Sibling Peer Effects in Fertility*

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Extended Abstract

Over the past 200 years, developed economies have experienced a dramatic decline in fertility rates falling from four to five children per woman, to between 1.4 and 2.1 children per woman (Doepke et al., 2023). Besides the short-lived "baby boom" reversal after World War II, the decline was mostly steady through the 1980s in both the United States (Bailey and Hershbein, 2015) and across Europe and Japan (Doepke et al., 2023). Birth rates in the United States remained stable for the next 25 years, but since the beginning of the Great Recession in 2007, have collapsed, falling nearly 20 percent from between 65 and 70 births per 1,000 women to 55.8 births per 1,000 women in 2020 (Kearney et al., 2022).

Many theories have been put forward to explain the decline (both in the long-run and over the past 15 years) including quality-quantity trade-offs (Becker, 1960), changing opportunity costs of having children (Bailey and Hershbein, 2015), the introduction of reliable contraception (Bailey, 2010) which led to increases in female labor force participation (Bailey, 2006), and reductions in unintended pregnancies (Buckles et al., 2022) Although each

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of these theories can explain some of the decline, the overall extent of the decline remains a puzzle.

One potential channel that has received less focus, in part because it is more challenging to evaluate, is the role of social norms and peers. As birth rates decline and age at first birth rises, it is possible that couples making joint decisions about family, fertility, and careers observe fewer peers prioritizing child-rearing and perceive less of a social norm surrounding childbearing. We have evidence that in some settings, exposure to media highlighting particular choices around fertility affect birth rates (Kearney and Levine, 2015). This can result in "shifting priorities" (Kearney et al., 2022) and an aggregate change in birth rates.

In this paper we explore the role of sibling peer effects on fertility decisions of mid-1900s Americans. By focusing on siblings, we are able to identify relationships that allow us to leverage variation the fertility experiences of one individual's peers that are independent of broader social and economic trends in a community. Additionally, there are few relationships that are both as strong as that between siblings and observable in large-scale datasets. For our analysis we use full-count census records from the first half of the twentieth century along with machine learning census record linkages through the Census Tree (Buckles et al., 2023) that allow us to identify family relationships over the life cycle.

For our analysis, we first examine the correlation between the fertility of siblings. This, of course, reflects both peer effects as well as the set of correlated shocks to which an individual is exposed. In Table 1, we show results from a regression of an individual's own fertility in 1930 on sibling's fertility, controlling for the reference individual's age, race, and sibling age. Column 1 shows these results for all individuals. We see that if one's sibling has an additional child, it significantly increases one's own number of children by 0.188. These relationships may be stronger depending on the reference individual's gender as well as that of their sibling. Consequently, in columns 2 through 5, we examine the corresponding relationships for each combination of own and sibling gender. We find the predictive relationship is larger among girls, and particularly between sisters. The results are consistent with an

individual both being positively influenced by (and influencing) a sibling's fertility, with the relationship being strongest among sisters. It serves to confirm that individuals who are socially connected tend to make similar fertility decision.

If these correlated decisions are driven by individuals communicating affirmative desires to have children, we might expect that the timing of fertility decisions would also be correlated across siblings. To test this hypothesis, we create an indicator of whether an individual has a child who is three years old. We regress this indicator on corresponding indicators of whether the person's sibling has a child who is one, two, three, four, or five years old. We do so controlling for fixed effects for an individual's own age and total number of children as well as that of their sibling. As a consequence, these regressions are pure measures of the timing of children which are not confounded by decisions regarding total fertility. Figure1 shows these coefficients. The coefficients are all positive, suggesting that siblings tend to have children of similar ages even once one controls for their own age. Further, siblings are more likely to have children of the exact same age than they are to have children slightly older or younger. The patterns, once again, are stronger for sisters than for brothers. These results suggest that childbearing is a social activity that individuals who are close choose to undergo together. These patterns are consistent with existing evidence of childbirth timing among coworkers in Sweden (Asphjell et al., 2013).

Finally, we leverage quasi-experimental variation in family size by examining how individuals respond to the unexpected increase in sibling fertility when their sibling has twins.[1] Controlling for age and race, having twins as your first birth is more or less random, conditional on having a child. Consequently, having twins at the first time of birth could shift the number and timing of a couples' births. Using this design we find that having a twin as a first child is associated with 0.67 additional children (see Table 2). These effects are insensitive to controlling for age, sex, and family race. This suggests that while twinning increases total fertility, it both delays subsequent pregnancies and increases total fertility by

[1]This is similar to the approach of Angrist and Evans (1998), though we prefer a reduced form analysis because we find the exclusion restriction unlikely to hold in our sample.

less than an additional child.

