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ABSTRACT

This paper estimates the causal effect of fertility on mothers' work arrangements, with a particular focus on remote work. Using harmonized individual-level data from the American Community Survey (ACS) for the period 2003--2024, we exploit exogenous variation in fertility generated by the sex composition of the first two children and twin births at the second parity. We find that fertility significantly reduces labor force participation across our sample period, consistent with existing evidence, but its effects on remote work are nuanced. Prior to the COVID-19 pandemic, an additional child increases the likelihood of working remotely. However, these effects turn negative after 2020 when remote work became common. We show that these patterns are not driven by changing selection into teleworkable occupations nor by changes in the observable characteristics of compliers over time. The limited feasibility or attractiveness of remote work for many women, combined with changes in the nature of remote work over time, are more likely explanations. Taken together, these findings suggest that remote work, in its current form, has limited potential to meaningfully reduce child penalties for higher-order births.

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1 Introduction

Amid sustained declines in fertility across much of the developed world, re-examining the consequences of childbearing for parents'—and especially mothers'—labor-market outcomes is increasingly important. Childbearing burdens continue to fall disproportionately on mothers (Aksoy et al., 2025). In industrialized economies, mothers have traditionally adjusted to fertility by exiting the labor force or reducing their work hours.

Could the rise of remote work change this pattern? By reducing commuting costs and possibly enabling the blending of work and childcare throughout the day, remote work has the potential to relax the trade-off between paid employment and childcare. This possibility is particularly salient given evidence that workplace flexibility—especially flexibility in working hours—reduces gender wage disparities (Goldin, 2014). While a large literature examines how fertility affects labor force participation, earnings, and hours worked, much less is known about whether remote work provides mothers with an alternative margin of adjustment to reduced hours or labor-market exit.

Recent studies suggest that remote work can mitigate labor-market child penalties. Arnon et al. (2025) suggest that employment child penalties have declined much more for college-educated mothers than for non-college-educated ones, a pattern they attribute to the greater prevalence of occupations that allow for remote work among the former group. Likewise, Harrington and Kahn (2026) find that working from home substantially reduced motherhood penalties among college-educated mothers employed in traditionally family-unfriendly occupations. A related literature suggests that remote work is also associated with increases in fertility (Bratsberg and Walther, 2025; Davis et al., 2026), arguing that the greater location and scheduling flexibility of remote work increases the time available for childcare and thereby reduces the costs of having children (Bratsberg and Walther, 2025).

These studies suggest that remote work is often more compatible with childcare responsibilities than traditional work and may lead to smaller labor-market child penalties. Yet they leave two important questions unanswered. First, does fertility itself increase mothers' uptake of remote work? The studies mentioned above are based on comparisons of trends across education/occupation categories and the presence of children rather than exogenous variation in childbearing. Second, if remote work facilitates the combination of work and childcare, has the effect of fertility on mothers' labor force participation diminished in an era of widespread remote work? We address these gaps in the literature by providing direct evidence on the causal effect of fertility on mothers' remote-work and labor-force participation decisions over the past 2+ decades.

Our analysis focuses on higher-order births. From an econometric perspective, exogenous variation in

fertility generated by available instruments, including the sex composition of the first two children or twin births at the second parity, allows us to identify the causal effect of fertility on remote work. Although these instruments do not identify the effects of first births, they are well suited to studying higher-order fertility, which has well-established effects on mothers' labor supply (Angrist and Evans, 1998; Aaronson et al., 2020). From a policy perspective, understanding whether additional children induce mothers to substitute toward remote work instead of exiting the labor market provides evidence on whether expanding access to remote work can help offset labor-market child penalties associated with higher-order births.

Using data from the American Community Survey (ACS), we exploit exogenous variation in fertility generated by the sex composition of the first two children and by twin births (Angrist and Evans, 1998). We find that prior to the pandemic, an additional child increases the probability of remote work. In contrast, post-pandemic estimates are negative (though generally imprecisely estimated).

Importantly, the negative effect of fertility on labor-force participation persists in the post-COVID era. Thus, the negative/null effect on remote work in that period is not due to fewer women dropping out of the labor force upon having an additional child (which would occur, for example, if they were already working remotely or because they were better able to balance their in-person job with childbearing than they would have been in the past). The question then becomes why we see no effect of fertility on remote work in an era in which working from home is much more common than it was prior to the pandemic.

We provide evidence that this pattern is not driven by changing selection into teleworkable occupations nor by changes in the observable characteristics of compliers (women who are induced to change their fertility due to the value of the instrument) over time. We also do not find any effect of fertility on the labor supply of spouses of women with 2 or more children in either period, suggesting that fathers' remote work does not explain the post-COVID null effect of fertility on mothers' remote work. Instead, we argue that this pattern reflects structural changes in the nature of remote work following the COVID-19 pandemic. Remote jobs were relatively scarce before the pandemic but became widely available and highly valued by workers afterward. Associated developments—such as larger compensating wage differentials and/or standardization of remote jobs along with technologies used in part to enforce remote workers' hours and tasks—may have reduced the attractiveness of remote work for mothers with two or more children. We develop a simple theoretical framework that rationalizes the empirical patterns we find through changes in compensating wage differentials, employer monitoring intensity, and childcare costs.

The remainder of the paper proceeds as follows. Section 2 reviews the related literature. Section 3 describes the data and empirical strategy. Section 4 presents the main results. Section 5 explores the mechanisms. Section 6 develops the theoretical model, and Section 7 concludes.

2 Related Literature

A substantial body of work documents a negative effect of fertility on mothers' labor-force participation (Bronars and Grogger, 1994; Angrist and Evans, 1998; Bloom et al., 2009; Vere, 2011). Evidence also points to important heterogeneity across levels of economic development. Using same-sex composition and twin births as instruments, Aaronson et al. (2020) show that fertility significantly reduces mothers' labor force participation in developed economies but has little effect in developing countries. Similarly, Agüero and Marks (2008), using infertility as an instrument, find no significant effect of fertility on women's labor supply in Latin America. Taken together, these findings suggest that the labor-market consequences of fertility depend importantly on institutional and economic context.

Beyond participation decisions, fertility also affects earnings and career trajectories. Fertility reduces mothers' earnings (Angrist and Evans, 1998; Kleven et al., 2019), while delayed motherhood is associated with earnings gains (Abboud, 2025). Unplanned childbearing reduces educational attainment and economic well-being among unmarried mothers (Bronars and Grogger, 1994). Using Danish administrative data, Kleven et al. (2019) document a large and persistent first child penalty that accounts for nearly 80 percent of the gender gap in earnings and employment. Extending this analysis across countries and cities, Kleven et al. (2025) show that child penalties explain most of the gender gap in employment across the developed world.

Recent evidence, however, suggests that traditional event-study estimates may overstate the contribution of mothers' earnings losses to the gender earnings gap because the timing of childbirth is endogenous. Using an instrumental-variable event-study design, Bensnes et al. (2026) show that mothers' earnings losses explain only part of the post-childbirth gender earnings gap, with the remainder driven by increases in partners' earnings. Similarly, Kaeppel (2025) demonstrates that standard child penalty estimates are biased and finds substantially smaller earnings losses for mothers in French administrative data than those implied by the traditional event-study approach.

Despite these methodological challenges, the broader consensus remains that childbearing imposes economically meaningful labor-market costs on mothers, particularly in developed economies. This has motivated a growing literature examining whether workplace flexibility can mitigate these child penalties. Flexible work arrangements, including reduced-hour contracts and/or flexible work schedules, may allow mothers to better combine paid employment with caregiving responsibilities. For example, Ciasullo and Uccioli (2025) show that Australia's 2009 Fair Work Act, which enabled mothers to retain permanent contracts while reducing their working hours, increased maternal labor supply and reduced child penalties.

More recently, attention has shifted toward remote work as a particular form of flexibility. Working from home increases the time parents spend with their children (Cowan, 2024) and improves children's educational outcomes (Achard et al., 2025). During the COVID-19 pandemic, telecommuting also enabled mothers to maintain paid work hours while contributing to a more equal division of childcare responsibilities within households (Lyttelton et al., 2022). The availability of teleworkable jobs likewise appears to shape child penalties. Arnon et al. (2025) show that women employed in teleworkable occupations have experienced meaningful declines in employment child penalties, while Harrington and Kahn (2026) find that working from home has significantly reduced motherhood penalties in traditionally family-unfriendly occupations.

