Causal analysis of policy effects on fertility

Rannveig Kaldager Hart[1], Janna Bergsvik[2], Agnes Fauske[3] and Wookun Kim[4]

This chapter reviews the literature on the causal effects of policies on fertility. It focuses on evidence from experiments and quasi-experiments in low fertility contexts, including studies from Europe, Northern America, Oceania and Asia. Making no a priori restrictions on policy type, the review encompasses evaluations of parental leave, childcare, health insurance, and financial incentives such as child transfers. Childcare expansions increase completed fertility. Financial incentives had positive effects on fertility across contexts, both in the short and long run. Expansions of parental leave rights in Central Europe, and introduction of parental leave in the U.S., also had positive effects. Distributional effects of these policies are very different, with parental leave compensation benefiting high-earning couples, while expansions of child care programs have potential to reduce social inequalities.

[1] Centre for Fertility and Health, Norwegian Institute of Public Health,

rannveigkaldager.hart@fhi.no

[2] Research Department, Statistics Norway

[3] Department of Sociology and Human Geography, University of Oslo

[4] Economics Department, Southern Methodist University, U.S.

1. Introduction

The decline of fertility below the 2.1 replacement level has been met with concern in several advanced economies. Scholars from sociology, demography, and economics have warned of the large socioeconomic consequences of falling fertility and emphasized the importance of policies circumventing and reversing the trend (Doepke et al. 2022; Harper 2014; Jones 2022). All else equal, fertility decline leads to an aging workforce, requiring new solutions for both financing pensions and caring for the elderly (Sobotka et al. 2019). Large budget shares are allocated to different forms of family support in countries with relatively low fertility: 66 percent of European and almost 40 percent of Asian countries had policies aiming to raise fertility or impede a further decline (United Nations 2018).

Disentangling the causal effects of policies from other characteristics of individuals and societies, such as values, institutions and conditions in the housing and labor markets, is notoriously challenging (Gauthier 2007). The "credibility revolution" in applied microeconomics was a leap forward in causal analysis (Angrist & Pischke 2010). Policy changes at specific times or in specific subpopulations are used as naturally occurring "experiments," with clearly defined control and treatment groups.

Main findings: Policy effects on fertility

- Childcare expansions have a lasting impact on fertility
- Transfers have a large impact, but it may be transitory
- Substantial parental leave reforms have large and lasting effects

This chapter reviews experimental and quasi-experimental studies of effects of policies on fertility. The review includes policies with potential to impact fertility regardless of their aim and focuses on low fertility contexts, that is Europe, North America, Australia and parts of Asia. The review does not consider the literature on restrictions on abortion and contraception, but includes effects on fertility when the costs of

contraception change due to health service reforms. Policies that aim to influence fertility norms and preferences are also disregarded, due to both a likely weak impact and also being considered largely unacceptable in liberal democracies (Schultz 2015). Finally, evaluations of welfare policies (conditional transfers) are excluded, as cutbacks often aim to reduce births among welfare dependents, and increasing welfare dependency is unlikely to be considered a feasible policy for increasing fertility. The policies found in the included literature encompass childcare, parental leave, transfers and health services.

2. Conceptual framework

2.1 Predictions from theory

In the microeconomic theory of the family, a couple's number of children depends on their purchasing power, the required input to childrearing in terms of time and money, and parents' preferences for childrearing relative to goods (Becker 1991). Policies can affect both income and the cost of childrearing. For example, by making healthcare or housing more affordable for families with kids, the cost of raising a child diminishes. When families have more income due to subsidies or tax incentives, they might have more children, unless they decide to invest more in each child's upbringing. On the other hand, strategies that boost wages or enhance job commitment can make taking time off for child-rearing more costly (opportunity costs). Consequently, the overall impact of policies on family size can either be positive or negative.

Policies that reduce the opportunity costs of childbearing, traditionally taken by women, could also contribute to higher fertility (Goldscheider et al. 2015). The expected effect of policies that aim to foster father's involvement is theoretically ambiguous, as it may simultaneously reduce the opportunity costs for mothers, but increase the opportunity costs for

fathers (Farré & González 2019). Therefore, evaluating the efficacy of pro-natalist policies warrants an empirical investigation.

2.2 Using quasi-experimental techniques to test predictions

To estimate the effects of policy on fertility, we cannot simply rely on the association between individual-level studies of policy *uptake* and subsequent fertility due to endogeneity concerns. Consider that we want to estimate the effect of paternity leave length (X) on the number of children born subsequently (Y). Capturing the causal effect of X on Y in a regression framework would require controlling for all characteristics that could influence both the length of parental leave and subsequent fertility. Assuming we could capture all these factors in a vector of controls **Z**, we would get an unbiased estimate of the effect of paternity leave length on fertility while controlling for the vector of control by OLS. However, consider the following model:

$$1)\ Y_i = \alpha + \beta X_i + F_i'\Gamma + \delta W_i + \varepsilon_i$$

In practice, we cannot observe all components that impact both fertility and leave uptake precisely (Neyer & Andersson 2008). For instance, we only observe F, a subset of **Z**, and there may exist W, an unobservable determinant of Y that is correlated with X. Without accounting for W, an OLS estimate of β suffers from omitted variable bias; the estimated coefficient $\hat{\beta}$ may be larger or smaller than the true effect depending on the effect of W on Y and the covariances of X, F, and W (see Angrist and Pischke (2009) p. 60). Furthermore, the OLS estimate may be biased due to measurement errors and selection bias. Experiments and quasi-experimental designs aim to address such endogeneity concerns, thereby teasing out the causal effects of policies. The designs included in this chapter can be grouped into some major categories:

In **randomized experiments**, the researcher assigns participants randomly to either a treatment group or control group. In this case, a simple regression of treatment X on the outcome Y will give average treatment effects (Angrist and Pischke (2009) p:22):

$$2)\ Y_i = \alpha + \beta X_i + \varepsilon_i$$

The identifying assumption is that all determinants of Y other than the treatment are balanced across the treatment and control groups.

Regression discontinuity design (RD) can be used if exposure to a policy is defined by an arbitrary cutoff, e.g. fathers of children born before a given date have a shorter paternity quota, and fathers born after the date have a longer paternity quota. The coefficient of interest is the parameter estimate for a dummy variable D taking 1 for fathers of children born after the cutoff, otherwise 0. The key assumption is that all other determinants of Y are smooth around the cutoff. After controls for the assignment variable x (in this case, the birth date of the child), β captures the (local) causal effect of the reform (Angrist and Pischke 2009:253):

$$3)\ Y_i = \alpha + \beta D_i + \rho x_i + \varepsilon_i$$

An extension of RD is the **regression kink design** (RKD). This approach leverages a change in the slope at which the intensity of a treatment or the probability of being treated increases (or decreases) at a kink point (Card et al. 2015).

Difference-in-differences estimation (DiD) can be used if one or more groups are exposed to a policy change, while some are not. This identification strategy requires that trends in the treated and untreated groups are parallel absent the reform, which can be tested in the pre-reform period only. The basic form of the DiD equation, where post is a dummy for being in the post-period, and treat is a dummy for being in the treated group, is (Angrist and Pischke 2009:233):

$$4)\ Y_i = \alpha + \gamma post_t + \delta treat_i + \beta(post_t * treat_i) + \varepsilon_{i.t}$$

Here, β captures the effect of being treated in the treated period net of level differences across the treated and untreated groups and the common time trend, and thus the reform effect.

Multiple extensions of DiD designs exist. In some instances, one can identify a less impacted subgroup within the treatment group, and estimate a **triple-differenced design (DDD)**.