We further regress an individual's own fertility on whether their sibling had twins during their first completed pregancy relative to a singleton. We find that individuals have 0.03 fewer children when their sibling's first child is a twin (see Table 3). Relative to the average number of children of 1.59,[2] this represents a 2 percent effect. However, there are distinct patterns of heterogeneity. Effects are nearly twice as large and significant if the sibling is a sister, with no statistically distinguishable effects if the sibling is a brother. The effects are also almost entirely driven by individuals who did not have children when the sibling had twins (Table 4). Individuals who were childless when their sister had twins have 0.12 fewer children (7.5 percent). This is driven by both an extensive and intensive margin response. Individuals are 3.5-4.7 percentage points less likely to have any children by 1930 if they did not have any children before their sibling had twins (Table 5). These patterns suggest strong patterns of sibling peer effects. Perhaps surprisingly, these effects are negative but they are consistent with younger siblings updating expectations about parenthood and child rearing when their sibling experiences a challenging fertility event, like twinning.

Overall, our preliminary results confirm prior literature that closely-related individuals tend to make positively correlated fertility decisions. This is consistent with individuals both internalizing norms regarding fertility from close peers as well as choosing to match peer fertility timing. However, the results from twinning suggest that learning also plays an important role in fertility decisions. While positive peer experiences may increase desired fertility, a more challenging experience may serve to delay or reduce fertility. We plan to further explore how patterns differ depending on gender, age similarity, and geographic proximity. Furthermore, we also plan to expand this using Finnish registry data in a more recent time period.

To the best of our knowledge, we are the first to document peer effects on fertility rates in the United States. Besides small-scale longitudinal surveys like the Panel Study

[2]This does not represent completed fertility as the individuals are between 25 and 35 in our analysis sample

of Income Dynamics (PSID) or National Longitudinal Survey of Youth (NLSY) it is not possible to follow the fertility decisions of American siblings over time into adulthood. By linking historic census records over time, we are able to follow millions of sibiling pairs over time. Most existing work exploring peer effects in fertility rely on administrative registry data from Western Europe and Scandinavia. However, beyond providing the first estimates for the United States, this work also highlights how peer experiences can shape fertility decisions.

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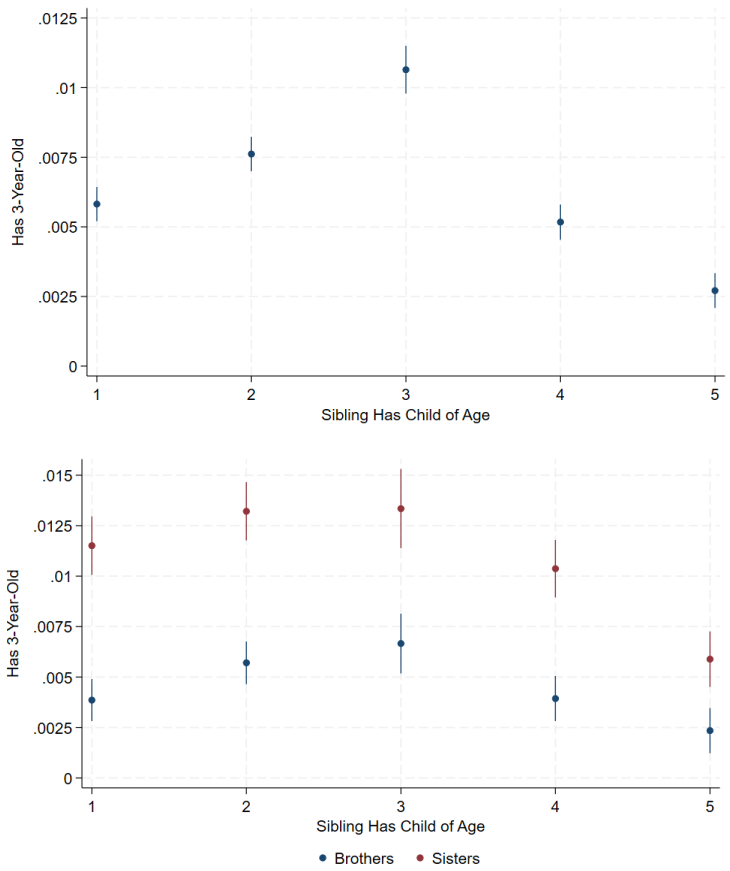
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Tables and Figures

Figure 1: Similarity in Childbirth Timing between Siblings



NOTE: Sample restricted to sibling pairs identified in 1910 where both children can be linked to 1930 outcomes using Census Tree links and where the sibling has at least one child. Fixed effects for age, siblings age, number of children and sibling's number of children are included. Standard errors are clustered at the 1910 sibling group level, with 95-percent confidence intervals provided.