A related strand of the literature examines the relationship between remote work and fertility, showing that working from home is associated with increases in fertility (Bailey et al., 2023; Davis et al., 2026; Bratsberg and Walther, 2025). Using survey data from 38 countries including the U.S., Davis et al. (2026) document a positive association between remote work and both realized and intended fertility for men and women, arguing that working from home improves work-life balance and thereby encourages childbearing. Exploiting the expansion of remote work following the COVID-19 lockdowns, Bratsberg and Walther (2025) find that increased remote work is associated with higher fertility in Norway. They argue that greater location and scheduling flexibility expand women's time budget, reduce the costs of childrearing, and consequently increase fertility.[1]

To our knowledge, no papers in this literature examine a fundamental question underlying the idea that the availability of remote work can lessen motherhood employment penalties: does an increase in fertility lead to an increase in remote work arrangements? Because our data span the pre- and post-COVID periods, we can also examine whether the relationship between fertility and remote work has changed since its dramatic rise following the pandemic. Lastly, we can examine whether this change in remote-work opportunities has led to a weakening of the relationship between fertility and women's labor-force participation. If additional children increase parents' use of remote work instead of inducing them to leave the labor market, then the new prevalence of remote work could mitigate the negative labor-market effects of childbearing.

[1] In a similar vein, Bailey et al. (2023) argue that reduced employment and remote work during the pandemic reduced the opportunity cost of childbearing, while expanded unemployment benefits further relaxed financial constraints, contributing to higher fertility.

3 Data and Empirical Strategy

3.1 Data

We use individual-level data from the American Community Survey (ACS) for 2003–2024, obtained from IPUMS USA (Ruggles et al., 2025), which provides harmonized ACS microdata. The ACS contains rich information on individuals' socio-demographic characteristics, educational attainment, and labor market outcomes, including employment status, industry, occupation, and the respondent's primary means of transportation to work.

We classify an individual as working remotely if she is employed and reports "working at home" as her primary means of transportation to work. We therefore construct a binary indicator equal to one if the individual works from home and zero otherwise. This measure provides a straightforward classification of workers into those who report working remotely and those who do not. It also aligns closely with our empirical framework, which views labor supply as a choice among three alternatives: working onsite, working remotely, or not working.

A weakness of this measure is that it does not distinguish hybrid workers from fully remote workers, though based on the structure of the question, we expect it to be skewed toward the latter. Thus, our measure likely misses a large amount of hybrid work, which is significantly more common than fully remote work (Barrero et al., 2023). Because the ACS does not report the share of work hours performed remotely, it is not possible to construct a continuous measure of remote work intensity. The advantage of the ACS over other datasets with finer measures of remote work is its very large sample size, which provides the power needed for identification of our effects of interest, as discussed below.

Because the analysis focuses on working-age mothers, we restrict the sample to women aged 25-55 with at least two children. The latter restriction is necessary because both of our proposed instrumental variables require the presence of at least two children. To assess the representativeness of this subsample, we compare remote-work patterns among mothers aged 25-55 with at least two children to those observed in the broader population of all individuals in the same age range.

Figure 1 plots the share of all employed individuals aged 25-55 who report working from home, both for the full sample and for mothers with at least two children. For both groups, the share of remote work remains low but increases steadily between 2003 and 2019. It then rises sharply around 2020, peaks at nearly 20 percent in 2021, and declines to roughly 15 percent by 2024. Remote work patterns among mothers aged 25–55 with at least two children closely mirror those in the broader working-age population. However, across our sample period, the remote-work share among these mothers is consistently slightly higher, indicating

that they are somewhat more likely to work remotely than the overall working-age population.

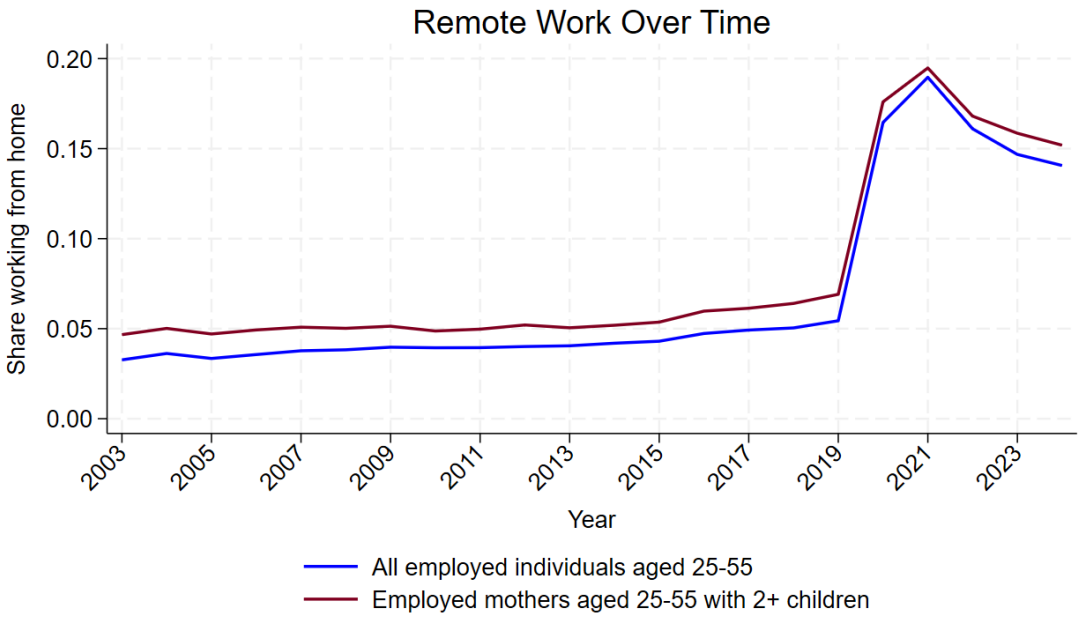


Figure 1: Remote work over time

Table 1 reports descriptive statistics for mothers aged 25-55 with at least two children. For this table and others below, we report statistics for four different time periods: the entire sample period (2003-2024), the entire pre-COVID period (2003-2019), the five years just prior to COVID (2015-2019, to match the number of post-COVID years in the data), and the post-COVID period (2020-2024). Labor force participation among mothers with at least two children is modestly increasing over time. The share of mothers who are employed is also somewhat higher in later periods, while the share working remotely rises sharply during the post-pandemic period, consistent with the patterns shown in Figure 1.

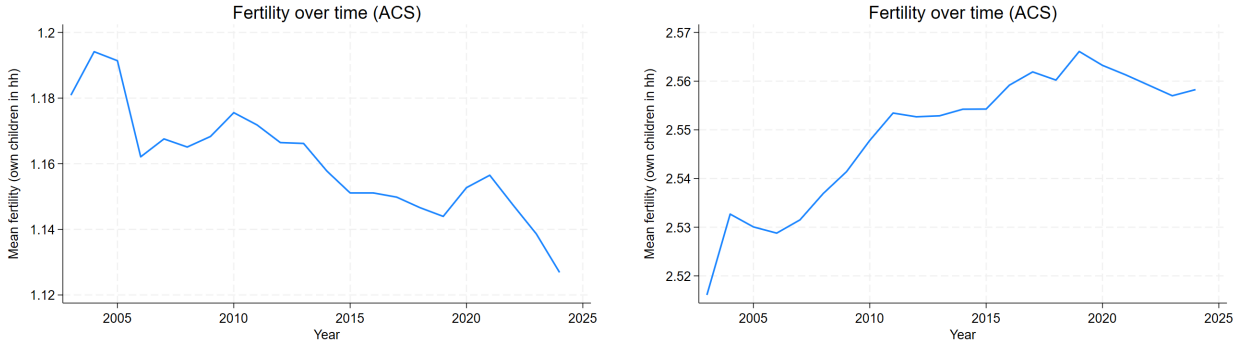
Table 1: Labor Market Outcomes by Period (Weighted Means, %)

	(1) 2003–2024	(2) 2003–2019	(3) 2015–2019	(4) 2020–2024
In labor force (%)	71.66	71.05	72.17	73.76
Employed (%)	67.28	66.37	68.71	70.39
Works from home (%)	5.45	3.55	4.24	11.94
Observations	4,672,016	3,620,574	1,103,006	1,051,442

Notes: Entries are weighted means using ACS person weights (`perwt`). All variables are binary indicators. Samples are restricted to mothers aged 25–55 with at least two children.

