

The effect of paternity leave quotas on childbearing decisions: Quasi-experimental evidence from Norway

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1 Introduction and previous literature

Public policies aiming to lower the direct and indirect costs of having children for mothers could be a tool to work against declining fertility rates. In this article, I study paternity leave quotas, a policy motivated by the desire for higher gender equality (Kitterød and Halrynjo, 2017), and their effect on fertility. The goal is to investigate the impact of paternity leave duration, the division of parental leave between parents and unpaid parental leave uptake on childbearing decisions.

I contribute to the literature in three ways. First, I provide evidence on how paternity leave affects fertility. Previous research has primarily focused on the effect of maternity leave extensions on fertility (for an overview, see Bergsvik et al. (2021) or Thomas et al. (2022)). Among the research that looks at paternity leave and fertility, the reforms mainly include an extension of the total leave period and not a change in the parental leave division between parents. However, research on childcare responsibilities and fertility indicates that a more equal division of tasks could have a positive effect on fertility (Doepke and Kindermann, 2019). It is, therefore, interesting to isolate the effect of a shift in the parental leave division between parents on fertility.

Second, I look at two different reforms: one that reduces the paternity leave quota and one that increases it. Previous research has almost exclusively looked at the effect of increased parental leave. Although we could theoretically expect the same effects (with opposite signs) from reducing and increasing the duration of paternity leave, it is interesting to study empirically how these dynamics differ.

Third, using a rich administrative dataset, I can provide a better understanding of the mechanisms that could be driving potential effects. Specifically, I aim to identify how the reforms affect mothers' unpaid leave uptake. The evidence on how paternity quotas affect unpaid leave in Norway is scarce, as data on unpaid leave uptake are limited (Ellingsæter et al., 2025). I use short-term changes in income as an indicator for changes in unpaid leave uptake and argue that changes in unpaid leave caused by the reform could affect couples' fertility decisions.

The large majority at studies looking at the effect of increased maternity leave on fertility find either a positive effect on fertility or no effect at all (Bergsvik et al., 2021). The studies looking at the effect of paternity leave on fertility, find either no effect or a negative effect of extended paternity leave. Farré and González (2019) examines the impact of introducing 13 days of non-transferable paid paternity leave in Spain. This leave was added to the total period of paid parental leave, meaning that the mother's paid leave was not impacted. They use a regression discontinuity design to compare the likelihood of having another child and the time to have an additional child for women who had a child just before the reform with those who had a child shortly after. Their findings indicate a negative effect on fertility, particularly among older women. Depending on the specification used, the probability of having another child decreased by 10% to 22%, and women took 20 to 41 days longer to have another child. Duvander et al. (2020) estimates the impact of the introduction of paternity leave quotas on fertility in Norway and Sweden. A paternity leave quota of around 4 weeks was introduced in Norway in 1993 and in Sweden in 1995. The authors compare parents who had children before and after the reform to examine the likelihood of continued childbearing. Their findings reveal no significant impact on fertility in Norway, while they observe a positive effect on fertility among low-educated, low-income parents in Sweden. This latter group also had the lowest uptake of paternity leave before the reform and increased their uptake the most.

2 Paternity leave in Norway

In 1993, a paternity leave quota was introduced in Norway, reserving 4 weeks of paid parental leave specifically for fathers (Norwegian Ministry of Children and Equality, 1996). There have been several changes to the length of parental leave and the length of the quota. The 2014 and 2018 reforms is the focus of this research project. While the other changes in the paternity quota affected the total paid leave period, these reforms

did not. The total paid leave period remained 49 weeks during the whole period. As a result, the reforms only impacted the division of paid parental leave between parents.

Parental leave compensation in Norway is earnings-based. The coverage rate is 100%, but it is capped at six times the national insurance scheme basic amount (Lovdata, 1997). Employers can top up the difference. Parents can also choose to take a longer leave at 80% compensation. The total leave period at 80% coverage rate was, until 2024, equal to 59 weeks (Stortinget, 2024). Until 2019, the choice of taking parental leave at an 80% coverage rate did not affect the length of the paternity leave quota. In addition, the parents have the right to 12 months' unpaid leave with job protection. Parents also have the right to take partial parental leave unless this causes significant disadvantages for their workplace (Lovdata, 1997). Partial parental leave allows parents to work part-time while receiving parental leave benefits.

