use among eligible fathers in Norway increased from 4 to 39 per cent at the time of the introduction of the quota. Out of the users the average use was 25 days and most fathers take exactly the quota. Only 10 percent of the fathers took more than the quota, but this group is growing over time (Cools, Fiva and Kirkeboen, 2015). In Sweden about half of all fathers used leave before the reform was introduced, and this increased to around 8 out of 10 fathers after the reform (Swedish Inspectorate of the Social Insurance, 2012). All groups of fathers increased the number of leave days but especially the ones who did not use very much before, resulting in a more equal distribution of leave use (Duvander and Johansson, 2014). These were mainly fathers with low income, low education, and foreign-born fathers. On average the leave use increased from 30 days to 45 days when fathers were followed until the child turns eight years old and the right to use leave expires.

In the same way 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. From 2012 the mother's quota became the same length as the father's quota in Norway and any changes after this 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 agree by signature. In Norway, any parent claiming leave will get it which means that in practice mothers may use a major part 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 programmes. First, in Sweden all parents permanently residing in the country with 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 to parental leave benefits requires employment during six of the last ten months prior to childbearing. Fathers' right to benefits in Norway were, until 2000, totally based on mothers' eligibility. Thus, while practically all Swedish fathers (and mothers) have access to the father's quota, about one fifth of the Norwegian fathers have been excluded as the mother is not eligible to parental leave.

Because of the more strict employment requirements in Norway the proportion of parental leave users is smaller than in Sweden. This holds for mothers as well as for fathers. Practically all mothers in Sweden take parental leave, while around 20 percent of mothers in Norway are not eligible. Almost 90 percent of fathers in Sweden use parental leave (Swedish Social Insurance Agency, 2012), while among entitled fathers in Norway users are close to 80 percent, but since their right to benefits depends on mothers' eligibility only around 60 percent of all fathers take some parental leave (Lappegard, 2010).

In conclusion, even if Norway introduced the quota before Sweden, the quota is more accessible to fathers in Sweden. Today Norwegian fathers use 15 percent of the leave and Swedish fathers 24 percent. The difference can be exemplified also in the attitudes and behaviours where young adults in Sweden are more in favour of an egalitarian work-family balance than are young adults in Norway (Bernhardt, Noack and Lyngstad, 2008).

## **Framing**

Our point of departure is new gender practices and shifts in family dynamics, changes that first started in the Nordic countries. Gender practices in work and unpaid work have changed over the past decades, and in most western countries there has been a move from traditionally male-breadwinner model towards various degrees of dual-earner models where both men and women participate in the labour market. However, changes in employment have been more profound than changes in domestic responsibilities. This uneven development has been labelled 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 if men share more of the domestic responsibilities than in most other countries (Hook, 2006). The father’s quotas are directly aimed at changing the uneven division of work in the household. Whether it has actually changed the long term division of labour market and household work can be 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 gender equal division of labor market work and household work (including childcare) may affect continued childbearing in the couple. The major argument for why fathers’ use of parental leave would increase fertility is that it would lead to a more equal division 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). Parental leave taken by the father can, for example, facilitate a faster return to work for the mother. A shared parental leave also indicates more shared responsibility for childcare during the child’s first year(s) and signals the father’s commitment to share the care of children also later in the child’s life (Duvander and Andersson, 2006). Such shared responsibility may not just facilitate the situation of the woman, but also stimulate men’s interest and orientation towards children. It may have negative effects on the career of men (Rege and Solli, 2013; Evertsson, 2014) but it may enable and strengthen childbearing desires.

In this study we attempt to study the effect of social policy by using critical junctures (Neyer and Andersson, 2008) at a time when a major change in policy occurs, that is the introduction of the father’s quota. We also study two similar countries to be able to isolate the importance of minor differences that may have importance. The major difference between Norway and Sweden at the time of the introduction was that in Norway very few fathers used parental

leave before the quota was introduced and even if 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, already before the quota, a large share of fathers used leave and this dramatically increased to the majority of fathers. It seems the quota in Sweden reached groups of fathers that were not reached in Norway. In other words, the quota became more universal in Sweden than in Norway. The main reason to compare the two countries is to find out whether a parental leave that reaches the most dedicated parents, or a parental leave that reaches all fathers, have varying influence on the fertility.