Two-way fixed-effects panel regression models (2WFE) has been a common extension when changes happen at different time periods in different regions. 2WFE models combine a treatment variable (either in the form of a dummy or a continuous variable indicating treatment intensity) with time and region fixed effects. A recent literature has identified overlooked sources of bias in the 2WFE models and put forward an array of estimators robust to these biases (Callaway & Sant'Anna 2021; de Chaisemartin & D'Haultfœuille 2020; Goodman-Bacon 2021; Sun & Abraham 2021).

Instrumental variable designs (IV) are estimated in two steps. In the first stage regression, one estimates the effect of the reform *R* on an otherwise endogenous regressor of interest D (Angrist and Pischke 2014:132):

$$5)\ D_i = \alpha_1 + \rho R_i + \varepsilon_{1,i}$$

Predictions from this first stage regression ($\widehat{D}$) capture variation in the endogenous variable of interest that is random, in the sense that it is uncorrelated with potential sources of bias (W in Eq. 1 above). A valid instrumental variable must satisfy the relevance condition (a strong first stage relationship) and exclusion restriction (no direct effect of an instrumental variable (R) on the outcome of interest (Y)). $\widehat{D}$ is then used as the independent variable in a second stage regression (Angrist and Pischke 2014:133):

$$6)\ Y_i = \alpha_2 + \beta_{2SLS}\widehat{D}_i + \varepsilon_{2,i}$$

2.3 Regional scope and search strategy

The aim of this chapter is to give an overview of the effects of policies related to fertility in low-fertility contexts. This encompasses most of Europe and Northern America, as well as

regions in East Asia, Israel, Australia and New Zealand. Central and South America, and Africa are excluded as high fertility contexts (World Bank 2022).

The counterfactual of a reform effect will differ substantially by study context. The effect of one additional year of parental leave will likely depend on whether the alternative is public childcare, costly market-based childcare or informal care arrangements such as unpaid care at home by the parents or other relatives. Of the evidence available, a large share is from the Nordics and Central Europe. While Nordic countries are characterized by extensive public support to families, Central European countries are known for a more traditional division of labor and scarce universal support to families (Esping-Andersen 1990). Evidence is scarce from Southern Europe, which has rudimentary support to families. Studies from the Anglo-Saxon countries are relatively many but especially concentrated on specific policies (health and parental leave) or regions (the Canadian region Quebec). We found one relevant study from Eastern Europe and none from Australia and New Zealand with sufficiently good identification. Parts of Asia, including South Korea, Japan, and Singapore, have experienced a rapid decline in fertility and relatively recently implemented policies targeting fertility. There is little evidence from the Asian context. The exception is South Korea and Israel, and we include recent studies on estimating its policy effects on fertility.[1]

[1] The starting point for the literature presented is systematic search conducted in 2019 (see Fauske et al. 2020). The search comprised studies that used fertility as the outcome, a policy such as specified above as the key explanatory variable, and (quasi-)experimental methods. The search was further restricted according to several pre-set criteria about the study population, type of policy, comparison groups, outcome, and study design, yielding a final sample of thirty-five articles (see Bergsvik et al. 2021). An additional search was conducted in 2023, expanding the scope to low-fertility contexts in general and updating with newer results.

3. Results from empirical studies

This Section summarizes the results from the literature on the causal analysis of policies affecting fertility: public childcare, parental leave, direct financial incentives and health services in low fertility contexts. On the one hand, the findings in the literature overall suggest that the policies are effective in increasing fertility when they reduce the costs of childbearing (holding all other factors constant or ceteris paribus). However, there are some policies that either have no impact on fertility or even a negative one. This is true for paternity leave in particular, that aims to shift some of the unpaid work from mothers to fathers.

3.1 Public childcare

Childcare reforms reduce the work-family conflict for parents by increasing the availability and lowering the cost of formal care (Presser and Baldwin 1980). Childcare reforms exhibit another social profile than parental leave reforms since they also impact stay-at-home mothers, relieving their care load. Thus, an increase in fertility may also be observed in this group as a consequence of childcare reforms. Evidence on the effects of childcare reforms is mainly derived from expansions in Central Europe and the Nordic countries. However, we also include evidence of the fertility effects of marked based child care from Southern Europe.

Solid evidence indicates enduring positive effects on fertility resulting from expansions of public childcare in both Nordic and Central European countries. Rindfuss et al. (2010) found lasting and substantial effects of a Norwegian expansion where each percentage point increase in childcare availability for preschool children led to a corresponding 0.7 percent increase in the number of children among women at age 35 (Rindfuss et al. 2010). The most substantial effects were observed for second and higher-order births, exhibiting a 0.6 and 1.1 percent increase for each percentage point increase respectively (Rindfuss et al. 2010).

Evidence from a comparable German reform also demonstrated positive effects, showing a 0.3 percent increase in fertility overall per percentage point increase in childcare coverage for children below age three. The effects were however concentrated at second and third births (0.2 percent for first births, 0.4 percent for second births, and 0.7 percent for third births) (Bauernschuster et al. 2016). Another study examining the same reform using a Cox hazard model (including DiD) found that effects were robust after accounting for internal migration. An increase in childcare coverage increased the probability of first birth among employed native childless couples(Schuss & Azaouagh 2023). No such effect was found regarding the transition to second births. The increase was mainly driven by highly educated women.

Huber (2019) analyzed the variation in childcare supply expansion across counties in Germany for children under three in a generalized difference-in-difference design and found a positive impact on fertility. The effects were driven by women in careers with high child-related costs, such as occupations with steep age-earnings profiles or in jobs where tasks cannot easily be allocated to others.

Another study examines a Belgian expansion in childcare coverage among dual-earner couples and found considerable effects (Wood & Neels 2019). Similar to Schuss and Azaouagh (2023)'s findings, it was in particular first-birth rates that increased. The Belgian study found an increase of 2.3 percent per percentage point increase in coverage (Wood & Neels 2019). Although the increase in second (third) birth rates is smaller (1.2 (1.7) percent), it is still substantial. The stronger response at first births may indicate that the effect is (partly) temporary. However, since the observation period is relatively shorter, measurement of policy effects on completed fertility is more vulnerable to errors.

Although comparison is facilitated by scaling the effect sizes per percentage point increase in childcare coverage, the procedure hides that the expansions were large, and thus that the total effect of childcare provision is substantial. In Norway, the expansion happened over the course of several decades and resulted in an increase in childcare coverage from 0 to 60 percent. This gave a cumulative reform effect of 44 percent.

Evidence from Italy also indicates that an increase in the supply of marketable childcare had positive effects on fertility. Using a DiD analysis, Mariani and Rosati (2022) found that a large inflow of migrants in 2007, where many specialized in child-care, increased native births by 2 to 4 percent. Thus, this suggests that an increase in the supply of public childcare would be effective. Also lowering the cost of public childcare is found to have a positive impact on fertility. In Sweden, a reform was announced in 1998 and executed in 2002, where the cost of public childcare was reduced and standardized across municipalities. Using a DiD design, Mörk et al. (2013) analyzed the variation in change by household type across municipalities. They found an increase of 9.8 percent in first births among married couples already in 2000 when the reform was only announced but not yet implemented. This finding suggests announcement effects among couples without prior children. Effects were most pronounced in low-income households.

3.2 Parental leave

Parental leave policies aim to enable new parents to take time off to care for their newborns. Parental leave can include job security, i.e. the right to return to the pre-birth job after the leave, and/or monetary compensation for the duration of the leave period. When parental leave includes pre-birth earnings compensation instead of a fixed transfer, the value will be higher for parents with higher earnings.

