Does an Additional Nephew Increase Fertility? Identifying Fertility Contagion Using Random Fertility Shocks

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Abstract

Fertility contagion through social networks increasingly attracts the interest of demographers. Contagion is expected to be strong between individuals who relatively similar and keep in frequent contact, making it challenging to distinguish network effects from selection. We utilize random fertility shocks to identify fertility contagion – taking contagion between siblings as an empirical example. We draw data from Norwegian administrative registers (N $\sim$ 170 000 men and women), and use twin births and the sex composition of children as random fertility shocks. Preliminary results show that when a sibling has twins at second birth, ego's fertility is significantly and substantially reduced. Though fertility contagion is predominantly found to be positive, our results show that effects may also run in the opposite direction.

1 Motivation

When friends and family have children, individuals' preferences for and knowledge of life with children may change. Thus, the fertility behavior of one individual can affect the fertility choices of another. Such social contagion is usually thought of as a fertility multiplier – letting relatively small changes in the costs of childbearing lead to large fertility responses. Typically, contagion is expected to be stronger between individuals who are relatively similar, and who keep in frequent contact (Bernardi and Klaerner 2014).

Previous studies indicate that friends and siblings influence each other's fertility behavior (Balbo and Barban (2014); Lyngstad and Prskawetz (2010); Kuziemko (2006), but see Kotte and Ludwig (2011) for a counterexample). However, as friends and siblings tend to be similar, the coordinated fertility behavior may be driven by common unobservable characterstics rather than network effects (Manski 1995). Such selection would likely give a positive bias in the estimates of the studies above (see e.g. Wooldridge (2010)).

The current study aims to estimate fertility contagion net of unobserved heterogeneity, using sibling networks as an empirical example. We draw data on fertility behavior comes from Norwegian administrative registers (N $\sim$ 170 000). Because they usually keep in contact throughout adulthood and often are relatively similar, siblings are expected to affect each other's fertility. However, they must also be expected to share features like fertility preferences, that are unobservable to the researcher. Our method for handling this endogeneity is to estimate the effect of a random shock to the sibling's fertility decision on ego's fertility outcomes.

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Two types of such random shocks are extensively used in previous demographic and economic literature: Twin births and the event of having two children of the same sex. A twin birth is an unintended family increase, which is arguably random (conditional on the mother's age and SES) (Rosenzweig and Wolpin 1980*a*,*b*). Having two children of the same sex is known to increase the preference for having a third child among a subset of the population. For Norway, a third birth occurs in about 10% more of the families with two children of the same sex, compared to families with two children of opposite sex.

2 Disentangling mechanisms of contagion

Siblings may affect each others' fertility through transmission of knowledge (*social learning*) or emotions (*emotional contagion*). When a sibling has an additional child, ego may learn of the (dis)advantages of relatively large families, and experience positive or negative feelings toward childbearing. This may in turn lead to positive or negative effects on fertility. Furthermore, an increase in family size increases the sibling's workload at home – potentially reducing the help the he or she can offer others. Such a reduction of *social support* may have a negative impact on ego's fertility behavior (Bernardi and Klaerner 2014).

Siblings are distinct from other peers in that they share parents, and one sibling's family expansion may reduce the pressure for grandchildren put upon the other. Though this is indeed an example of social contagion, the contagion does not run directly between siblings. Such alleviated pressure for grandchildren is expected to *reduce* ego's fertility.

3 Empirical approach

Our point of departure is a data set consisting of Norwegian men and women of the birth cohorts 1960-1969. By way of a personal identification number, individuals are linked to their siblings and children, as well as to available information on earnings and education for robustness checks.

Our explanatory variable of interest is a dummy variable denoting whether the sibling experienced a random birth shock. In the preliminary results shown, we use the sibling's twinning at second birth as a source of such variation. For this variable to be defined for all individuals, we limit our study sample to individuals who have at least one sibling registered with at least two children.