## **Method**

While previous analyses capture the association between parental leave use and childbearing the present study attempts to isolate the causal effect from leave use on continued childbearing. Men who take parental leave, and especially those who take extensive leaves, are likely to do so because they are more child-oriented than other fathers and it is thereby also conceivable that such fathers are more interested in having more children. Similarly, women who take short parental leave may be the most work oriented and may see one child as sufficient. In order to distinguish causality in effects from selections 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 involved countries 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 receive a "treatment" (father's quota) or to act "control group" (no father's quota). After some time, we can then compare fertility-outcomes for the "treatment" and "control" groups and reach conclusions about the effect of the increased leave use among fathers. Assuming that inclusion in the pre- and post-reform populations is largely random or exogenously determined, comparison of outcomes for pre- and post-reform families would allow us to reach stronger conclusions about the true effects of leave-taking than would be the case with standard correlation studies, where fathers may be self-selected into parental leave use. Note however, that we are in this study only capturing the direct effect of the reform and we are not able to observe gradual changes or indirect effects.



## **Data and descriptive statistics**

In Norway data are gathered at 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 is identified by a unique identification number. For the Swedish analyses register data from the Swedish Social Insurance Agency 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 (parts of the day if not a full day) and the amount of benefit 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, as well as regional residence of parents, are defined at age of birth of the child. Income level, which includes social transfers, is taken from the year before the birth to not be affected by the use of parental leave.

Empirically, we make use of the fact that both quotas were introduced for children born after a specific date. 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 chose our sample to be limited to parents with children born 25 days before and after the reform as larger samples seem to indicate that parents in the control and treatment group differ, also found in Johansson (2010) for Sweden. Differences in mothers' age between the control and treatment group exist when the sample is extended to one month before and after, but disappear when we limit the sample. We include parents where the birth is the first or second birth of the mother and the father. In the descriptives for Norway (Table 1A, appendix) there are no significant differences between the control and treatment group. In the descriptives for Sweden (Table 1B, appendix) we find that the control group includes more first children (in December), than the treatment group (in January). The difference is significant on the 5 percent level, but when a difference in difference approach is applied, and seasonal variations controlled, the difference in composition of birth order is no longer significant. That is, the pattern of more first births taking place in December compared to January is true the years of the reform and also the control year. Also differences between control and treatment group on civil status and region of residence exist before a difference in difference approach is applied. The difference between control and treatment group is a strong argument to use a difference in difference approach and not just compare before and after the reform. For various reasons

one may expect more difference between parents to children born in December and January (control and treatment group in Sweden), than between parents to children born in March and April (control and treatment group in Norway), for example as it may be advantageous to be among the oldest in a school class.

Parents to children born four days just before or after the reform are excluded to eliminate the risk of inclusion of planned deliveries. In a study from Norway a change in birth pattern was found where births were shifted to after the reform (Cools, Fiva and Kirkeboen, 2015). The 1<sup>st</sup> of April in 1994 was a Friday and we believe that to exclude four days is reasonable as it is possible to postpone planned caesarians to the next working day, that is, Monday the 4<sup>th</sup> of April. As the F-tests (see Table 1A and 1B, appendix) are not significant in neither Norway nor Sweden we feel confident that the control and treatment groups do not differ in ways that may influence the results on 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 the leave and thus one month was added to the leave, while in Sweden the quota was established within the existing leave length. In Sweden, the quota coincided with a reduction of the earnings replacement from 90 per cent of earlier earnings to 80 per cent. This applied to the whole leave except the father's and mother's quota.

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 of extending the parental leave length, which we think may have affected the propensity of continued fertility. Therefore we chose to run models including parents of children born the same periods the year *after* the reform, that is, 1995 in Norway and 1996 in Sweden. There may however be a change in composition of parents from the reform, which makes the comparison with the year after difficult as well. We find no such compositional changes in the descriptives for Norway and Sweden, but there may of course be unmeasured changes. As a sensitivity test we run models where parents of children born one year *before*, that is, 1993 in Norway and 1994 in Sweden. If we find similar results from these models they can be considered more robust.

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 continue with another child within the full observation period of 10 years, and

divided up to the first 1-4 years and the 5-10 year after the reform, separately for second and third births (Table 2A-D, appendix). The Norwegian pattern seems to be more or less random where the shares who have a second and a third birth vary between the years. The tables for Sweden however show some interesting patterns. First, it seems that parents to first children born in January more often continue with a second child within ten years. Secondly, among parents with two children it seems that the parents to children born in December are more likely to have a third child over the ten year period, all years except the reform year when it is the parents of January-children who more often have a third birth. The difference is mainly found the first 1-4 years, and even if the reform comparison indicate more births from December-parents the following 1-4 years after the reform, the difference between parents of December and January children are considerably smaller than the years before and after.