Introductions, changes, and revocations of both paid and unpaid parental leave are analyzed in Anglo-Saxon, Central European, Nordic and Asian countries. Significant and substantial effects on fertility were found both for large parental leave reforms in Central Europe and South Korea, and for moderate expansions from short or non-existent leaves in Switzerland and the United States. In these contexts, public childcare is limited, especially for younger children, so the implementation of (paid) parental leave prevents job loss or serves as a substitute for unpaid leave, costly marked-based care or other informal care arrangements. Smaller extensions of parental leave and paternity leave were analyzed in several studies, especially from Nordic countries, but did not give measurable effects. As mothers typically use sharable parental leave more, the discussion aligns with the effects of maternity leave.

First, a small extension of the mandatory prenatal leave from 6 to 8 weeks in 1974 had no effect on subsequent fertility behavior among women in Austria (Ahammer et al. 2020). Yet, in 1990 an Austrian reform, which extended the parental leave period from 12 to 24 months, yielded a 5.7 (14) percent increase in the probability of another birth within 10 (3) years among mothers eligible for extended leave (Lalive & Zweimuller 2009). Supporting evidence of positive short-term effects on the probability of another birth was found by Danzer et al. (2022), who analyzed the same reform, separating communities with and without nurseries. In communities with nurseries, they observe an insignificant long-term increase in the number of children. Conversely, reducing the leave period from 24 to 18 months six years later did not affect births within three years (the longest observed timeframe), although births were rescheduled to earlier points within this window (Lalive & Zweimuller 2009).

In 2007, the structure of German maternity leave benefits underwent a huge transformation: they shifted from flat, means-tested transfers available for up to 24 months following birth to a system that compensated for pre-birth earnings within a 12-month

timeframe. When comparing the likelihood of subsequent births for mothers who gave birth shortly before and after this reform, Cygan-Rehm (2016) identified an insignificant decrease in births within 57 months in the main sample. Among mothers with lower earnings who were adversely affected by the loss of the extended flat-rate benefit, the reform resulted in a significant reduction in the probability of having another child within 21 and 45 months.

Another study conducted by Raute (2019) analyzed the same reform, distinguishing between the long-term "losers" (lower educated/lower earners) and the long-term "winners" (higher educated/higher earners). As benefit levels varied for these groups' future children and first births, the estimated effect of the reform captures a larger portion of the total reform effect on the target group. This likely accounts for the notably larger reform effect estimates, namely a 16 percent increase in the annual probability of births, concentrated at first and second parity. While the effects are evaluated over a span of up to five years subsequent to the reform, the significant impacts observed among the older age groups suggest that the effect is enduring rather than temporary.

In Switzerland, the share of first-time mothers who had a second child rose by three percentage points after 2005 when a universal 14-week paid maternity leave was introduced (Girsberger et al. 2023). Effects were observed both in the short and long run (after nine years) and driven by mothers who were employed in firms that already offered leave before the reform (explained by a trickle-down effect), as well as mothers in regions with relatively high childcare availability. Hence, subsequent fertility was mainly raised among mothers who could rely on additional support systems beyond the leave, such as childcare or firms providing additional benefits.

Similar to the Swiss case, relatively large effects of more moderate expansions are also found after the introduction of parental leave in the Anglo-Saxon context. Potentially, the

impacts are more pronounced when there are expansions from non-existent or short leave periods since there are limited viable alternatives for providing parental care to newborns.

Evidence from the Anglo-Saxon context comes amongst others from the implementation of 12 weeks of unpaid job-protected parental leave in 1993 in the United States. Using women who were eligible and those who were not eligible as comparison groups, Cannonier (2014) finds that job protection led to a yearly rise in the likelihood of first and second births by 1.5 and 0.6 percent. Since then, several states have independently added a paid family leave system, with California being the first in 2004. Using a difference-in-differences approach on data encompassing all U.S. births, Golightly and Meyerhofer (2022) find that paid leave availability boosts fertility in California by almost three percent. This rise is attributed to higher-order births among mothers in their 30s (4.5 percent increase), Hispanic mothers, and births among those with high school education. Supporting evidence for the positive effects of the introduction of paid leave is in the same study also provided by a parallel analysis of the introduction of paid leave in New Jersey in 2009, and by another analysis of Californian data by Bana et al. (2020). Using the earnings threshold that defines the received benefit amount for identification in a regression kink design, Bana et al. (2020) find that higher benefits give a higher likelihood of subsequent benefit claims, partly explained by more frequent returns to the pre-birth employer.

In the Nordic context, between 1987 and 1992 there were six minor extensions of 3-4 weeks to the Norwegian parental leave which are analyzed by Dahl et al. (2016) in a regression discontinuity design. Comparing the number of children 14 years later among mothers giving birth just before and just after each extension, only one extension yielded a marginally significant effect (+1.6 percent, $p< 0.1$). Similarly, extending the Swedish paid parental leave period from 12 to 15 months in 1989 yielded a relatively precise zero effect in Liu and Skans'

(2010) DiD-analysis of the reform. They estimated an insignificant increase of 0.2 percent ($p>0.1$) in the number of future children in the main sample and a temporary increase in highly educated mothers' fertility. Both studies in Nordic settings compare outcomes for mothers who have varying experiences with leave regarding their current children while sharing identical expectations of leave for any potential future child. In addition to the absence of differences in benefits for future children, they examine incremental reforms of modest magnitude, increasing the likelihood that the estimated effect of the reform will be notably smaller compared to the overall impact of the reform.

Evidence from Eastern Europe is only found from one Romanian study. Tudor (2020) analyzes the effect of a reform that improved maternity leave benefits in Romania using a differences-in-differences design. She finds positive effects on birth, driven by a reduction of induced abortions.

Similarly, there is little causal evidence on the efficacy of parental leave policies on fertility in the Asian context (Thomas et al. 2022). First, while parental leave has been generally available in this context, the uptake rates have stayed substantially lower, compared to the other western countries due to social norms resulting in low female labor force participation and unequal gender division of childcare (Lee 2022; Myong et al. 2021). Second, the countries with low fertility rates have recently reformed their parental leave policies and seen an untick in the uptake. One exception is Kim et al. (2022), who estimated the causal effect by leveraging the expansion of paid maternity leave benefits in 2011 in South Korea. Prior to the reform, working mothers received 500 USD regardless of their income. The reform increased the amount for working mothers earning more than 1,250 USD by 0.40 USD for each additional dollar of income (capped at 1,000). Based on a DiD design and a complementary regression kink design, they estimated an increase in conception by about 2.4 percentage points (arc-elasticity of 0.65)

and a decrease in contraception by 3.5 percentage point (arc-elasticity of 0.1), leading to an overall increase in fertility.[2]

Variations in both the reforms themselves and the analytical approaches across different study contexts result in a lack of conclusive evidence to determine whether the effects are influenced by the specific context. Yet, if the most weight is given to studies that use substantial changes and capture future child effects, it appears evident that introducing or generously prolonging parental leave has positive short- and long-term effects on fertility. When it comes to designated paternity leave, evidence is more equivocal.

Paternity quotas might compensate for the opportunity costs of mothers but might at the same time increase fathers' opportunity costs, potentially reducing fertility. These quotas were introduced as a reaction to the fact that mothers predominantly take parental leave, with the aim of encouraging more balanced gender roles in paid work and caregiving. Paternity quotas are implemented by allocating weeks of existing parental leave specifically to fathers or by incorporating additional weeks designated for fathers into the overall parental leave period.

In the Nordic countries, introductions and extensions of paternity quotas are extensively evaluated. For instance, the Norwegian introduction was analyzed by Cools et al. (2015), while Duvander et al. (2020) combined an analysis of the Swedish and Norwegian implementation and Hart et al. (2022) analyzed a Norwegian extension. None of these studies found significant effects of paternity leave on fertility in their main samples. This applies in both the short term and the long term. Moreover, each gradual adjustment to the paternity quota is minor, and the analytical designs employed solely identify current child effects. Despite varying experiences, parents in both the treatment and control categories will share an identical paternity quota if

[2] Based on OLS and structural estimations, Lee et al. (20009) and Yamaguchi (2019) provide evidence that the parental leave policy in Japan had a positive effect on fertility.

they have an additional child. Consequently, these analytical approaches only capture a fraction of the overall effects of the reform. Thus, the lack of observable effects should not be misconstrued as evidence of no impact.