We next examine whether fertility patterns in our estimation sample are comparable to those in the broader population of women. Figure 2a plots the average number of own children in the household for

all women aged 25-55, while Figure 2b reports the same measure for women aged 25-55 with at least two children present in the household. Though the number of own children in the household is a lower bound on actual fertility, we use it synonymously with fertility throughout the paper. Average fertility among all women aged 25-55 declines steadily from about 1.20 children per woman in 2005 to approximately 1.13 by 2024, a reduction of about 6 percent. In contrast, average fertility among women aged 25-55 with at least two children increases slightly over time, rising from 2.51 children in 2003 to 2.56 by 2020. These patterns indicate that, conditional on having at least two children, women are having slightly more children over time, implying that fertility trends differ between women with two or more children and those with fewer (though the magnitudes of these changes are small). Against the backdrop of declining overall fertility, this suggests that women with two or more children increasingly represent a group with stronger preferences for childbearing. We return to this issue later in the paper to examine whether these stronger preferences for children contribute to stronger negative labor-market responses to fertility among these mothers.



(a) Fertility per woman aged 25–55

(b) Fertility per woman aged 25–55 with $n \geq 2$ children

Figure 2: Fertility over time

Table 2 reports the share of women with at least one child and the share with at least two children in the household among all women over time. On average, roughly 59 percent of women have at least one child, while about 36 percent have two or more children. Thus, the women who form the core group in our analysis represent a little more than one-third of prime-age women in the full sample.

Table 2: Mothers Aged 25–55

	(1) 2003–2024	(2) 2003–2019	(3) 2015–2019	(4) 2020–2024
Women with any children (%)	59.31	59.70	58.50	58.01
Women with at least two children (%)	36.62	36.75	36.12	36.17
Observations	12,900,700	9,935,592	3,069,659	2,965,108

Notes: Entries are survey-weighted means using ACS person weights (`perwt`) and expressed as percentages. The sample includes women aged 25–55. "Any children" and "two or more children" are based on the number of own children residing in the household.

3.2 Empirical Strategy

We adopt a standard instrumental variable strategy because fertility is endogenous, as documented in the existing literature (Bronars and Grogger, 1994; Angrist and Evans, 1998; Aaronson et al., 2020). Following Angrist and Evans (1998), we exploit exogenous variation in fertility induced by the sex composition of the first two children and by twin births at the second parity. The first-stage equation is

$$x_{ijkt} = \alpha z_{ijkt} + w'_{ijkt}\gamma + \mu_j + \zeta_k + \delta_t + \lambda_{T_k \times t} + \varepsilon_{ijkt},$$

where x_{ijkt} denotes the fertility of mother i in industry j, occupation k, and year t. As discussed above, fertility is measured primarily by the total number of own children in the household and, in alternative specifications, by an indicator for having a third own child in the household as in Aaronson et al. (2020). The excluded instrument z_{ijkt} is either an indicator for whether the first two children are of the same sex or, in a separate specification, an indicator for a multiple birth at the second parity. As shown in Table 3, a little less than 2 percent of mothers in our sample have a multiple birth at the second parity, while about 50 percent have their first two children of the same sex.

Table 3: Distribution of Instruments Across Periods

	2003–2024	2003–2019	2015–2019	2020–2024
Panel A: Same-sex instrument				
Number with same-sex first two children	2,368,850	1,836,049	559,309	532,801
Share with same-sex first two children	0.5072	0.5072	0.5071	0.5073
Panel B: Twin instrument				
Number with twins at second birth	87,317	67,620	21,391	19,697
Share with twins at second birth	0.0186	0.0185	0.0192	0.0187
Observations	4,672,016	3,620,574	1,103,006	1,051,442

Notes: The table reports the distribution of the two fertility instruments across periods for the sample of mothers aged 25–55 with at least two children. The same-sex instrument equals one if the first two children are of the same sex. The twin instrument equals one if the second and third children have the same age, proxying for a twin birth at the second parity. Shares are weighted using ACS person weights.

The control vector w_{ijkt} in the first-stage equation includes the mother's age, an indicator for the sex of her first child, race, ethnicity, marital status, and educational attainment. The specification also includes industry fixed effects (μ_j), occupation fixed effects (ζ_k), year fixed effects (δ_t), and occupation teleworkability-by-year fixed effects ($\lambda_{T_k \times t}$) to account for the evolving feasibility of remote work across occupations over time. For individuals who are unemployed or out of the labor force but have worked within the last 5 years, the ACS reports the industry and occupation codes corresponding to their most recent job.

Occupation-level teleworkability measures are obtained from Dingel and Neiman (2020), who assign each occupation a score ranging from 0 to 1 based on the extent to which its tasks can be performed from home. Higher scores indicate greater teleworkability, with a score of 1 denoting a fully teleworkable occupation. We classify occupations as "teleworkable" if the index score is greater than or equal to 0.5 (in practice, only 6.33 percent of observations with a non-missing teleworkability score take a value strictly between 0 and 1, so this is largely a distinction between fully teleworkable and fully non-teleworkable occupations).

The second-stage equation is

$$y_{ijkt} = \beta x_{ijkt} + w'_{ijkt}\theta + \mu_j + \zeta_k + \delta_t + \lambda_{T_k \times t} + u_{ijkt},$$

where y_{ijkt} is the outcome of interest and β is the coefficient of interest. The main outcomes are labor force participation and remote work. When the outcome is labor force participation, y_{ijkt} is an indicator equal to one if the mother is in the labor force and zero otherwise. Industry and occupation fixed effects are not included in the model when the outcome is labor force participation, as those variables are missing for women who have not worked in the past 5 years. When the outcome is remote work, y_{ijkt} is an indicator equal to one if the mother works from home and zero if she works onsite; for mothers who are unemployed

or out of the labor force, this variable is also set equal to zero. Only individuals who have worked in the past 5 years are included in the remote-work regression, as missing occupation and industry codes perfectly predict not working remotely.

Table 4 summarizes the construction of the samples used in the labor-force participation and remote-work regressions. The labor-force participation regressions use a baseline sample of 4,672,016 mothers aged 25-55 with two or more children in the household. This sample retains the first mothers to whom their children are linked, thereby excluding 0.26% of the initial sample who are identified as second mothers in households with two female parents. The remote-work specification require two additional restrictions. First, because missing occupation and industry codes perfectly predict not working remotely, we exclude women who have not worked within the past five years (as stated above). Second, the inclusion of occupation teleworkability-by-year fixed effects mechanically requires us to exclude women with valid occupation codes but missing occupation-level teleworkability measures (for example, military occupations have missing teleworkability scores). These restrictions yield a final remote-work estimation sample of 3,666,278 observations.[2]

Table 4: Sample Construction and Attrition

Sample construction stage	**Observations excluded**	**Total observations**
Initial sample	—	4,684,233
Second mothers excluded	12,217	4,672,016
Women who have not worked within the past five years	766,148	3,905,868
Women with a missing teleworkability index	239,590	3,666,278

Notes: The initial sample consists of women aged 25–55 with at least two own children residing in the household, observed in the 2003–2024 ACS. The "Observations excluded" column reports the number of observations removed at each stage relative to the preceding stage, while the "Total observations" column reports the number remaining after each restriction. The first restriction excludes 12,217 women identified as second mothers through `MOMLOC2`. Of these women, 12,216 have no children linked through `MOMLOC`, while one has only one child linked through `MOMLOC`. Women classified as not having worked within the past five years are those with occupation codes 0000 or 9920. Occupation code 0000 denotes individuals without an applicable occupation, including those outside the labor force whose most recent employment was more than five years ago. Occupation code 9920 denotes unemployed individuals with no work experience within the past five years. The final stage excludes women with other occupation codes for whom the occupation-level teleworkability index is missing.

Having defined the regression specifications and their corresponding estimation samples, we now turn to the conditions required for identification. The validity of the instrumental-variables strategy rests on two conditions: relevance and exogeneity. Relevance requires that the instruments—an indicator for whether the first two children are of the same sex or alternatively an indicator for twin births at the second parity—predict fertility conditional on the controls. Exogeneity requires that these instruments affect mothers' labor-market outcomes only through their impact on fertility (the exclusion restriction).