We then use Cox regressions to investigate the effect of the reforms during the years following the reforms up to present day. The model can be described accordingly:

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

where  $y$  is the dependent variable,  $\mathbf{X}_i$  is a vector of individual characteristics of the mother and the father, including mother's and father's age at birth, mother's and father's age square, parity of child, mother's and father's income, mother's and father's education, immigrant status, geographical region and union status at birth. The variables "Year" and "Month" are dummy variables indicating the year and month of birth of the child, where "Year" is one for children born around the introduction of each reform and zero for children born a year later/earlier. The variable "Month" assumes the value one for the month where each of the reforms were 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 belongs to the treatment group.

Couples are censored at separation or divorce. For Norway we only include parents where the mother is eligible to leave according to the labor market criteria as they are the only ones affected by the reform. As another sensitivity test we run models with all Norwegian parents, also cases when the mother is not eligible to leave, but this does not change the results of the study.

## Results

We follow parents 10 years after the father's quota was introduced in Norway and Sweden. Models are performed including all parents and separately for the propensity to continue childbearing with a second and a third child. Table 1A and 1B 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.

The first row in the table indicates a model where the propensity to continue childbearing is calculated for the whole period of 10 years. The analyses of the Norwegian data show no effect over all years for all, one-child or two-child couples. Also when the period is divided up to 1-4 years after subsequent birth (and reform) and 5-10 year after, no effect is found.

For Sweden there are no effects in the models including all parents, and neither for the models of one child parents. However in the models of two-child parents there is an increased risk of a third child in the model without controls. The increased risk of a third birth is after controls not significant and the interpretation should be cautious.

**Table 1A.** 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)
-4 years	0.96 (0.068)	0.94 (0.066)	0.97 (0.079)	0.97 (0.079)	0.84 (0.123)	0.87 (0.130)
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)

Note: Model I is without control variables. Model II include the following control variables: mothers and fathers age at birth and age square, mothers and fathers education, mothers and fathers income, immigrant status, unions status at birth and geographical region. Model II for all also include parity of child.

**Table 1B.** 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 yrs	1,01 (0,048)	1,02 (0,048)	0,94 (0,051)	0,95 (0,051)	1,22** (0,120)	1,19 (0,117)
-4 yrs	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 yrs	1,07 (0,100)	1,06 (0,098)	0,94 (0,114)	0,99 (0,118)	1,15 (0,168)	1,13 (0,163)

Note: Model I is without control variables. Model II include the following control variables: mothers age at birth, mothers age square, age difference in couple, parity of child, mothers and fathers education, immigrant status, unions status at birth and geographical region. Model II for all also include union status at birth.

\*\*\*  $p < 0.01$  \*\*  $p < 0.05$ .

To find out whether the third birth risk is particularly altered for any specific subgroup of parents we performed 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 (Table 2A, 2B). For Sweden (Table 2C, 2D) 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 2D). This applies in both models with and without controls.

We have performed a number of sensitivity analyses whereof some are found in the appendix. When we perform identical models but use the year before the reform as control for seasonal variation we find a negative effect on the second birth risk among Norwegian parents. As this is the only model where such an effect turns up we refrain from interpreting it, especially as we have reason to believe that controlling for the year before the reform may be problematic (Table 3A in appendix). In the Swedish model we find no significant effect when comparing to the year before, which gives us reason to be cautious when interpreting the elevated third birth risks found in the main models. However, our ocular comparison found in Table 2A-D in appendix indicates that the years before reform (1993-1994) are exceptional in that the difference between December and January is small. (Table 3B in appendix). When the sample is divided in the ones where the father has low and high income, the reform year stands out for both fathers with low and high income, indicating a higher share having a child

**Table 2A.** Risk of continued childbearing for parents with children born just before and after the father’s quota reform, by mothers 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 yrs	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)
-4 yrs	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 yrs	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)

Note: Model I is without control variables. Model II include the following control variables: mothers and fathers age at birth and age square, mothers and fathers education, fathers income, immigrant status, unions status at birth and geographical region.