Meanwhile, there is evidence of negative effects of paternity leave on fertility from Southern Europe (Farré & González 2019). In 2007, Spain implemented 13 days of fully compensated paternity leave as a direct response to the fact that the 10 weeks of parental leave offered since 1999 were predominantly utilized by mothers. According to results from Farré and González (2019), who analyzed this reform with a RD approach, introducing paternity leave led to a 5 percent decrease in fertility. The negative effects align with fathers' heightened opportunity costs, yet the effect size is noteworthy, considering the relatively minor increase in their opportunity costs. Contrary to the Nordic studies, the Spanish study exclusively analyzes changes in future child benefits, thereby giving reform effect estimates more proximate to the total effect of the reform.

3.3 Direct financial incentives

Direct financial incentives include cash transfers, baby bonuses and tax breaks. These policies can increase fertility through reducing the costs of current and future children and may have positive effects on fertility. Alternatively, these incentives could increase the investment in each child, c.f. "child quality", leaving fertility unaffected (Becker 1991).

Evidence on financial incentives from contexts with extensive support to families is taken from Canada, Norway and France. Milligan (2005) analyzes the effect of a substantial increase in transfers in Quebec in 1988 in a difference-in-difference design with the rest of Canada as controls. Results suggest a 12 percent fertility increase due to the reform. The transfer increase was largest for third births, and the largest effect is found at this parity. This indicates an effect on completed fertility, but some uncertainty remains given an observation period of

five years. Malak et al. (2019) analyze the same reform in a similar design with data for a longer follow-up period, and find evidence for lasting effects on completed fertility. Parent and Wang (2007) estimate effects of a similar reform in the 1970s. They find an increase similar to that of Milligan (2005) in the short (5 year) run, but no effect in the long (15 year) run. An increase in transfers to families with children in Northern Norway was found to increase fertility, driven mainly by women in their early 20s (Hart & Galloway 2023). El-Mallakh (2021) studied the effect of conditioning and restricting child allowances in France using a regression discontinuity design. She found that the discontinuation decreased fertility. As in Northern Norway, the effect was driven by women of younger ages, pointing to timing effects rather than effects on completed fertility.

From Central Europe, Chuard and Chuard-Keller (2021) studied a Swiss increase in baby bonuses in some regions (cantons) but not others, using a two way fixed effects design. Results suggest a temporary 5.5 percent increase in fertility. Riphahn and Wiynck (2017) analyzed a German reform in 1996 that increased subsidies for first births among low-earning couples. High-earning childless women faced no change and are the control group. Birth rates of low-earning women fell relative to high-earning women, contrasting expectations from incentives. Benefits for second births increased among high-earning couples only, making low-earning women a control group. In line with incentives, birth rates increased relatively more for high-earning couples. A regional reform in East Germany 2006 gave at least 150 euros monthly (increasing in family size) to families with 2-year-olds not in public childcare. Using a regional difference-in-difference design, Gathmann and Sass (2018) found positive effects on higher-order births (4-year run). The effects were concentrated among groups more likely to choose home care, such as large families, single mothers and foreign born mothers.

Transfers also have a positive effect on fertility in contexts with less public support to families. A substantial universal child benefit was introduced in Spain in 2007 to curb fertility decline. The introduction gave a 5 percent increase in fertility in the 2.5 year-run (González 2013). It also impacted fertility in the longer run, an effect driven by high-skill parents (González and Trommlerová 2023). The retraction of the benefit in 2010 reduced fertility, an effect concentrated among low-skilled and non-working parents (ibid.). In Italy, Boccuzzo et al. (2008) studied the effect of a regional baby bonus on fertility in a difference-in-difference design. They find a positive effect, concentrated among poor women with at least two children.

Cohen et al. (2013) exploited variation in child subsidies in Israel, and found a positive effect of transfer increases on fertility. Interestingly, they found that effects were largest in the highest income brackets. In South Korea, local governments began providing cash transfers to families with a newborn(s). Leveraging the spatial and temporal variation in policy implementation timing and cash-transfer generosity across birth parity, using administrative birth registry records, Kim (2023) estimated 1 to 5 percent increase in birth rates and provide evidence that the cash transfers increased completed fertility. In addition, the cash transfers partly explained the recent decline in the unnaturally high boy-to-girl ratio among higher-parity births by increasing the number of girls being born.

There is also some evidence on the fertility effects of introducing basic universal income, which pertains to a financial incentive for childbearing. Yonzan et al. (2020) assessed the effect of the establishment of the Alaska Permanent Fund Dividend in 1982. They found an increase in fertility using a synthetic control approach. Dökmeci et al. (2023) used data from the income experiment in Manitoba, Canada, where participants from low-income households were randomly assigned to received guaranteed annual income at different levels. Their results suggest substantial fertility increases (between 7 and 10 percentage points).

Overall, there is quite solid evidence that financial incentives affect fertility. Most studies estimate effects in the short or medium run, but there is also increasing evidence of lasting effects on completed fertility (González & Trommlerová 2023; Malak et al. 2019).

3.4 Health services

When public health care is not offered, a large share of the immediate costs of having a child are due to perinatal care and health services for the child. Cheaper health services reduce both the cost of children and regulation costs, and the effects of such reduction depend strongly on age group.

The health insurance system in the United States varies across time at the regional (state) level, making it useful for studying how access to healthcare affects fertility. Most of the studies included in this review are based on US reforms and data. The only study from another context is a German study investigating the effect of a home visiting program related to first births.

Cheaper infertility treatment increased fertility among women reaching the latter stages of their reproductive years. Among (white) women aged 35 and above, infertility treatments covered by insurance led to a 32 percent rise in birth rates (Schmidt 2005). In the youngest age groups, having access to health insurance led to a decrease in fertility, likely due to lower expenses related to regulation costs. The implementation of the Affordable Care Act ("Obamacare," ACA) in 2010 lowered health care expenses for young adults, since they were eligible to be covered by their parents' insurance. Research (Heim et al. 2018) and 10 percent (Abramowitz 2018). In the youngest age group, fertility was reduced due to a reduction in regulation costs (contraception).

Unlike the substantial effects presented above, quasi-experimental findings indicate that the state-specific Medicaid has no or negligible effects. Medicaid, a means-tested public insurance program, covers a substantial portion of expenses related to perinatal care, childbirth,

and health services for low-income families in the US. Using a 2WFE design, a 5 percent increase in fertility was found, though the estimates were not significant in the main sample ($p > 0.1$) (Joyce et al. 1998). A marginal decrease of 0.2 percent in fertility ($p < 0.1$) has been suggested using this design (Deleire et al. 2011) or, a precisely measured yet modest 0.9 percent ($p < 0.05$) elevation in fertility from a 100 percent expansion of the in the eligibility threshold (Zavodny & Bitler 2010). It is possible that the socio-economic segments impacted by Medicaid changes exhibit a weaker response to financial incentives compared to the groups affected by ACA, in line with what was observed in the case of transfers (Milligan 2005).

Although the evidence indicates no overall effect, a small decrease in fertility rates among those having three or more children ($p < 0.01$), and among unmarried ($p < 0.05$) and native subgroups of low-income women ($p < 0.01$), and among certain age groups ($p < 0.01$) was reported. No decrease in first births was found (Eliason et al. 2022; Gartner et al. 2022). Additional findings indicating subgroup effects suggest small, yet significant effects from Medicaid expansions among young adults (18-24) based on a DiD design ($p < 0.05$) in Gartner et al. (2022). Nonetheless, no overall effect was found.