The exclusion restriction is plausible in this context. The sex composition of the first two children is widely

[2]The remote-work regression drops one singleton observation; consequently, the regression output for the full 2003-2024 period reports 3,666,277 observations.

viewed as quasi-random and is unlikely to directly affect mothers' labor supply or work arrangement decisions except through its effect on subsequent fertility. The twin instrument, while also generating exogenous variation, has been subject to concerns that twin births may be correlated with maternal characteristics such as age, health, or wealth. For example, wealthier mothers may be more likely to use fertility treatments, such as in vitro fertilization, which increases the probability of twin births (Kulkarni et al., 2013) and may therefore violate the exclusion restriction. We mitigate these concerns by including rich controls for education and occupation in our models and by emphasizing that the same-sex instrument—generally considered more credible in developed-country settings (Aaronson et al., 2020)—yields qualitatively similar estimates.

Importantly, the use of two instruments that rely on distinct sources of variation provides an additional robustness check. If both instruments produce consistent estimates despite their different underlying mechanisms, this strengthens the credibility of the exclusion restriction and the overall identification strategy.

4 Main Results

We begin by assessing the strength of our proposed instruments. Table 5 reports the first-stage estimates using the sex composition of the first two children and twin births at second parity as instruments for fertility. Both instruments strongly predict completed fertility. Having the first two children of the same sex increases fertility by approximately 0.07 children, while a twin birth at the second parity increases fertility by roughly 0.95 children. These estimates are highly precise and stable across sample periods. Consistent with these strong first-stage results, the weak-instrument diagnostics reported in Table 6 indicate no evidence of weak instruments. The Kleibergen-Paap Wald F-statistics are extremely large in all specifications, confirming the strong relevance of both instruments.

Table 5: First-Stage Effects of Instruments on Number of Children

	Dependent variable: Number of Children			
	(1)	(2)	(3)	(4)
	2003–2024	2003–2019	2015–2019	2020–2024
Same-sex siblings	0.070***	0.070***	0.071***	0.068***
	(0.001)	(0.001)	(0.002)	(0.002)
Twin at 2nd birth	0.952***	0.952***	0.941***	0.952***
	(0.004)	(0.005)	(0.008)	(0.009)
Mean dep. var	2.497	2.492	2.505	2.511
Observations	3,666,277	2,834,254	856,222	832,021

Notes: Each column reports a separate first-stage regression of the number of children on the indicated instrument. All specifications include controls for age, education, marital status, race, Hispanic origin, gender, year fixed effects, industry fixed effects, occupation fixed effects, and occupation teleworkability-by-year fixed effects. Regressions are weighted using person weights. Robust standard errors are reported in parentheses. $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$.

Table 6: Weak Instrument Diagnostics for First-Stage Regressions on Number of Children

	2003–2024	2003–2019	2015–2019	2020–2024
Panel A: Same-sex instrument				
Kleibergen–Paap Wald rk F statistic	3991.01	3225.33	991.45	793.89
Panel B: Twin instrument				
Kleibergen–Paap Wald rk F statistic	49172.70	38989.15	13181.57	10357.37

Notes: This table reports weak instrument diagnostics from separate first-stage regressions of the number of children on each excluded instrument. The Kleibergen–Paap Wald rk F statistic is robust to heteroskedasticity. Stock–Yogo critical values (not reported) correspond to the 10% maximal IV size threshold for one endogenous regressor and one excluded instrument and are equal to 16.38 in all time periods. In exactly identified models with a single endogenous regressor, the Kleibergen–Paap Wald rk F statistic coincides with the robust first-stage F statistic.

We next examine the effects of the number of children on labor-force participation and remote work.[3] Table 7 reports OLS and IV estimates for four periods: 2003-2024, 2003-2019, 2015-2019, and 2020-2024.[4] The OLS estimates reveal a modest positive association between fertility and remote work in pre-COVID periods but a small negative association in the post-COVID period. Meanwhile, fertility is consistently negatively associated with labor-force participation across all periods.

[3]As a robustness check in Appendix A, we use an indicator for having a third child as an alternative measure of fertility and estimate its effects on the same outcomes. The results are similar to those obtained using the number of children as the fertility measure.

[4]In Appendix B, we re-estimate the models after excluding the year 2020, which marked the onset of the pandemic and was characterized by substantial labor-market disruptions. The results remain similar to the baseline estimates that include 2020.

Table 7: Effects of Fertility on Remote Work and Labor Force Participation

	Remote work		Labor force participation		OLS	
	Same-sex IV	Twin IV	Same-sex IV	Twin IV	Remote	Labor force
Panel A. 2003–2024						
Number of children	0.003	0.001	-0.056***	-0.029***	0.003***	-0.050***
	(0.004)	(0.001)	(0.007)	(0.002)	(0.000)	(0.000)
Mean of dep. var.	0.066	0.066	0.717	0.717	0.066	0.717
Observations	3,666,277	3,666,277	4,672,016	4,672,016	3,666,277	4,672,016
Panel B. 2003–2019						
Number of children	0.009**	0.002**	-0.053***	-0.033***	0.005***	-0.051***
	(0.004)	(0.001)	(0.008)	(0.002)	(0.000)	(0.000)
Mean of dep. var.	0.043	0.043	0.711	0.711	0.043	0.711
Observations	2,834,254	2,834,254	3,620,574	3,620,574	2,834,254	3,620,574
Panel C. 2015–2019						
Number of children	0.007	0.002	-0.057***	-0.023***	0.005***	-0.049***
	(0.008)	(0.002)	(0.015)	(0.004)	(0.000)	(0.001)
Mean of dep. var.	0.052	0.052	0.722	0.722	0.052	0.722
Observations	856,222	856,222	1,103,006	1,103,006	856,222	1,103,006
Panel D. 2020–2024						
Number of children	-0.023*	-0.003	-0.068***	-0.018***	-0.002***	-0.047***
	(0.014)	(0.003)	(0.015)	(0.004)	(0.001)	(0.001)
Mean of dep. var.	0.141	0.141	0.738	0.738	0.141	0.738
Observations	832,021	832,021	1,051,442	1,051,442	832,021	1,051,442
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Occupation FE	Yes	Yes	No	No	Yes	No
Industry FE	Yes	Yes	No	No	Yes	No
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Teleworkability × Year FE	Yes	Yes	No	No	Yes	No

Notes: Each panel reports second-stage estimates of the effect of the number of children on remote work and labor force participation. Same-sex IV instruments fertility using an indicator for whether the first two children are of the same sex. Twin IV instruments fertility using an indicator for twins at the second birth. The OLS columns report weighted linear regressions of each outcome on the number of children. Remote-work specifications include controls, year fixed effects, industry fixed effects, occupation fixed effects, and occupation teleworkability-by-year fixed effects. Labor force participation specifications include controls and year fixed effects only. Controls include age, education, marital status, race, Hispanic origin, and the sex of the first child. Regressions are weighted using person weights, and robust standard errors are reported in parentheses. Remote-work regressions exclude observations with occupation codes 0000 and 9920 and observations with missing teleworkability scores. Differences in sample size between the remote-work and labor force participation regressions therefore reflect their different sample restrictions.
$^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.10$.

The IV estimates yield two main findings. First, fertility substantially reduces mothers' labor-force participation. Over the entire sample period, an additional child lowers labor force participation by approximately 2.9 and 5.6 percentage points under the twin and same-sex instruments, respectively, corresponding to declines of about 3.9 and 7.6 percent relative to the mean participation rate.[5] These estimates are consistent with a large literature documenting sizable negative effects of fertility on mothers' labor supply (Angrist and

[5]The magnitude of these estimates varies with the age of the mother's second child. Table C1 in Appendix C shows that these pre-pandemic estimates are largest among mothers whose second child is five years old or younger, consistent with the negative labor-market effects of fertility being strongest when childcare demands are greatest. The estimates are more moderate and closer to the baseline estimates among mothers whose second child is between 6 and 12 years old and smallest among mothers whose second child is 13 year old or older.

Evans, 1998; Vere, 2011; Aaronson et al., 2020).

Our second major finding from the IV analysis concerns the effects of childbearing on remote work. These exhibit a different pattern from the LFP results. Between 2003 and 2019, an additional child increases the probability of working remotely by 0.9 percentage points under the same-sex instrument, equivalent to 21 percent of the pre-pandemic mean. The twin-IV estimate for this period, however, is much smaller at 0.2 percentage points, though it is also significant at the 5 percent level. In the post-pandemic period (2020-2024), the effect of an additional child turns negative. In the same-sex IV specification, it is sizable (2.3 percentage points) and significant at the 10 percent level, though it is again much smaller in the twin-IV case. After COVID, 95 percent confidence intervals rule out effects larger than about 0.44 percentage points (same-sex IV) and 0.29 percentage points (twin IV), just 6.5 percent (16 percent) of the post-pandemic effect of fertility on LFP.