**Table 2B.** Risk of continued childbearing for parents with children born just before and after the father’s quota reform, by fathers 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 yrs	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)
-4 yrs	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 yrs	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)

Note: Model I is without control variables. Model II include the following control variables: mothers and fathers age at birth and age square, mothers and fathers education, mothers income, immigrant status, unions status at birth and geographical region.

after the reform (January-parents) whereas most other years it is the December-parents who more often have another child. We test to not censor for separation and to also not select only couples who live together the year of childbirth and we again find no effect for Norway. For Sweden, these sensitivity tests do not change the elevated third birth risks for fathers with low income. We also perform analyses with all Norwegian parents, that is, also couples where the mother is not eligible for leave, but find no effect. Likewise, placebo effects give no effects in

any of the countries. To test for placebo effects we use the exact same models but testing the difference between propensity of childbearing just before and after the same time as the reform was introduced but one year after. That is in April 1994 and 1995 for Norway and January 1995 and 1996 for Sweden.

**Table 2C** 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 yrs	0,99	1,00	0,89	0,92		1,24	1,21	1,15	1,16
	(0,075)	(0,075)	(0,068)	(0,070)		(0,141)	(0,137)	(0,228)	(0,231)
-4 yrs	0,95	0,96	0,92	0,94		1,30	1,26	1,29	1,28
	(0,082)	(0,083)	(0,078)	(0,080)		(0,202)	(0,197)	(0,344)	(0,348)
5-10 yrs	1,15	1,15	0,74	0,81		1,20	1,17	0,99	1,02
	(0,186)	(0,185)	(0,136)	(0,146)		(0,201)	(0,195)	(0,296)	(0,301)

Note: Model I is without control variables. Model II include the following control variables: mothers age at birth, mothers age square, age difference in couple, parity of child, mothers and fathers education, immigrant status, unions status at birth and geographical region. Model II for all also include union status at birth.

**Table 2D.** Risk of continued childbearing for parents with children born just before and after the father's quota reform, by fathers 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 yrs	0,93	0,95	0,94	0,95		1,28**	1,28**	1,11	1,10
	(0,064)	(0,065)	(0,082)	(0,081)		(0,161)	(0,161)	(0,176)	(0,175)
-4 yrs	0,93	0,94	0,94	0,95		1,33	1,31	1,24	1,23
	(0,073)	(0,073)	(0,090)	(0,091)		(0,231)	(0,229)	(0,262)	(0,263)
5-10 yrs	0,93	0,98	0,95	0,97		1,24	1,26	0,98	0,97
	(0,138)	(0,144)	(0,200)	(0,199)		(0,226)	(0,229)	(0,238)	(0,234)

Note: Model I is without control variables. Model II include the following control variables: mothers age at birth, mothers age square, age difference in couple, parity of child, mothers and fathers education, immigrant status, unions status at birth and geographical region. Model II for all also include union status at birth.

\*\*\* p < 0.01 \*\* p < 0.05

Lastly we perform the analysis separately by mothers' and fathers' educational level. For Norway, there are no effects. For Sweden we find the elevated third birth risk among couples where the mother has low education. This group is to a large extent overlapping with the group of fathers with low income who also had a higher risk of a third birth. It thus seems that a cautious conclusion is that families with low income or low education may have had an elevated third birth risk caused by the reform. It is these groups that changed their behavior most by the reform, that is, where the father did not use the leave before the reform, but did so after the reform. It is thus most likely that this group is influenced also regarding fertility. All sensitivity analyses are available upon request.

## **Discussion**

This study focuses on causal effects of reforms and it should be pointed out that it is far more likely that reforms influence behavior gradually and in indirect ways. It is therefore important to not limit the idea of potential effects of the reforms of father's quotas to such analysis as performed here. It is even more important to not limit the potential effect of fathers' leave use, or gender equal childcare, to a reform study. Even if it is very difficult to pin down causality, the association should be investigated with various analytical strategies where this study investigates one dimension of the relationship.

Minor effects or no effects should be expected as reforms may take time to change behavior, especially indirect behavior as studied here. However, based on the strong response of the reforms on parental leave days in Norway and Sweden it is well worth investigating the reform impact on family dynamics. In addition, the earlier found association between parental leave use and continued childbearing prompts this study.