In line with the other studies, Palmer (2020) found no effect of the Medicaid expansion on fertility. However, using two simulated eligibility measures (Medicaid and non-Medicaid subsidized insurance (NMSI)), the findings suggested that a 10 percentage point increase in the NMSI eligibility increased the birth rate of 1.6 ($p < 0.001$) and 2.3 ($p < 0.01$) percent, depending on age group (20-35 and 36-45, respectively).

Three studies examine the impact of health services across various age groups, socioeconomic strata, plus among immigrant groups. First, in the period 1974-1979, six US cities randomly allocated families to separate health insurance programs. Among those allocated to a full-coverage plan with free health services, the birth rate surged by 29 percent in

contrast to the control group within two-three years (Leibowitz 1990). It is possible, however, that these effects were a temporary response to the experiment; if people gain knowledge about future increases in healthcare expenses, they may have paced up childbearing.

Second, a precursor to the ACA was implemented in Massachusetts in 2006, leading to a notable 8 percent reduction in fertility among unmarried women in the age group 20-34, a group where unplanned births are relatively common (Apostolova-Mihaylova & Yelowitz 2018). Among married women in the corresponding age bracket, fertility exhibited a modest 1 percent rise, which aligns with the Medicaid effect sizes. Among married, this is an age group that is likely to have intentions of having a(nother) child in the near future.

Third, by using a DiD design, Dasgupta et al. (2022) investigated the effects of the State Children's Health Insurance Program (SCHIP) which was enacted in all the United States between 1997 and 2000. The program offered publicly funded health insurance coverage for children in low-income families. However, only 15 states initially provided coverage for children of newly arrived immigrants. Thus, by exploiting this state and time variation, they found that the SCHIP eligibility increased the probability of having a childbirth between 1.8 and 2.4 percentage points ($p < 0.01$) among unmarried immigrant women in their reproductive years, depending on methods and sample.

Evidence obtained from a randomized controlled trial of a home visiting program providing midwife visits among first-time mothers in Germany suggests an increased subsequent birth rate by 6.4 percentage point ($p < 0.05$) (Sandner 2019) .

3.5 Selectivity and sources of bias

Publication bias refers to the fact that studies rejecting the null are more often published, so that the body of evidence gives a distorted impression of reality (Ioannidis 2008; Simonshohn et al. 2014). Previous studies have found evidence of p-hacking in the quasi-experimental literature

in general (Brodeur et al. 2020). Bergsvik et al. (2021) also find a tendency of the same in an analysis of quasi-experimental studies of effects of family policy on fertility. In itself, this would make the literature overstate the impact of policy on fertility.

Subsample estimation amplifies the challenges linked to false positives: With ten subgroups, every second study will have a false positive at the 5 percent significance level. A number of the included studies test and report subsample results along a number of stratification lines. In general, subsamples with significant effects tend to be emphasized in abstracts and conclusions. In absence of a pre-registered analysis plan, cannot be determined whether stratification variables were post-hoc motivated, and whether the results reported represent the complete number of subsample tests performed. This underlines the importance of detailed pre-registration of planned analyses to ensure credibility of future quasi-experimental studies.

Given the evidence of publication bias, it would be unsurprising if researchers ignored smaller policy changes and focused on large reforms that could plausibly lead to large and significant effects on fertility. This literature review suggests the opposite: many studies focus on changes in very small increments, or use designs that capture only a fraction of the total reform effect. As a consequence, it is often plausible that the total reform effect could be non-zero, even if the estimated reform effect is zero. One common example of this is that reforms that change the cost of future children are analyzed by comparing fertility responses between parents receiving differential treatment for current children onlyt (see Lalive and Zweimüller 2009; Raute 2019).

4 Discussion

Overarching conclusions by policy type are summarized in Box 2.

[BOX 2 ABOUT HERE]

4.1 Regional differences

There is solid evidence of positive effects of childcare in both the Central European and Nordic countries (Bauernschuster et al. 2016; Mörk et al. 2013; Rindfuss et al. 2007, 2010; Wood and Neels 2019). In the Nordic countries, parental leave reforms have happened in small increments, so that the total policy effect likely exceeds the estimated reform effect substantially (Dahl et al. 2016; Liu and Skans 2010). Studies of more substantial policy changes in Central Europe and South Korea suggest substantial positive effects on fertility (Girsberger et al. 2023; Lalive and Zweimüller 2009; Kim et al. 2022; Raute 2019). Effects are comparable across country contexts. The studies on parental leave that do heterogeneity tests by other support system availability show stronger effects when eg. childcare supply in a region within the country is high (Danzer et al. 2022; Girsberger et al. 2023).

Heterogenous and context specific effects of policies

- Childcare expansions have a substantial positive impact on fertility in both Nordic and Central European countries
- Financial incentives have a positive impact across contexts. Effects are generally larger for higher-earning couples
- Improved health insurance reduces fertility in young adulthood (through contraception), and increases fertility at higher ages (through ART)
- Substantial parental leave reforms impact fertility across contexts. Effects are heterogenous by women's socioeconomic status depending on how close the parental leave is tied to employment.

Job-protected parental leave and paid family leave has a positive impact on fertility in the U.S. (Cannonier 2014; Golightly and Meyerhofer 2022). Evidence from health insurance reforms in the U.S. also suggest that public health care can reduce unplanned births among young adults, and increase planned births at higher ages. Several studies use data from the Canadian region Quebec. However, the extensive support to families in this region makes it more comparable to the Nordics than to the U.S. Overall, studies of financial incentives suggest that they impact fertility in a range of contexts,

such as Spain (González, 2013), Israel (Cohen et al., 2013), South Korea (Kim 2023), Canada (Malik et al. 2019), and Norway (Hart and Galloway 2023).

4.2 Heterogeneous effects

Theory predicts that policies that reduce the opportunity cost of child rearing (e.g. child care and parental leave) would be comparatively more important for mothers with higher earnings potential, often proxied by the degree and field of education (Becker 1991). Similarly, one may expect that mothers with lower earnings potential respond more to incentives regarding the monetary costs of childbearing, such as cash transfers. The latter prediction is, however, contested, as it depends on how the demand for both quality and quantity of children changes with income potential (Becker, 1991).

The review suggests that responses to parental leave reforms depend on the earnings potential: among low-earning women in Germany, the loss of a long flat-transfer leave reduced births in the short-run (Cygan-Rehm 2016). On the other hand, higher educated and higher earning women had a relative increase in fertility when earnings compensation of parental leave improved in both Germany (Raute 2019) and Sweden (Liu and Skans 2010). Evidence from both Austria and the U.S. supports that (flat-rate) transfers are more important for lower educated and low-wage women, and job protection is more important to higher educated women, or women in white- and blue collar occupations (Lalive and Zweimüller 2009; Cannonier 2014; Golightly and Meyerhofer 2022).

While it would be of interest to see heterogeneous responses to childcare reforms, studies of these were rarely stratified by (prospective) parents' socioeconomic background (Bauernschuster et al. 2016; Rindfuss et al. 2010). In accordance with expectations, a reform reducing the price of childcare in Sweden saw the strongest effects on fertility in low-income

households (Mörk et al. 2013). Similarly, cheaper health services had stronger effects on the fertility of lower- or high-school educated women.

When results for transfers were stratified by income or education, effects were strongest in the higher income population in Canada (Milligan 2005), Germany (Riphahn and Wiynck 2017) and Israel (Cohen 2013). In contrast to this, Kim (2023) showed that lower educated mothers and low income families responded more to the cash transfers in South Korea. The diverging results are noteworthy in light of the ambiguous predictions from theory. However, the differentials by context suggest that contextual factors shape the relationship between transfers and fertility.