SOURCE: Author's own calculations using 1910 and 1930 full count census, linked using Census Tree Linkages.

Table 1: Predictive Relationship Between Own and Siblings Total Number of Children

	Number of Children				
		Sibling is Female		Sibling is Male	
		Female	Male	Female	Male
	(1)	(2)	(3)	(4)	(5)
Sibling's Number of Children	0.188***	0.270***	0.142***	0.216***	0.157***
	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)
Dependent Mean	1.39	1.71	1.17	1.69	1.15
Observations	13,067,226	2,491,226	3,141,475	3,141,475	4,293,050

NOTE: Sample restricted to sibling pairs identified in 1910 where both children can be linked to 1930 outcomes using Census Tree links and where the sibling has at least one child. All regressions control for age, race, ethnicity, and sibling's age. Standard errors are clustered at the 1910 sibling group level. $p < 0.01$ ***, $p < 0.05$ **, $p < 0.1$ *.

Table 2: Effect of Sibling's First Birth Twins on Siblings Number of Children

	Number of Children		
	(1)	(2)	(3)
First Child is Twin	0.669***	0.674***	0.666***
	(0.009)	(0.009)	(0.009)
Age Fixed Effects		X	X
Race and Sex Fixed Effects			X
Dependent Mean	2.41	2.41	2.41
Observations	7,536,274	7,536,274	7,536,274

NOTE: Sample restricted to sibling pairs identified in 1910 where both children can be linked to 1930 outcomes using Census Tree links and where the sibling has at least one child. Column (2) adds aged fixed effects. Column (3) adds race/ethnicity, and sibling sex fixed effects. Standard errors are clustered at the 1910 sibling group level. $p < 0.01$ ***, $p < 0.05$ **, $p < 0.1$ *.

Table 3: Effect of Sibling's First Birth Twins on Own Number of Children

	Number of Children						
		Sibling is Female			Sibling is Male		
		All	Female	Male	All	Female	Male
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Sibling's First Child is Twin	-0.029***	-0.046***	-0.038**	-0.056***	-0.014	-0.025	-0.007
	(0.008)	(0.011)	(0.018)	(0.013)	(0.011)	(0.018)	(0.012)
Dependent Mean	1.59	1.61	1.98	1.32	1.56	1.90	1.31
Observations	7,536,274	3,620,518	1,610,886	2,009,632	3,915,756	1,667,814	2,247,942

NOTE: Sample restricted to sibling pairs identified in 1910 where both children can be linked to 1930 outcomes using Census Tree links and where the sibling has at least one child. Age, sibling age, and race/ethnicity fixed effects are included. Standard errors are clustered at the 1910 sibling group level. $p < 0.01$ ***, $p < 0.05$ **, $p < 0.1$ *.

Table 4: Effect of Sibling's First Birth Twins on Own Number of Children, by Parenthood Status When Twins Were Born

	Number of Children				
		Sibling is Female		Sibling is Male	
	All	No Children When Twin Born	Had Children When Twin Born	No Children When Twin Born	Had Children When Twin Born
	(1)	(2)	(3)	(4)	(5)
Sibling's First Child is Twin	-0.029***	-0.120***	-0.009	-0.074***	-0.029*
	(0.008)	(0.011)	(0.019)	(0.010)	(0.015)
Dependent Mean	1.59	1.03	2.97	0.76	2.84
Observations	7,536,274	2,541,445	1,079,073	2,408,809	1,506,947

NOTE: Sample restricted to sibling pairs identified in 1910 where both children can be linked to 1930 outcomes using Census Tree links and where the sibling has at least one child. Age, sibling age, and race/ethnicity fixed effects are included. Standard errors are clustered at the 1910 sibling group level. p < 0.01 ***, p < 0.05 **, p <0.1 *.

Table 5: Effect of Sibling's First Birth Twins on Presence of Children, by Parenthood Status When Twins Were Born

	Any Children		
	All	Sibling is Female No Children When Twin Born	Sibling is Male No Children When Twin Born
	(1)	(2)	(3)
Sibling's First Child is Twin	-0.014***	-0.047***	-0.035***
	(0.002)	(0.004)	(0.004)
Dependent Mean	0.64	0.49	0.40
Observations	7,536,274	2,541,445	2,408,809

NOTE: Sample restricted to sibling pairs identified in 1910 where both children can be linked to 1930 outcomes using Census Tree links and where the sibling has at least one child. Age, sibling age, and race/ethnicity fixed effects are included. Standard errors are clustered at the 1910 sibling group level. $p < 0.01$ ***, $p < 0.05$ **, $p < 0.1$ *.