The difference between Norway and Sweden should be interpreted in the light of different set-up of systems, different contexts at the time of the introduction of reform as well as who actually responded to the reform. In Norway it was the highly educated fathers who started to use the parental leave. These fathers already used parental leave at the reform time in Sweden. Instead, for Sweden it was the fathers with low education and low income who started to use the leave and who had not used very much leave before the reform. They changed their leave use radically by the reform and this study indicates that increased fathers' leave use also had effects on continued childbearing. As the two-child norm is strong in Sweden it can be expected that a change in pattern is found for higher parities and this is also what we found. We found that among Swedish parents where the father had low income the propensity to



continue with a third child increased by the reform. The same was found in cases the mother had low education. Perhaps the father's quota reform was most important for these couples with low income or education, as it made it possible to share more of the childcare in the household. Not only may this have encouraged fathers' child orientation, but as the leave was used by the very large majority also the employers had to accept fathers' absence. In addition, for the mothers in these couples, the fathers' participation in childcare and perhaps also other domestic work, may have made the prospect of more children more realistic and desired. Reasons may be both a facilitated work burden and more understanding within the couple. The same group of fathers in Norway did not have the same chance to participate in the childcare. A considerable share of them did not have access to the father's quota as the mother of their children was not eligible. The ones 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 much less, and may not have changed the division of childcare very much, and continued childbearing may not have been enabled. The results indicate that not just the type of reform and the context, but when it is introduced matter for the potential effects. It seems that Sweden was ready for a change to a general norm of one month leave for all fathers at the time the quota was introduced. In the couples where the fathers were then enabled to participate in childcare they also seem to have been more enabled to have a third child. It is very likely that this is a temporary effect as the Swedish third birth pattern has not radically changed, although 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 in Sweden.

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## Appendix

**Table 1A.** 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 Mean	SE	Post-reform Mean	SE	Difference Estimate	SE	Diff-in-diff 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
Parity of child								
- % parity one	0.52	0.012	0.51	0.012	-0.01	0.017	0.02	0.024
- % parity two	0.48	0.012	0.49	0.012	0.01	0.017	-0.02	0.024
Mothers education								
- % 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
Fathers education								
- % 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
Mothers income								
- % 1 <sup>st</sup> quintile	0.20	0.010	0.20	0.009	0.00	0.014	0.00	0.020
- % 2 <sup>nd</sup> quintile	0.20	0.010	0.20	0.009	-0.00	0.014	0.00	0.019
- % 3 <sup>rd</sup> quintile	0.20	0.010	0.20	0.009	-0.00	0.014	0.00	0.019
- % 4 <sup>th</sup> quintile	0.20	0.010	0.20	0.009	0.00	0.014	-0.00	0.019
- % 5 <sup>th</sup> quintile	0.20	0.010	0.20	0.009	-0.00	0.014	-0.00	0.019
Fathers income								
- % 1 <sup>st</sup> quintile	0.20	0.010	0.20	0.009	0.00	0.014	0.00	0.019
- % 2 <sup>nd</sup> quintile	0.20	0.010	0.20	0.009	-0.00	0.014	-0.00	0.019
- % 3 <sup>rd</sup> quintile	0.20	0.010	0.20	0.009	0.00	0.013	0.00	0.019
- % 4 <sup>th</sup> quintile	0.20	0.010	0.20	0.009	-0.00	0.014	-0.00	0.019
- % 5 <sup>th</sup> quintile	0.20	0.010	0.20	0.009	0.00	0.014	0.00	0.019
Mothers immigrant 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
Fathers immigrant 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 at 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
- % 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	1,668		1,838		3,506		7,193	

Note: Observations about 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. Sample is 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).

\*\* p < 0.05; \* p < 0.01.

F-test:  $F(29,608190) = 193.76$

**Table 1B.** Descriptive statistics for parents with children born just before and after the father's quota reform. Sweden