4.3 Does pro-natalist intent matter?

The policies reviewed here differ substantially in their intent, and this could in theory affect the fertility response in its own right. On one hand, a pro-natalist intent could amplify the effect, as it conveys that childbearing is valued and supported. For retraction of welfare benefits, there is some evidence that the normative message to reduce childbearing while on benefits affects fertility in its own right (Jagannathan et al. 2010). On the other hand, explicit pro-natalist intent has been controversial in liberal democracies, and such intent could also backfire and mute policy effects (Botev 2015).

In the Nordic context, the primary aim of family policies has been to secure a good upbringing of children from all social backgrounds, and to facilitate high maternal labor supply. Positive impact on fertility has been considered a welcome side effect, that comes about as policies reduce the opportunity cost of childbearing (Hart and Holst 2022). In more recent expansions of family policies in Central Europe, the expectation of pro-natalist effects for certain population groups, such as highly educated women and dual-earner couples, has been more explicit (Raute 2019). In the U.S., the expansion of parental leave rights has lagged

substantially behind other OECD countries. When introduced, they have been motivated as a way to ameliorate motherhood wage penalties (Golightly and Meyerhofer 2022). Given that the largest effects are found in Central Europe and the U.S., reform intent does not seem to be decisive for reform effects.

Cash transfers have been used to combat social inequality and reduce child poverty (Milligan 2005), to make a region more attractive (Hart and Galloway 2023), but also with the explicit aim to increase fertility (Kim 2023). Again, the impact of cash transfers does not seem to vary systematically with their intent.

In sum, the review suggests that the reform content, rather than the reform intent, shapes the fertility response.

4.4 Agenda for future research

The literature studying the causal policy effects on fertility has expanded in the past couple of decades, reflecting the growing interest in policies with potential to impact fertility particularly among countries experiencing low (and declining) fertility. As surveyed in this chapter, researchers have put forth careful analyses of these policy options influencing a childbearing decision. Nonetheless, the robust findings and richness of the previous literature further stipulate future research to better understand not only their efficacy, but also their cost-effectiveness in raising fertility and how these policies affect the overall economic wellbeing, for instance, through their impacts on the demographic composition and the labor and housing markets.

First, evidence on the long-run effects of these policies is limited in the previous literature, except for a few contexts with a longer history of these policies in place (see e.g. Rindfuss et al. 2010 for Norway, Malak et al. 2019 for Canada). Many of the policies discussed

in this chapter have been recently implemented, and an important venue for future research is to evaluate their long-term impact. Such long-run effects could then also be seen in conjunction with effects on the health and educational outcomes of the children born under the policies (Kim 2023). On a similar note, the empirical setting of the previous literature is concentrated mostly in the Western countries. Causal analyses in different contexts would enable us to understand how the policy effects may or may not differ by institutional background and socioeconomic conditions, thereby enhancing the external validity of the findings in the literature.

Second, the current literature lacks evidence on the additive and interactive effects of different types of policies. Most previous literature has focused on one of these policies to cleanly identify its policy effect. One of a few exemptions is Girsperger et al. (2023), who studied parental leave and childcare supply together in the context of Switzerland. It is often the case that several policies, if not all, that we discussed in this chapter are in place simultaneously; for example, in the cases of Spain and South Korea where the introduction of cash transfers and expansion of parental leave took place simultaneously. While this does not necessarily pose threats to identification, it would be important to understand how these policies interact, especially because each policy affects childbearing decisions through different channels (i.e., monetary costs of childbearing and parental labor supply). It is challenging to find independent policy implementations or changes that would generate exogenous variation on two or more different policies. Alternatively, a rich heterogeneity analysis (e.g., the heterogeneous effects of cash transfers by length of maternity leave) would shed light on the interaction between policy tools.

Third, the future research may investigate the general equilibrium ramifications arising from these policies. Changes in the average family size and the demographic composition at the population level and in the labor market (or undoing these changes) would engender economy-wide impacts: such as, housing prices and wages, that could again impact the capacity of policies to impact fertility. For instance, in a context where women in reproductive ages shoulder substantial informal care for elderly relatives, marginal increases in child care supply may be less efficient in increasing fertility. Future research in this area would allow researchers to quantify the welfare consequences of policies affecting fertility and help policy makers to better design family policies.

5 Concluding remarks

This chapter summarized studies on the effects of policies on fertility. The review supports that family-friendly policies contribute to high fertility, and that cross-country variation in fertility is at least partly due to different family policies.

Public childcare and parental leave stand out as large reforms with substantial effects on fertility. Together, they go a long way in reducing the opportunity cost of childbearing for mothers: The evidence on effects of these policies is largely from contexts where opportunity costs were relatively high (Norway in the 1970s and Central Europe in the 2000s). The combination of compensated parental leave and subsidized child care allows women to retain their jobs while caring for a newborn, and later return to paid work. Thus, a much apprised side effect can also be increased maternal labor supply (Gauthier 2007; Goldscheider et al. 2015).

Reserving a share of the parental leave for fathers does not seem to have the same positive impact on fertility, with results suggesting a negative effect in Spain and no effect in the Nordic countries. Paternity quotas reduce mothers' opportunity costs by transferring work

to fathers and increasing their opportunity costs. It is less than surprising that this shift in opportunity costs within the household is not found to increase fertility. It should be noted, however, that the included studies assess relatively small changes in paternity leave, and that changes in maternity leave of the same magnitude had no impact on fertility. Results suggest, however, a more gender egalitarian division of household work is no magic bullet to increase fertility.

Declining fertility goes together with a marked increase in the age at first birth. The review showed that offering fertility treatment had positive effects on fertility. With an increasing share of births to older mothers, assisted reproduction may be more decisive for total fertility rates in the future (Sobotka et al. 2020). Parents using assisted reproduction have higher socioeconomic status on average (Imrie et al. 2023), and children conceived by assisted reproduction seem to have equal academic outcomes to those conceived naturally (Kennedy et al. 2023). As such, this policy does not seem to have any unintended negative consequences at the individual or societal level.

Introductions of and reforms in policies with potential to impact fertility usually tend to balance several goals. While child development and maternal labor supply are common motivations, pro-natalist effects are mentioned increasingly often as fertility rates continue to decline. Understanding heterogeneity in responses, and responses across multiple domains, is crucial to capture the total impact on society. Earnings-compensated parental leaves implies a substantial redistribution toward higher-earning couples (Dahl et al. 2016). On the other hand, subsidized child care has potential to reduce inequalities in health, educational attainment and earnings (Campbell et al. 2014; De Haan and Leuven 2020). If reducing inequality is a goal, policy makers should emphasize in-kind services. In particular, improvements in childcare coverage and quality should take priority over compensating very long parental leaves.

Acknowledgments

Hart's work was supported by the Norwegian Research Council under the Centers of Excellence funding scheme (#262700). Bergsvik's work was supported by the Norwegian Research Council through the Fertility decline research project (#287634). Fauske's work was supported by the European Research Council under the European Union's Horizon 2020 research and innovation program (#818420).

References

Abramowitz, J. (2018). Planning parenthood: the Affordable Care Act young adult provision and pathways to fertility. *Journal of Population Economics*, *31*(4), 1097-1123.

Ahammer, A., Halla, M., & Schneeweis, N. (2020). The effect of prenatal maternity leave on short and long-term child outcomes. *Journal of Health Economics*, *70*, 102250. doi:https://doi.org/10.1016/j.jhealeco.2019.102250

Angrist, J. D., & Pischke, J.-S. (2009). *Mostly harmless econometrics: An empiricist's companion*: Princeton university press.

Angrist, J. D., & Pischke, J.-S. (2010). The credibility revolution in empirical economics: How better research design is taking the con out of econometrics. *Journal of economic perspectives*, *24*(2), 3-30.