The (remote-work) estimates presented so far are based on the full remote-work estimation sample, which includes both labor force participants and nonparticipants. We therefore re-estimate the model on a sample of women who are in the labor force. This distinction is important because some mothers may not work remotely simply because they are not in the labor force. Therefore, restricting the sample to labor force participants allows us to isolate the effect of fertility on the choice between remote and onsite work, holding fixed the decision to participate in the labor market. Table 8 reports the results. Between 2003 and 2019, an additional child significantly increases the probability of working remotely by 0.4 percentage points under the twin instrument and 1.3 percentage points under the same-sex instrument, equivalent to roughly 8-26 percent of the pre-pandemic mean. Consistent with the baseline findings, these estimated effects become negative (but insignificantly different from zero) after 2020.

Table 8: Effects of Fertility on Remote Work Among Mothers in the Labor Force

	IV		OLS
	Same-sex IV	Twin IV	Remote
Panel A. 2003–2024			
Number of children	0.006	0.002	0.005***
	(0.005)	(0.001)	(0.000)
Mean of dep. var.	0.076	0.076	0.076
Observations	3,130,103	3,130,103	3,130,103
Panel B. 2003–2019			
Number of children	0.013***	0.004***	0.007***
	(0.005)	(0.001)	(0.000)
Mean of dep. var.	0.050	0.050	0.050
Observations	2,407,544	2,407,544	2,407,544
Panel C. 2015–2019			
Number of children	0.011	0.003	0.007***
	(0.009)	(0.003)	(0.000)
Mean of dep. var.	0.059	0.059	0.059
Observations	741,701	741,701	741,701
Panel D. 2020–2024			
Number of children	-0.020	-0.004	0.000
	(0.015)	(0.004)	(0.001)
Mean of dep. var.	0.162	0.162	0.162
Observations	722,556	722,556	722,556

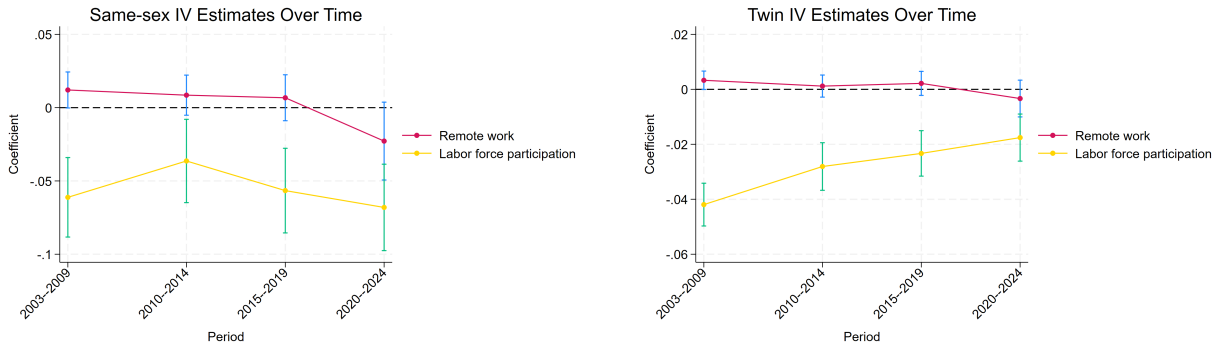
Notes: Each panel reports estimates of the effect of the number of children on remote work among mothers in the labor force. Same-sex IV instruments the number of children using an indicator for whether the first two children are of the same sex. Twin IV instruments the number of children using an indicator for twins at the second birth. The OLS column reports weighted linear regressions of remote work on the number of children. All specifications include controls for age, education, marital status, race, Hispanic origin, and sex of the first child, as well as year, industry, occupation, and occupation teleworkability-by-year fixed effects. The estimation sample is further restricted to mothers with applicable occupation and industry codes and nonmissing occupation-level teleworkability measures. A small number of singleton observations are automatically dropped by the fixed-effects estimator. Regressions are weighted using person weights, and robust standard errors are reported in parentheses.
$^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.10$.

The evolution of childbearing effects on remote work and LFP over time are shown in Figure 3. Effects on LFP are consistently negative across instruments and time periods, though the pattern over time differs across instrument. In the case of remote work, both instruments suggest that positive (though sometimes insignificant) effects before the pandemic become negative after it. Because the overall prevalence of remote work is so much higher after COVID, even for mothers with (2+) children at home, this creates a puzzle we seek to understand better in the next section.

In Appendix D, we examine our results specifically for women 1) in teleworkable occupations, 2) who are

college-educated, and 3) both. These are women who generally have greater access to remote work through the nature of their occupations. We note three main findings: first, the pre-pandemic point estimates of the effect of fertility on remote work are generally somewhat larger than they are in the full sample (Table 7), at least for the same-sex instrument. This is consistent with women in these positions having greater access to remote work. Second, the point estimates are less precisely estimated (likely due at least in part to smaller sample sizes). Lastly, the pattern of positive coefficients prior to COVID turning negative after COVID holds among these samples just as it does in the full sample.

Taken together, these results reveal substantial temporal heterogeneity in the labor-market consequences of fertility for mothers with two or more children. Although fertility continues to reduce mothers' labor-force participation throughout the sample period, its effect on remote work is concentrated in the pre-pandemic period. The contrasting evolution of these outcomes suggests that the role of remote work as a margin of adjustment to childbearing has changed over time, particularly following the pandemic.



(a) Same-Sex IV

(b) Twin IV

Figure 3: Effects of Fertility Over Time

5 Mechanisms

5.1 Selection into Teleworkable Occupations

The preceding results establish that fertility increased remote work among mothers with two or more children before the pandemic but that these effects have declined over time, especially in the post-pandemic period. Understanding why this relationship has weakened just as remote work has become much more ubiquitous requires examining the mechanisms through which fertility affects remote work. We begin by examining whether the relationship between fertility and selection into a teleworkable occupation has changed over time. To explore this channel, we estimate the effects of fertility on having a teleworkable occupation among mothers with two or more children who are already participating in the labor force. Conditioning on labor-

force participation for this exercise is important because including nonparticipants would confound the effect of fertility on occupational choice with its effect on LFP.

Table 9 presents the results. OLS results imply that an additional child is associated with a modest reduction in the likelihood of having a teleworkable occupation, perhaps because women who have more children are less likely to select into teleworkable occupations to begin with. However, plausibly exogenous variation in childbearing via our instruments indicates small (relative to the mean) and statistically insignificant effects of an additional child on occupational teleworkability. This is true for both instruments and across time periods. Thus, it is not the case that differential sorting into teleworkable occupations helps to explain the change in the effect of fertility on remote work after COVID. Rather, it appears that the relationship between fertility and remote work conditional on occupation has changed. This is consistent with our instruments working as expected because they affect fertility only after one (twin IV) or two (same-sex IV) children are born, by which time it is unlikely that many women change their occupation.

Table 9: Effects of Fertility on Having a Teleworkable Occupation

	IV		OLS
	Same-sex IV	Twin IV	Tele. occ.
Panel A. 2003–2024			
Number of children	0.003	-0.004	-0.017***
	(0.010)	(0.003)	(0.000)
Mean of dep. var.	0.507	0.507	0.507
Observations	3,130,104	3,130,104	3,130,104
Panel B. 2003–2019			
Number of children	0.002	-0.004	-0.018***
	(0.011)	(0.003)	(0.001)
Mean of dep. var.	0.501	0.501	0.501
Observations	2,407,547	2,407,547	2,407,547
Panel C. 2015–2019			
Number of children	-0.003	-0.003	-0.013***
	(0.020)	(0.005)	(0.001)
Mean of dep. var.	0.499	0.499	0.499
Observations	741,703	741,703	741,703
Panel D. 2020–2024			
Number of children	0.005	-0.002	-0.012***
	(0.022)	(0.006)	(0.001)
Mean of dep. var.	0.524	0.524	0.524
Observations	722,557	722,557	722,557
Controls	Yes	Yes	Yes
Year FE	Yes	Yes	Yes

Notes: Each panel reports estimates of the effect of the number of children on having a teleworkable occupation. Same-sex IV instruments fertility using an indicator for whether the first two children are of the same sex. Twin IV instruments fertility using an indicator for twins at the second birth. The OLS column reports weighted linear regressions of the teleworkable-occupation indicator on the number of children. All specifications condition on mothers in the labor force with a nonmissing occupational teleworkability measure and include controls for age, education, marital status, race, Hispanic origin, sex of the first child, and year fixed effects. For unemployed mothers, the outcome reflects the teleworkability of their reported prior occupation. Regressions are weighted using ACS person weights, and robust standard errors are reported in parentheses. $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.10$.