	(1)		(2)		(3)		(4)	
	Pre-reform Mean	SE	Post-reform Mean	SE	Difference Estimate	SE	Diff-in-diff Estimate	SE
Mean age mothers	28.0	0.079	27.9	0.075	0.04	0.109	-0.08	0.152
Mean age fathers	30.5	0.090	30.6	0.084	-0.02	0.123	0.02	0.172
Union status at birth								
- % cohabiting	0.57	0.008	0.55	0.008	0.01	0.012	0.02	0.016
- % married	0.43	0.008	0.45	0.008	-0.01	0.012	-0.02	0.016
Parity of child								
- % parity one	0.55	0.008	0.52	0.008	0.03*	0.012	-0.02	0.016
- % parity two	0.45	0.008	0.48	0.008	-0.03*	0.012	0.02	0.016
Mothers education								
- % lower sec. or less	0.13	0.006	0.13	0.005	0.00	0.008	0.00	0.011
- % upper secondary	0.57	0.008	0.57	0.008	-0.01	0.012	0.01	0.016
- % higher ed.	0.30	0.008	0.29	0.007	0.01	0.011	-0.02	0.015
- % ed. Unknown	0.01	0.001	0.01	0.001	0.00	0.002	0.00	0.003
Fathers education								
- % lower sec. or less	0.16	0.006	0.15	0.006	0.01	0.008	0.01	0.012
- % upper secondary	0.55	0.008	0.56	0.008	-0.01	0.012	-0.01	0.016
- % higher ed.	0.29	0.008	0.29	0.007	0.00	0.011	0.00	0.015
- % 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	2.032
Mean income fathers	160.6	1.299	159.5	1.255	1.1	1.808	-2.7	2.500
Mothers income								
- % 1 <sup>st</sup> quintile	0.20	0.007	0.20	0.006	0.00	0.009	0.00	0.013
- % 2 <sup>nd</sup> quintile	0.20	0.007	0.20	0.006	0.00	0.009	0.00	0.013
- % 3 <sup>rd</sup> quintile	0.20	0.007	0.20	0.006	0.00	0.009	0.00	0.013
- % 4 <sup>th</sup> quintile	0.20	0.007	0.20	0.006	0.00	0.009	0.00	0.013
- % 5 <sup>th</sup> quintile	0.20	0.007	0.20	0.006	0.00	0.009	0.00	0.013
Fathers income								
- % 1 <sup>st</sup> quintile	0.20	0.007	0.20	0.006	0.00	0.009	0.00	0.013
- % 2 <sup>nd</sup> quintile	0.20	0.007	0.20	0.006	0.00	0.009	0.00	0.013
- % 3 <sup>rd</sup> quintile	0.20	0.007	0.20	0.006	0.00	0.009	0.00	0.013
- % 4 <sup>th</sup> quintile	0.20	0.007	0.20	0.006	0.00	0.009	0.00	0.013
- % 5 <sup>th</sup> quintile	0.20	0.007	0.20	0.006	0.00	0.009	0.00	0.013
Mothers immigrant 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
Fathers immigrant status								
- % born abroad	0.17	0.006	0.17	0.006	0.00	0.009	0.01	0.012
- % born in SE	0.83	0.006	0.83	0.006	0.00	0.009	0.01	0.012
Geo. region at year of child's birth								
- % Stockholm	0.24	0.007	0.22	0.007	0.02	0.010	0.00	0.014
- % East Middle Sweden	0.17	0.006	0.18	0.006	-0.01	0.009	0.00	0.012
- % Småland and the islands	0.09	0.005	0.09	0.005	0.00	0.007	-0.01	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	0.00	0.013
- % 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	0.00	0.006
- % Upper Norrland	0.06	0.004	0.05	0.004	0.00	0.005	-0.01	0.007
	3,449		3,814		7,263		14,742	

Note: Observations about 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. Sample is 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; \*\* p < 0.01.

$$F(28, 14711) = 0.45 \quad ; \quad \text{Prob} > F = 0.9944$$

**Table 2A.** Share of parents having another child, parity one born during 25 days before or 25 days after reform introduction and same time 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

**Table 2B.** Share of parents having another child, parity two born during 25 days before or 25 days after reform introduction and same time 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

**Table 2C.** Share of parents having another child, parity one born during 25 days before or 25 days after reform introduction and same time 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

**Table 2D.** Share of parents having another child, parity two born during 25 days before or 25 days after reform introduction and same time 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

**Table 3A.** 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 yrs	0.91 (0.057)	0.91 (0.057)	0.86** (0.064)	0.87 (0.064)	1.02 (0.115)	1.04 (0.117)
-4 yrs	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 yrs	0.97 (0.114)	0.93 (0.110)	0.78 (0.129)	0.78 (0.128)	1.15 (0.190)	1.17 (0.194)

Note: Model I is without control variables. Model II include the following control variables: mothers and fathers age at birth and age square, mothers and fathers education, mothers and fathers income, immigrant status, unions status at birth and geographical region. Model II for all also include parity of child.

\*\* p < 0.05.

**Table 3B.** 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 yrs	0,96 (0,044)	0,99 (0,045)	0,94 (0,049)	0,96 (0,049)	1,11 (0,102)	1,10 (0,100)
-4 yrs	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 yrs	1,01 (0,093)	0,99 (0,090)	0,86 (0,104)	0,90 (0,108)	1,24 (0,175)	1,22 (0,170)

Note: Model I is without control variables. Model II include the following control variables: mothers age at birth, mothers age square, age difference in couple, parity of child, mothers and fathers education, immigrant status, unions status at birth and geographical region. Model II for all also include union status at birth.