Angrist, J. D., & Pischke, J.-S. (2014). *Mastering'metrics: The path from cause to effect*: Princeton university press.

Apostolova-Mihaylova, M., & Yelowitz, A. (2018). Health insurance, fertility, and the wantedness of pregnancies: Evidence from Massachusetts *Contemporary Economic Policy*, *36*(1), 59-72. doi:10.1111/coep.12235

Bana, S. H., Bedard, K., & Rossin-Slater, M. (2020). The Impacts of Paid Family Leave Benefits: Regression Kink Evidence from California Administrative Data. *Journal of Policy Analysis and Management*, *39*(4), 888-929. doi:https://doi.org/10.1002/pam.22242

Bauernschuster, S., Hener, T., & Rainer, H. (2016). Children of a (policy) revolution: the introduction of universal child care and its effect on fertility. *Journal of the European Economic Association*, *14*(4), 975-1005. doi:10.1111/jeea.12158

Becker, G. S. (1991). *A Treatise on the Family*: Harvard university press.

Boccuzzo, G., Caltabiano, M., Zuanna, G. D., & Loghi, M. (2008). The impact of the bonus at birth on reproductive behaviour in a lowest-low fertility context: Friuli-Venezia Giulia (Italy), 1989-2005. *Vienna yearbook of population research*, 125-147.

Botev, Nikolai. 2015. "Could Pronatalist Policies Discourage Childbearing?" *Population and Development Review 41*(2): 301–314.

Callaway, B., & Sant'Anna, P. H. C. (2021). Difference-in-Differences with multiple time periods. *Journal of Econometrics*, *225*(2), 200-230. doi:https://doi.org/10.1016/j.jeconom.2020.12.001

Cannonier, C. (2014). Does the Family and Medical Leave Act (FMLA) Increase Fertility Behavior? *Journal of Labor Research*, *35*(2), 105-132. doi:10.1007/s12122-014-9181-9

Card, D., Lee, D. S., Pei, Z., & Weber, A. (2015). Inference on Causal Effects in a Generalized Regression Kink Design. *Econometrica*, *83*(6), 2453-2483. doi:https://doi.org/10.3982/ECTA11224

Chuard, C., & Chuard-Keller, P. (2021). Baby bonus in Switzerland: Effects on fertility, newborn health, and birth-scheduling. *Health Economics, 30*(9), 2092-2123.
Cohen, A., Dehejia, R., & Romanov, D. (2013). Financial incentives and fertility. *Review of Economics and Statistics, 95*(1), 1-20.
Cools, S., Fiva, J. H., & Kirkeboen, L. J. (2015). Causal Effects of Paternity Leave on Children and Parents. *Scandinavian Journal of Economics, 117*(3), 801-828. doi:10.1111/sjoe.12113
Dahl, G. B., Loken, K. V., Mogstad, M., & Salvanes, K. V. (2016). What Is the Case for Paid Maternity Leave? *Review of Economics and Statistics, 98*(4), 655-670. doi:10.1162/REST_a_00602
Danzer, N., Halla, M., Schneeweis, N., & Zweimüller, M. (2022). Parental leave,(in) formal childcare, and long-term child outcomes. *Journal of Human Resources, 57*(6), 1826-1884.
Dasgupta, K., Ghimire, K., & Plum, A. (2022). Impact of state children's health insurance program on fertility of immigrant women. *Applied Economics Letters, 29*(17), 1631-1643.
de Chaisemartin, C., & D'Haultfœuille, X. (2020). Two-Way Fixed Effects Estimators with Heterogeneous Treatment Effects. *American Economic Review, 110*(9), 2964-2996. doi:10.1257/aer.20181169
De Chaisemartin, C., & d'Haultfoeuille, X. (2020). Two-way fixed effects estimators with heterogeneous treatment effects. *American Economic Review, 110*(9), 2964-2996.
Deleire, T., Lopoo, L. M., & Simon, K. I. (2011). Medicaid expansions and fertility in the United States. *Demography, 48*(2), 725-747. doi:http://dx.doi.org/10.1007/s13524-011-0031-6
Doepke, M., Hannusch, A., Kindermann, F., & Tertilt, M. (2022). *The economics of fertility: A new era*. Retrieved from
Duvander, A.-Z., Lappegard, T., & Johansson, M. (2020). Impact of a reform towards shared parental leave on continued fertility in norway and sweden. *Population Research and Policy Review, 39*, 1205-1229.
Dökmeci, T., Rainer, C., & Schneebaum, A. (2023). Economic Security and Fertility: Evidence from the Mincome Experiment. *Canadian Public Policy, 49*(2), 136-161.
El-Mallakh, N. (2021). Fertility, Family Policy, and Labor Supply: Quasi-Experimental Evidence from France. *Available at SSRN 3969868*.
Eliason, E. L., Spishak-Thomas, A., & Steenland, M. W. (2022). Association of the affordable care act Medicaid expansions with postpartum contraceptive use and early postpartum pregnancy. *Contraception, 113*, 42-48.
Farré, L., & González, L. (2019). Does paternity leave reduce fertility? *Journal of Public Economics, 172*, 52-66.
Fauske, A., Hart, R., & Bergsvik, J. (2020). Protocol for "Effects of policy on fertility: A systematic review of (quasi) experiments".
Gartner, D. R., Kaestner, R., & Margerison, C. E. (2022). Impacts of the Affordable Care Act's Medicaid expansion on live births. *Epidemiology (Cambridge, Mass.), 33*(3), 406.
Gathmann, C., & Sass, B. (2018). Taxing childcare: Effects on childcare choices, family labor supply, and children. *Journal of Labor Economics, 36*(3), 665-709. doi:10.1086/696143
Gauthier, A. H. (2007). The impact of family policies on fertility in industrialized countries: a review of the literature. *Population Research and Policy Review, 26*(3), 323-346. doi:http://dx.doi.org/10.1007/s11113-007-9033-x
Girsberger, E. M., Hassani-Nezhad, L., Karunanethy, K., & Lalive, R. (2023). Mothers at work: How mandating a short maternity leave affects work and fertility. *Labour Economics, 84*, 102364. doi:https://doi.org/10.1016/j.labeco.2023.102364
Goldscheider, F., Bernhardt, E., & Lappegård, T. (2015). The gender revolution: A framework for understanding changing family and demographic behavior. *Population and development review, 41*(2), 207-239.
Golightly, E., & Meyerhofer, P. (2022). Does Paid Family Leave Cause Mothers to Have More Children? Evidence from California. *Journal of Labor Research, 43*(2), 203-238. doi:10.1007/s12122-022-09329-y