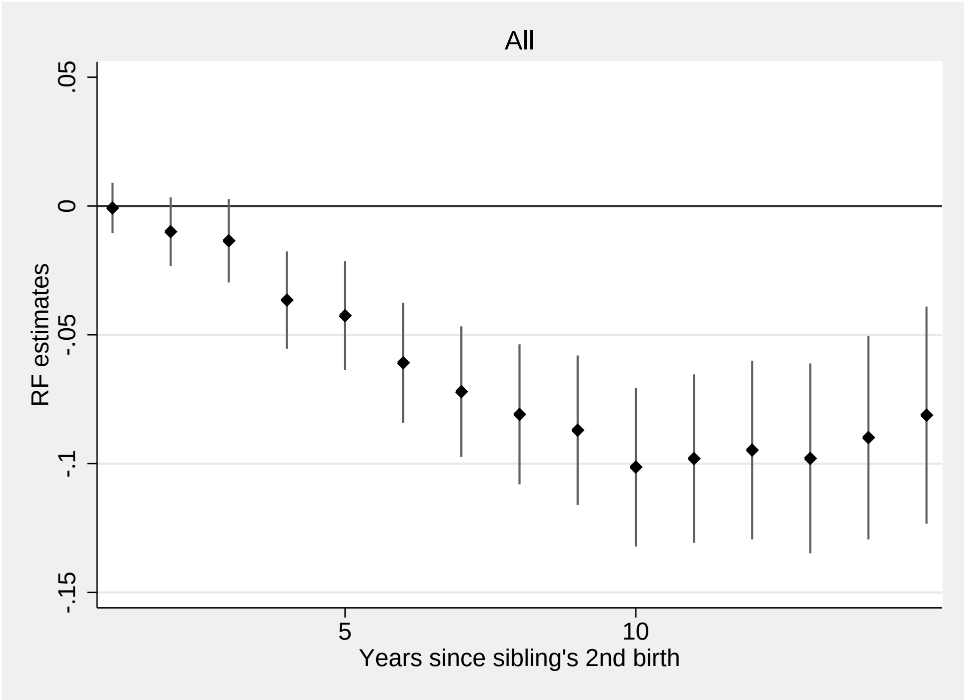
The outcome variable is ego's number of children. In order to describe tempo as well as quantum, the outcome variable is measured each year for 15 years after the sibling has a second child. Estimates are controlled for ego's birth year (dummies), sex and birth order, sex of the sibling, whether ego and sibling are of the same sex, and sex of the sibling's two first children. The coefficients capture the causal effect of a sibling's twin birth as long as twinning at second birth is random (conditional on covariates).[1]

In the full paper, we will proceed to an Instrumental Variable (2SLS) analysis, using twinning at second birth as well as sex composition of the sibling's two first born children as instruments for the sibling's number of children. Both instruments significantly increase sibship size.[2] Additionally, it is required that the instruments affects ego's fertility *exclusively* through inducing a change in the sibling's number of children. The plausibility of the exclusion restrictions for each instrument will be

[1] In the Instrumental Variable terminology, these are reduced form estimates.
[2] OLS estimation shows that both instruments have a first stage in our data (results not shown).

discussed extensively in the paper.

Figure 1: The effect of siblings twinning at second birth on ego's number of children. OLS estimates, separate models for each year after the sibling had a second child.



Error bars show 90% confidence intervals. All models include controls for ego's birth year (dummies), birth order, sex, sex of the sibling, whether ego and sibling are of the same sex, and sex of the sibling's two first children.

4 Preliminary results

Figure 1 shows the effect on the sibling having twins on second birth on ego's number of children, measured each year in 15 years after the sibling had a second child.

The preliminary results indicates that egos' fertility is significantly reduced when a sibling has twins. After 10 years, individuals whose sibling had twins on average have .1 fewer children. The effect persist for the 15 years observed, indicating a lasting reduction in quantum rather than a tempo effect.

5 Discussion and plans of further analysis

Our results indicate that fertility contagion need not be positive: Having an additional nephew or niece due to twinning significantly *reduces* fertility. Thus, the positive correlation between sibling's fertility behavior found in previous studies could be upwards biased by selection.

Social learning, emotional contagion and social support could all contribute to the estimated negative effect: Parents of twins may share information and feelings about the strains of childbearing with their siblings – and a larger workload at home may hinder them in providing practical help to kin. With zero spacing between the second and third child, raising twins may be particularly strainful, and therefore give rise to strong negative contagion. If the negative effects are due to contagion between siblings, we would expect a less straining fertility shock – such as a family expansion motivated by a preference for sex mix – to give less negative contagion effects.

Alternatively, a twin birth to a sibling may reduce ego's fertility by alleviating the pressure for grandchildren. Based on this explanation, we would expect other random fertility shocks to yield simiar estimates. In subsequent analysis, we will test whether we get similar estimates for social contagion when using the sex composition of the sibling's children as an instrumental variable.

Furthermore, we intend to explore whether network characteristics influences fertility contagion, by testing whether transmission is stronger between siblings of the same sex. We will also perform several robustness checks, including indirect tests of violation of the exclusion restriction, and assessiment of whether estimates are robust to inclusion of available exogenous covariates.

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