5.2 Changes in Complier Characteristics Over Time

Another possible explanation for the declining effect of fertility on remote work following the pandemic is that women who have at least two children are a fundamentally different group now than they were in past decades. For example, as the percentage of women with two or more children has declined (slightly) over time, those who belong to this group may now prioritize raising children over working to a greater extent than they did in the past. This could lead to a weaker relationship between fertility and remote work over

time.

Table 10 summarizes compliers' observable characteristics across sample periods and shows that some observable characteristics differ substantially between the pre- and post-pandemic periods. Post-pandemic compliers are slightly older and considerably more educated. There are also notable differences in racial and ethnic composition. For example, while 74 percent of compliers are white in the 2003–2019 period, only 61 percent are white in the 2020–2024 period. Similarly, the share of compliers identifying as "other race" increases from 8 percent to 23 percent, while the share identifying as Hispanic rises from 18 percent to 24 percent.

Importantly, however, these changes are not unique to the complier population. Table 11 shows that the observable characteristics of individuals in the full sample of women with two or more children evolve over time in much the same way as those of compliers. The rise in educational attainment among these women is consistent with broader national trends (U.S. Census Bureau, 2023; NCES, 2022). It also reflects differential response rates with respect to education documented after the pandemic, which resulted in college-educated individuals being disproportionately represented relative to less-educated individuals in the ACS (Shin, 2021; Rothbaum et al., 2021).[6] Changes in racial and ethnic composition largely reflect major revisions and improvements in the race and Hispanic origin questions in 2020, which were first implemented in the 2020 Decennial Census and subsequently in the ACS samples beginning in 2020 (IPUMS USA, 2026; U.S. Census Bureau, 2021; Jones et al., 2021).

Taken together, these patterns suggest that most of the observed changes in complier characteristics reflect broader demographic changes in the underlying ACS sample or changes in ACS survey design (in the case of race/ethnicity). Nevertheless, the substantial differences in both full-sample and complier characteristics across periods raise the possibility that the post-pandemic attenuation of the fertility effect reflects changes in the composition of the complier population rather than changes in the underlying relationship between fertility and remote work.

[6]Note that ACS sampling weights do not explicitly account for education.

Table 10: Characteristics of Compliers by Period

	2003–2024	2003–2019	2015–2019	2020–2024
Age	39.52	39.18	39.28	40.71
Married/partnered	0.78	0.78	0.78	0.80
High school or more	0.91	0.90	0.89	0.93
BA+	0.33	0.30	0.33	0.43
White	0.71	0.74	0.72	0.61
Black	0.10	0.11	0.10	0.08
Asian	0.07	0.07	0.08	0.08
Other race	0.12	0.08	0.10	0.23
Hispanic	0.20	0.18	0.22	0.24
Labor force participation	0.68	0.68	0.68	0.69
Remote work	0.05	0.04	0.04	0.10
Teleworkable occupation	0.381	0.380	0.382	0.385
Non-teleworkable occupation	0.372	0.371	0.375	0.375
Missing tele.: N/A occupation	0.199	0.202	0.207	0.188
Missing tele.: other occupation	0.048	0.047	0.036	0.052
Second child age 0–5	0.15	0.15	0.16	0.14
Second child age 6–12	0.42	0.43	0.43	0.40
Second child age 13+	0.43	0.42	0.41	0.46
Observations	4,672,016	3,620,574	1,103,006	1,051,442

Notes: The table reports estimated mean characteristics of compliers, defined as mothers whose probability of having a third child increases because their first two children are of the same sex. Complier means are computed using the Local Average Treatment Effect (LATE) decomposition:

$$E[X \mid C] = \frac{E[XD \mid Z = 1] - E[XD \mid Z = 0]}{E[D \mid Z = 1] - E[D \mid Z = 0]},$$

where D is an indicator for having a third child and Z is an indicator for having two first-born children of the same sex. Teleworkability measures are constructed by harmonizing ACS occupation codes to the 2018 Census occupation classification and merging them with the Dingel–Neiman teleworkability index. N/A occupations include occupation codes 0000 and 9920. The "other occupation" category includes military and all other non-N/A occupations with missing teleworkability scores. All statistics are weighted using ACS person weights. Because complier characteristics are estimated as ratios of sample moments, estimates for rare characteristics may fall slightly outside the unit interval.

To address this concern, we examine what the post-pandemic estimates would look like if the post-pandemic sample had a similar observable composition to the pre-pandemic sample. Following a similar approach to DiNardo et al. (1995), we reweight post-pandemic observations so that the distribution of observable characteristics matches that of the pre-pandemic sample. Specifically, we first estimate a logit model on the pooled pre-pandemic (2003–2019) and post-pandemic (2020–2024) samples, where the dependent variable indicates whether an observation belongs to the post-pandemic period. The model includes age, education, marital status, race, and Hispanic ethnicity as predictors. We then use the estimated model to compute, for each observation, the predicted probability of belonging to the post-pandemic period, denoted by p_{post}.

Next, for each observation in the post-pandemic sample, we construct an inverse-odds reweighting factor given by $rw = (1 - p_{post})/p_{post}$. This procedure assigns greater weight to individuals whose observable characteristics more closely resemble those of the pre-pandemic population and less weight to individuals whose characteristics are disproportionately represented in the post-pandemic period. To prevent a small number of observations from exerting undue influence on the results, we cap the estimated reweighting factor at the 99th percentile of its distribution. Finally, we construct the analysis weight as $fw = perwt \times rw$, where $perwt$ denotes the ACS person-level sampling weight.

The resulting balance statistics are reported in the last column of Table 11. After reweighting, the full post-pandemic sample closely resembles the pre-pandemic sample in terms of observable characteristics. Moreover, the estimated characteristics of compliers in the reweighted 2020–2024 sample more closely align with those of compliers in the 2003–2019 period.

We next re-estimate our baseline specifications using the reweighted 2020–2024 sample. Table 12 reports these estimates alongside the corresponding results for the 2003–2019 period and the original 2020–2024 sample period. The estimates from the reweighted post-pandemic sample closely mirror those from the original post-pandemic sample. In particular, an additional child continues to have a negative (though statistically insignificant) effect on mothers' likelihood of working remotely after 2020. At the same time, the post-COVID effect of fertility on LFP is at least as large with the reweighted sample as it is with the original sample. This is inconsistent with the idea that compliers after 2020 are less interested in working upon having another child (to the extent that the observable characteristics we use in reweighting are correlated with such preferences).

These findings suggest that the decline in the fertility effect on remote work over time among mothers with two or more children is not driven by changes in the observable characteristics of compliers. We therefore consider other potential explanations, including the possibility that the spouses of these mothers have become more likely to work from home and assume childcare responsibilities, thereby making it easier for mothers to continue working in person.

Table 11: Covariate Balance Before and After Reweighting

	2003-2019 Original	2020-2024 Original	2020-2024 Reweighted
Panel A. Full Sample Characteristics			
Age	39.12	40.12	39.05
High school or more	0.883	0.912	0.895
BA+	0.307	0.397	0.311
Married/partnered	0.722	0.721	0.721
White	0.715	0.567	0.707
Black	0.126	0.118	0.129
Asian	0.060	0.073	0.062
Other race	0.098	0.241	0.101
Hispanic	0.210	0.240	0.176
Panel B. Complier Characteristics			
Age	39.18	40.71	39.82
High school or more	0.903	0.928	0.906
BA+	0.297	0.432	0.344
Married/partnered	0.778	0.803	0.788
White	0.740	0.613	0.762
Black	0.109	0.080	0.077
Asian	0.067	0.079	0.069
Other race	0.084	0.228	0.093
Hispanic	0.184	0.241	0.194

Notes: The table compares demographic characteristics before and after reweighting the 2020-2024 sample. Reweighting factors are obtained from a logit model predicting likelihood of being in the post-COVID period using age, education, marital status, race, and Hispanic ethnicity. Panel A reports weighted means for the full sample. Panel B reports estimated complier characteristics, where compliers are mothers whose probability of having a third child increases because their first two children are of the same sex. Complier means are computed using the Abadie (2003) LATE decomposition. The reweighted post-COVID (2020-2024) sample closely matches the pre-COVID (2003-2019) sample in observable characteristics, and substantially reduces differences in estimated complier characteristics across periods.