3 Data and Methodology

The analysis relies on administrative data from Norwegian registers made available by Statistics Norway. The datasets contain a unique identifier for each individual, which allows information from different registers to be combined.

By utilizing the two changes in the paternity leave quota in 2014 and 2018 as a natural experiment, it is possible to identify how changes in parental leave division impact parents having a child right after the reform, compared to those who had a child right before the reform, using a Regression Discontinuity in Time (RDiT) framework. This methodology recovers the current child effect, which is how the experience of parental leave for one child affects parents' decisions to have additional children (Lalive and Zweimüller, 2009). I look at two outcome variables: birth spacing, which is the number of days it takes to have an additional child, and the probability of having another child.

Data on birth dates for individuals is available from 1885 to 2022. This means that individuals giving birth in 2018 have at least four years to have another child, and individuals giving birth in 2014 have at least eight years to have another child. To ensure that some individuals do not have more time to have another child than others, I restrict the time an individual has to have another child so it is equal for every observation.

There are also clear seasonal trends and time trends in the data. To control for this possible bias, the outcome variables, Y_i , are regressed on year and month dummies. The sample is then restricted to the given bandwidth, as proposed in Hausman and Rapson (2018). The residuals $\hat{\gamma}_i$ are then used as the dependent variables in the main regressions instead of Y_i . I also conduct a robustness check with other seasonality specifications. The results are not sensitive to the specification chosen.

The first stage is estimated with the following equation:

$$Y_i = \alpha_0 + \alpha_1 T_i + \alpha_2 f(\text{DateBirth}_i - c) + \alpha_3 T_i f(\text{DateBirth}_i - c) + \varepsilon_i \quad (1)$$

Where Y_i is either equal to changes in uptake of parental leave or change in income.

The Intention-to-Treat effect (ITT) and the Local Average Treatment Effect (LATE) are estimated by the following two equations:

$$\text{ITT} = \hat{\gamma}_i = \beta_0 + \beta_1 T_i + \beta_2 f(\text{DateBirth}_i - c) + \beta_3 T_i f(\text{DateBirth}_i - c) + \varepsilon_i \quad (2)$$

The outcome variable $\hat{\gamma}_i$ is either the residuals of the probability of having another child or the residuals of the number of days until the parent has another child, the cutoff is the date of the reform, DateBirth_i is the date of birth of the child. $\text{DateBirth}_i - c$ is the running variable, the number of days the child is born from the reform. Moreover, $f(\text{DateBirth}_i - c)$ is a polynomial function of the running variable. A local linear fit is used in the analysis, in line with the recommendations of Gelman and Imbens (2019). T_i is a dummy variable equal to 1 if the child is born after the reform. β_1 is the coefficient of interest and measures the effect of having a child after the reform on the fertility outcomes.

$$\text{LATE} = \hat{\gamma}_i = \theta_1 + \theta_2 \widehat{\text{PaternityLeave}}_i + \theta_3 f(\text{DateBirth}_i - c) + \theta_4 T_i f(\text{DateBirth}_i - c) + v_i \quad (3)$$

Where paternity leave is the number of days of paternity leave taken by the father. However, as we have several potential first stages (changes in paid and unpaid leave uptake by mothers and fathers) the ITT estimates is the main specification reported in the results.

4 Preliminary results

Table 1 presents the first stage estimates, changes in uptake of paternity, maternity and total leave as well as change in income for mothers. Changes in short term income (between the year before and after birth)

is used as an indicator of unpaid leave uptake. Note that paid parental leave is included in total income, changes in income right after birth is therefore likely to reflect changes in unpaid leave uptake. The mother can either choose to take less (or more) unpaid leave after the paid parental leave period or chooses to take leave at 100% (80%) pay instead of 80% (100%) pay.