González, L. (2013). The effect of a universal child benefit on conceptions, abortions, and early maternal labor supply. *American Economic Journal: Economic Policy*, *5*(3), 160-188.
González, L., & Trommlerová, S. K. (2023). Cash transfers and fertility: How the introduction and cancellation of a child benefit affected births and abortions. *Journal of Human Resources*, *58*(3), 783-818.
Goodman-Bacon, A. (2021). Difference-in-differences with variation in treatment timing. *Journal of Econometrics*, *225*(2), 254-277. doi:https://doi.org/10.1016/j.jeconom.2021.03.014
Harper, S. (2014). Economic and social implications of aging societies. *Science*, *346*(6209), 587-591.
Hart, R. K., Andersen, S. N., & Drange, N. (2022). Effects of extended paternity leave on family dynamics. *Journal of Marriage and Family*, *84*(3), 814-839.
Hart, R., & Holst, C. (2022). What About Fertility? The Unintentional Pro-Natalism of a Nordic Country. In *PAA 2022 Annual Meeting*. Conference proceedings. https://paa.confex.com/paa/2022/meetingapp.cgi/Paper/26290.
Hart, R. K., & Galloway, T. A. (2023). Universal Transfers, Tax Breaks and Fertility: Evidence from a Regional Reform in Norway. *Population Research and Policy Review*, *42*(3), 49.
Heim, B., Lurie, I., & Simon, K. (2018). The Impact of the Affordable Care Act Young Adult Provision on Childbearing: Evidence From Tax Data. *Demography*, *55*(4), 1233-1243. doi:http://dx.doi.org/10.1007/s13524-018-0692-5
Huber, K. (2019). *The role of the career costs of children for the effect of public child care on fertility and maternal employment*.
Imrie, R., Ghosh, S., Narvekar, N., Vigneswaran, K., Wang, Y., & Savvas, M. (2023). Socioeconomic status and fertility treatment outcomes in high-income countries: a review of the current literature. *Human Fertility*, *26*(1), 27-37.
Jagannathan, R., Camasso, M. J., and Harvey, C. (2010). The Price Effects of Family Caps on Fertility Decisions of Poor Women. Journal of Social Service Research, 36(4), 346-361.
Jones, C. I. (2022). The end of economic growth? Unintended consequences of a declining population. *American Economic Review*, *112*(11), 3489-3527.
Joyce, T., Kaestner, R., & Kwan, F. (1998). Is Medicaid pronatalist? The effect of eligibility expansions on abortions and births. *Family Planning Perspectives*, *30*(3), 108-113, 127.
Kennedy, A. L., Vollenhoven, B. J., Hiscock, R. J., Stern, C. J., Walker, S. P., Cheong, J. L., ... & Lindquist, A. C. (2023). School-age outcomes among IVF-conceived children: A population-wide cohort study. *PLoS medicine*, *20*(1), e1004148.
Kim, K., Lee, S., & Halliday, T. J. (2022). Paid childcare leave, fertility, and female labor supply in South Korea. *Review of Economics of the Household*. doi:10.1007/s11150-022-09622-w
Kim, W. (2023). *Baby Bonus, Fertility and Missing Women*. Available at SSRN: https://ssrn.com/abstract=3704188 or http://dx.doi.org/10.2139/ssrn.3704188
Lalive, R., & Zweimuller, J. (2009). How does parental leave affect fertility and return to work? Evidence from two natural experiments. *Quarterly Journal of Economics*, *124*(3), 1363-1402. doi:10.1162/qjec.2009.124.3.1363Lee, Y. (2022). Is Leave for Fathers Pronatalist? A Mixed-Methods Study of the Impact of Fathers' Uptake of Parental Leave on Couples' Childbearing Intentions in South Korea. *Population Research and Policy Review*, *41*(4), 1471-1500. doi:10.1007/s11113-022-09697-4
Lee, S. H., Ogawa, N., & Matsukura, R. (2009). Is childcare leave effective in raising fertility in Japan?. *Asian Population Studies*, *5*(3), 349-369.
Leibowitz, A. (1990). The response of births to changes in health care costs. *Journal of Human Resources*, 697-711.
Liu, Q., & Skans, O. N. (2010). The Duration of Paid Parental Leave and Children's Scholastic Performance. *10*(1).
Malak, N., Rahman, M. M., & Yip, T. A. (2019). Baby bonus, anyone? Examining heterogeneous responses to a pro-natalist policy. *Journal of Population Economics*, *32*, 1205-1246.
Mariani, R. D., & Rosati, F. C. (2022). Immigrant supply of marketable child care and native fertility in Italy. *Journal of Demographic Economics*, *88*(4), 503-533.

Milligan, K. (2005). Subsidizing the stork: New evidence on tax incentives and fertility. *Review of Economics and Statistics, 87*(3), 539-555. doi:10.1162/0034653054638382
Myong, S., Park, J., & Yi, J. (2021). Social Norms and Fertility. *Journal of the European Economic Association, 19*(5), 2429-2466. doi:10.1093/jeea/jvaa048
Mörk, E., Sjögren, A., & Svaleryd, H. (2013). Childcare costs and the demand for children—evidence from a nationwide reform. *Journal of Population Economics, 26*(1), 33-65. doi:10.1007/s00148-011-0399-z
Neyer, G., & Andersson, G. (2008). Consequences of Family Policies on Childbearing Behavior: Effects or Artifacts? *Population and Development Review, 34*(4), 699-724. Retrieved from http://www.jstor.org/stable/25434736
Palmer, M. (2020). Does publicly subsidized health insurance affect the birth rate? *Southern Economic Journal, 87*(1), 70-121.
Parent, D., & Wang, L. (2007). Tax incentives and fertility in Canada: quantum vs tempo effects. *Canadian Journal of Economics-Revue Canadienne D Economique, 40*(2), 371-400. doi:10.1111/j.1365-2966.2007.00413.x
Raute, A. (2019). Can financial incentives reduce the baby gap? Evidence from a reform in maternity leave benefits. *Journal of Public Economics, 169*, 203-222. doi:10.1016/j.jpubeco.2018.07.010
Rindfuss, R., Guilkey, D., Morgan, S. P., & Kravdal, O. (2010). Child-care availability and fertility in Norway. *Population and Development Review, 36*(4), 725-748. doi:http://dx.doi.org/10.1111/j.1728-4457.2010.00355.x
Riphahn, R. T., & Wiynck, F. (2017). Fertility effects of child benefits. *Journal of Population Economics, 30*(4), 1135-1184. doi:10.1007/s00148-017-0647-y
Sandner, M. (2019). Effects of early childhood intervention on fertility and maternal employment: Evidence from a randomized controlled trial. *Journal of health economics, 63*, 159-181.
Schmidt, L. (2005). Infertility insurance mandates and fertility. *American Economic Review, 95*(2), 204-208.
Schuss, E., & Azaouagh, M. (2023). The expansion of early childcare and transitions to first and second birth in Germany. *Bulletin of Economic Research, 75*(2), 476-507.
Sobotka, T., Matysiak, A., & Brzozowska, Z. (2019). Policy responses to low fertility: How effective are they. *United Nations Population Fund*.
Sun, L., & Abraham, S. (2021). Estimating dynamic treatment effects in event studies with heterogeneous treatment effects. *Journal of Econometrics, 225*(2), 175-199. doi:https://doi.org/10.1016/j.jeconom.2020.09.006
Thomas, J., Rowe, F., Williamson, P., & Lin, E. S. (2022). The effect of leave policies on increasing fertility: a systematic review. *Humanities and Social Sciences Communications, 9*(1), 262. doi:10.1057/s41599-022-01270-w
Tudor, S. (2020). Financial incentives, fertility and early life child outcomes. *Labour Economics, 64*, 101839. doi:https://doi.org/10.1016/j.labeco.2020.101839
United Nations. (2018). *World Population Policies 2015*. New York, NY: United Nations, Department ofEconomic and Social Affairs.
Wood, J., & Neels, K. (2019). Local childcare availability and dual-earner fertility: Variation in childcare coverage and birth hazards over place and time. *European Journal of Population*, 1-25. doi:http://dx.doi.org/10.1007/s10680-018-9510-4
WorldBank. (2022). Fertility rate, total (births per woman) - Latin America & Caribbean
Yamaguchi, S. (2019). Effects of parental leave policies on female career and fertility choices. *Quantitative Economics, 10*(3), 1195-1232.
Yonzan, N., Timilsina, L., & Kelly, I. R. (2020). *Economic Incentives Surrounding Fertility: Evidence from Alaska's Permanent Fund Dividend*. Retrieved from
Zavodny, M., & Bitler, M. P. (2010). The effect of Medicaid eligibility expansions on fertility. *Social Science & Medicine, 71*(5), 918-924. doi:10.1016/j.socscimed.2010.05.046