Table 12: Reweighting Robustness: Fertility, Remote Work, and Labor Force Participation

	Remote Work		Labor Force Participation		OLS	
	Same-sex IV	Twin IV	Same-sex IV	Twin IV	Remote Work	LFP
2003–2019	0.009**	0.002**	-0.053***	-0.033***	0.005***	-0.051***
	(0.004)	(0.001)	(0.008)	(0.002)	(0.000)	(0.000)
2020–2024, original	-0.023*	-0.003	-0.068***	-0.018***	-0.002***	-0.047***
	(0.014)	(0.003)	(0.015)	(0.004)	(0.001)	(0.001)
2020–2024, reweighted	-0.016	-0.004	-0.080***	-0.020***	-0.001	-0.049***
	(0.014)	(0.003)	(0.018)	(0.005)	(0.001)	(0.001)
Observations, 2003–2019	2,834,254	2,834,254	3,620,574	3,620,574	2,834,254	3,620,574
Observations, 2020–2024	832,021	832,021	1,051,442	1,051,442	832,021	1,051,442
Mean dep. var., 2003–2019	0.043	0.043	0.711	0.711	0.043	0.711
Mean dep. var., 2020–2024 original	0.141	0.141	0.738	0.738	0.141	0.738
Mean dep. var., 2020–2024 reweighted	0.132	0.132	0.723	0.723	0.132	0.723
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Occupation FE	Yes	Yes	No	No	Yes	No
Industry FE	Yes	Yes	No	No	Yes	No
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Teleworkability × Year FE	Yes	Yes	No	No	Yes	No

Notes: Robust standard errors are reported in parentheses. The table reports OLS and IV estimates of the effects of the number of children on remote work and labor force participation among mothers with at least two children. In columns 1–4, fertility is instrumented using either an indicator for whether the first two children are the same sex or an indicator for twins at the second birth. Columns 5–6 report OLS estimates. Remote-work specifications include controls, occupation fixed effects, industry fixed effects, year fixed effects, and occupation teleworkability-by-year fixed effects. Labor force participation specifications include controls and year fixed effects only. Controls include age, education, marital status, race, Hispanic status, and the sex of the first child. Differences in sample size across the remote-work and labor force participation regressions arise because the remote-work sample excludes observations with occupation codes 0000 or 9920 and observations with missing occupation-level teleworkability scores. The reweighted 2020–2024 estimates use sample-reweighting weights constructed to align the observable demographic composition of the post-pandemic sample with that of the pre-pandemic sample. All regressions use ACS person weights, with the reweighted specifications multiplying the ACS person weights by the sample-reweighting factor. Significance levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

5.3 Effects of Fertility on Spouses' likelihood of Working Remotely

Another possible explanation for the substantial post-pandemic decline in the effects of fertility on remote work among mothers with two or more children could be that co-resident spouses have become more likely to work remotely in this period. By spending more time at home, co-resident spouses who work remotely may be able to assume greater childcare care responsibilities[7], potentially allowing mothers to remain employed in person. To assess this potential channel, we examine the effects of fertility on remote work among the co-resident spouses of mothers aged 25-55 with at least two children in our main sample. Of these spouses, 99.84% are men and 0.16% are women, and all are linked as parents to both of the mothers' first two children.

We follow the same sample construction procedure used in the mothers analysis, excluding individuals who have not worked within the past five years and those with a missing teleworkability index from the remote-work specification. We also use the same specifications for remote work and labor force participation (LFP) used in the mothers analysis. Table 13 presents the sample construction stages, and Table 14 reports

[7]This possibility is consistent with evidence that parents who work from home spend more time with children (Cowan, 2024) and that telecommuting during the pandemic contributed to a more equal division of childcare responsibilities within households (Lyttelton et al., 2022).

the main results.

The OLS results indicate a positive association between fertility and remote work among spouses of mothers with two or more children in all sample periods except the post-pandemic period, when this relationship turns negative. The same-sex IV estimates are positive across all sample periods, suggesting that an additional child increases the likelihood of working remotely, although none of the estimates is statistically significant. The twin IV estimates are close to zero and statistically insignificant before the pandemic and turn negative and insignificant afterward. Meanwhile, the LFP estimates indicate small negative effects of additional children on spouses' labor force participation, with smaller magnitudes in the post-pandemic period.

These results suggest that although the estimated effects of fertility on spouses' LFP diminish after the pandemic, there is no clear evidence that additional children increase spouses' likelihood of working remotely during this period.[8] Accordingly, these findings provide little support for increased remote work among spouses as an explanation for the attenuation of the fertility effects on mothers' remote work in the post-pandemic period. Instead, the attenuation of the fertility effect is more likely due to structural changes in the labor market and the nature of remote work, which we discuss next.

Table 13: Sample Construction and Attrition: Spouse Analysis

Sample construction stage	**Observations excluded**	**Total observations**
Initial IV-eligible mother sample	—	4,672,016
Mothers without a linked legally married spouse	1,115,401	3,556,615
Spouses who have not worked within the past five years	88,140	3,468,475
Spouses with missing teleworkability or industry information	191,188	3,277,287

Notes: The initial sample consists of mothers aged 25–55 with at least two children residing in the household, observed in the 2003–2024 ACS. These mothers are successfully matched to their first two linked children and have nonmissing information on the sex of both children. The spouse analysis is restricted to mothers with a co-resident legally married spouse identified through `SPLOC`; spouses of either sex are included. All selected spouses have complete information on the controls and labor-force participation outcome, yielding a labor-force participation estimation sample of 3,556,615 observations. The remote-work sample excludes spouses with occupation codes 0000 or 9920 and spouses with missing occupation-level teleworkability or industry information. Occupation code 0000 denotes individuals without an applicable occupation, including those outside the labor force whose most recent employment was more than five years ago. Occupation code 9920 denotes unemployed individuals with no work experience within the past five years. The "Observations excluded" column reports the number removed at each stage relative to the preceding stage.

[8]This conclusion remains robust when the sample is restricted to spouses with a bachelor degree or higher. The results reported in Appendix E show that the IV estimates for both remote work and labor-force participation among college-educated co-resident spouses are statistically indistinguishable from zero.

Table 14: Effects of Fertility on Spouses' Remote Work and Labor Force Participation

	Remote work		Labor force participation		OLS	
	Same-sex IV	Twin IV	Same-sex IV	Twin IV	Remote	Labor force
Panel A. 2003–2024						
Number of children	0.004	-0.001	-0.009**	-0.006***	0.002***	-0.002***
	(0.004)	(0.001)	(0.004)	(0.001)	(0.000)	(0.000)
Mean of dep. var.	0.063	0.063	0.941	0.941	0.063	0.941
Observations	3,277,287	3,277,287	3,556,615	3,556,615	3,277,287	3,556,615
Panel B. 2003–2019						
Number of children	0.004	0.001	-0.009*	-0.007***	0.003***	-0.002***
	(0.004)	(0.001)	(0.005)	(0.002)	(0.000)	(0.000)
Mean of dep. var.	0.039	0.039	0.941	0.941	0.039	0.941
Observations	2,536,389	2,536,389	2,758,332	2,758,332	2,536,389	2,758,332
Panel C. 2015–2019						
Number of children	0.007	0.001	-0.007	-0.009***	0.004***	-0.002***
	(0.008)	(0.003)	(0.008)	(0.003)	(0.000)	(0.000)
Mean of dep. var.	0.049	0.049	0.944	0.944	0.049	0.944
Observations	764,912	764,912	829,861	829,861	764,912	829,861
Panel D. 2020–2024						
Number of children	0.004	-0.003	-0.007	-0.003	-0.002***	-0.003***
	(0.012)	(0.004)	(0.009)	(0.003)	(0.001)	(0.000)
Mean of dep. var.	0.143	0.143	0.941	0.941	0.143	0.941
Observations	740,897	740,897	798,283	798,283	740,897	798,283
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Occupation FE	Yes	Yes	No	No	Yes	No
Industry FE	Yes	Yes	No	No	Yes	No
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Teleworkability × Year FE	Yes	Yes	No	No	Yes	No

Notes: Each panel reports estimates of the effect of the number of children on the remote work and labor-force participation of mothers' legally married, co-resident spouses. Same-sex IV instruments fertility using an indicator for whether the first two children are of the same sex. Twin IV instruments fertility using an indicator for twins at the second birth. The OLS columns report weighted linear regressions of each outcome on the number of children. Remote-work specifications include spouse characteristics, year fixed effects, industry fixed effects, occupation fixed effects, and spouse occupation teleworkability-by-year fixed effects. Labor-force participation specifications include spouse characteristics and year fixed effects. Controls include the spouse's age, education, race, Hispanic origin, and sex, together with the sex of the first child. Regressions are weighted using the spouse's person weight, and robust standard errors are reported in parentheses. Reported means are probability-weighted means for the corresponding estimation samples. Observation counts reflect singleton removal by the fixed-effects estimator.
$^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.10$.