The 2014 reform decreased paid paternity leave and increased mothers wages, likely due to less unpaid leave uptake. The paid maternity leave taken by mothers have not changed. The main effect of the reform is therefore a shorter leave period and a positive income effect. The 2018 reform increased paid paternity leave and decreased paid maternity leave. Although the coefficients are negative there are no statistically effect on unpaid leave or total leave taken by the parents.

Table 1: Changes in leave uptake (Bandwidth = 90 Days)

	2014 – Decrease in paternity quota	2018 – Increase in paternity quota
<i>Panel A. Paid paternity leave (in months)</i>		
Full sample	-0.74*** (0.14)	0.56*** (0.11)
<i>Panel B. Paid maternity leave (in months)</i>		
Full sample	0.10 (0.14)	-0.82*** (0.11)
<i>Panel C. Total paid leave (in months)</i>		
Full sample	-0.644** (0.24)	-0.26 (0.30)
<i>Panel D. Change in total income for mothers (in NOK)</i>		
Full sample	21,778*** (7,616)	-79,770 (51,333)

Notes: Robust standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 2 presents the main findings and heterogeneous effects. The reforms have no significant effect on birth spacing at the 5 percent level. However, for all bandwidths tested (30, 60, 90, 180 and 365 days), there are consistently positive coefficients after the 2014 reform and negative coefficients after the 2018 reform for the days to next birth variable. This could indicate that the reform affects some groups. Splitting the sample in those under 30 and over 30 and in those unmarried and married shows that the 2014 decrease in the paternity leave increased birth spacing for those over 30 and those married. There are no significant effect on the probability of having another child or any signs of strong heterogeneity in this variable.

Table 2: ITT Estimates (Bandwidth = 90 Days)

	2014 – Decrease in paternity quota	2018 – Increase in paternity quota
<i>Panel A. Days to next birth</i>		
Full sample	48.95* (25.60)	-24.80 (17.35)
Observations	16,116	11,376
Under 30	9.86 (32.87)	-43.36* (23.77)
Observations	9,981	6,350
Over 30	108.48*** (41.64)	-0.38 (26.93)
Observations	6,133	5,025
Unmarried	23.99 (31.53)	-28.43 (23.99)
Observations	10,672	7,333
Married	89.67** (40.04)	-17.69 (32.25)
Observations	5,394	4,043
<i>Panel B. Probability of having another child</i>		
Full sample	-0.012 (0.014)	-0.004 (0.021)
Observations	33,947	30,514

Notes: Robust standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

In addition, I run the same regression with the probability of staying married and the probability of getting married as outcome variables. I find no significant effects of the reforms on the two variables.

5 Conclusion

I find that shifting parental leave responsibilities from fathers to mothers by reducing the paternity leave quota can, for certain groups, lead mothers to take longer to have an additional child. The 2014 decrease in parental leave led mothers over 30 to take over 108 days longer to have another child, and married women to take over 89 days longer to have another child. However, my results do not indicate that this shift decreases the overall likelihood of having another child. This does not necessarily mean that there is no effect of paternity leave quotas on fertility rates, but for small changes in the quota, this effect is not large enough to determine the overall probability of a woman having another child. This result is also supported by previous literature on parental leave and fertility in Norway. No previous changes in Norwegian maternity leave, paternity leave, or total leave period have been shown to increase fertility rates.

I also examine changes in unpaid leave uptake, measured by changes in income, and changes in the likelihood of marriage and marital stability as potential mechanisms. My results give clear indications of women taking less unpaid leave after the length of the quota is reduced, and more unpaid leave after the length is increased. I do not find an effect of the reforms on the likelihood of getting married or on marital stability.

In future studies, it would be interesting to look at how the length of paternity leave quotas affects women who do not yet have children. It would also be interesting to complement the research with time use and other survey data that investigates how and to which degree a shift in the paternity leave quota translates into a shift in childcare responsibilities.

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