5.4 Changes in the Nature of Remote Work Over Time

We now turn to changes in the nature of remote work as a potential explanation for the evolving relationship between fertility and remote work. The pandemic fundamentally transformed the allocation of remote work in the labor market. Before 2020, remote work was relatively rare and concentrated in a narrow set of occupations (Barrero et al., 2023; Pabilonia and Vernon, 2025). The post-pandemic labor market looks markedly different. Following the strong impetus to move work activities to the home (when possible) during the height of the pandemic, remote work expanded rapidly and became available to a much broader

segment of the workforce. As many workers experienced working remotely for the first time, it evolved into a highly valued job amenity for workers (Barrero et al., 2022; Cullen et al., 2025). At the same time, access to remote work is increasingly determined by company policies and managerial practices related to the feasibility of measuring and maintaining productivity for a large number of remote or hybrid employees.

Descriptive evidence further suggests that the uptake of remote work in the post-pandemic period is less tied to family circumstances. Panel A of Table 15 shows that, prior to the pandemic, mothers were more likely to work remotely than women without children. Following the pandemic, this relationship reversed, with women without children exhibiting higher rates of remote work than mothers. A similar reversal appears along the intensive margin of fertility. As shown in Panel B of Table 15, mothers with two or more children were more likely to work remotely than women with at most one child before the pandemic, whereas the opposite pattern emerges afterward. Together, these descriptive patterns suggest that both parenthood itself (the extensive margin of fertility) and larger family size (the intensive margin) were important predictors of remote work prior to the pandemic, but much less so afterward.

Table 15: Remote Work by Parental Status and Family Size Before and After COVID

	2003–2019		2021–2024	
	Remote (%)	Obs.	Remote (%)	Obs.
Panel A. Remote Work by Parental Status				
Parents vs. Non-Parents				
Any children	3.42	10,583,375	12.75	2,544,526
No children	2.87	8,941,539	12.66	2,432,916
Women Only				
Mothers (any child)	3.39	5,912,822	12.52	1,422,271
Women with no children	2.98	4,022,770	14.54	1,059,311
Panel B. Remote Work by Family Size				
2+ children vs. Others				
Two or more children	3.56	6,606,890	12.35	1,603,234
Fewer than two children	2.96	12,918,024	12.88	3,374,208
Women Only				
Mothers (2+ children)	3.55	3,629,434	11.92	881,405
Women with fewer than two children	3.04	6,306,158	14.19	1,600,177

Notes: This table reports survey-weighted means from the ACS for individuals aged 25–55. Remote work is defined as usually working from home. Remote-work rates are reported as percentages. The pre-COVID period covers 2003–2019, and the post-COVID period covers 2021–2024. Panel A presents estimates by parental status, while Panel B presents estimates by family size.

A complementary explanation is that the rapid expansion of remote work following the pandemic was driven largely by technological and organizational changes that affected the broader workforce rather than specific demographic groups. Barrero et al. (2023) show that remote work has reshaped firm hiring practices,

while Pabilonia and Vernon (2025) and Cullen et al. (2025) document adjustments in compensation and retention policies associated with remote-work arrangements.

Changes in the compensating wage differential associated with remote work may have further weakened the relationship between fertility and remote work. As remote work has become a more highly valued job amenity, workers are increasingly willing to accept lower wages in exchange for greater workplace flexibility. For example, Barrero et al. (2022) and Barrero et al. (2023) hypothesize that the expansion of remote work has reduced wage-growth pressures because employees place substantial value on the option to work from home. Barrero et al. (2022) estimate that low-wage workers are willing to forgo approximately 1.7 percent of earnings for remote work opportunities, while the corresponding figure rises to 6.8 percent among high-wage workers. Similar evidence is provided by Cullen et al. (2025), who estimate that workers are willing to sacrifice as much as 25 percent of their salary for otherwise identical jobs that offer remote work. Likewise, De Fraja et al. (2024) find that occupations with greater remote-work opportunities experienced slower wage growth following the pandemic. As remote work increasingly became associated with lower wage growth, its value as a childcare accommodation may have diminished.

Another possible explanation for why remote work is relatively less attractive to mothers is that post-pandemic remote jobs involve more intensive employer monitoring during working hours, increasing the practical costs of combining remote work with childcare responsibilities. Evidence on this mechanism remains, however, limited and mixed. Bartik et al. (2025) note that employers perceive substantial difficulties in monitoring remote workers, while Barrero et al. (2025), using newly developed work-from-home questions included in the nationally representative Business Trends and Outlook Survey (BTOS), report low levels of monitoring of employees who work from home. In contrast, Jiang et al. (2025) argue that remote workers in occupations with greater exposure to AI-enabled monitoring work longer hours and spend less time in leisure during the post-pandemic period. Similarly, Vitak and Zimmer (2023) document a substantial expansion of employee-monitoring technologies following the widespread adoption of remote work during the pandemic. Together, these changes suggest that remote work may have become less attractive for mothers with two or more children in the post-pandemic period. This mechanism could also help explain why higher-order births no longer increases mothers' likelihood of working remotely despite the dramatic expansion in the availability of remote jobs.

6 Theoretical Model

This section develops a simple framework to illustrate how fertility and the compensating wage differential associated with remote work shape mothers' labor supply choices. The model builds on Jones et al. (2025)

and emphasizes the trade-off between market childcare costs and the costs of combining work and childcare at home.

We consider a unitary household with two earners. The primary earner (e.g., the father) earns wage w_1, while the secondary earner (the mother) earns wage w_2 in onsite employment and w_2^r in remote work, where w_2^r may differ from w_2. The household chooses consumption $c \geq 0$, the number of children $n \geq 0$, and the mother's work arrangement $j \in \{o, r, h\}$, corresponding to onsite work, remote work, and home production.

Preferences are given by

$$U(c, n) = \log(c) + \delta \log(v + n),$$

where $\delta > 0$ captures the weight placed on children and $v > 0$ ensures well-defined utility at $n = 0$.

Childcare can be provided either in the market or at home. When the mother works onsite, childcare must be purchased in the market at cost $pn\phi$, where p is the price per unit of childcare and ϕ denotes childcare units per child. In contrast, when the mother works remotely or does not participate in the labor force, childcare is provided at home. However, combining remote work with childcare entails a shadow cost $h(n, m)$, where $m \geq 0$ captures monitoring intensity or the extent of synchronous work requirements. We assume

$$h(0, m) = 0, \quad 0 < h(n, m) < pn\phi \text{ for } n \geq 1, \quad h_n(n, m) > 0, \quad h_{nn}(n, m) < 0, \quad h_m(n, m) > 0.$$

Thus, multitasking costs increase with fertility, but at a decreasing rate, and are higher in more tightly monitored jobs. Caring for an additional child while teleworking raises the time and effort required—for example, caring for three young children is more demanding than caring for two. However, due to economies of scale in childrearing, these costs rise less than proportionally; caring for four children is unlikely to require twice the time and effort needed for two. In addition, as jobs become more tightly monitored or synchronous, it becomes increasingly difficult to combine work and childcare, further increasing the cost of multitasking.

The household budget constraint depends on the mother's work arrangement. If the mother works onsite,

$$c \leq w_1 + w_2 - pn\phi.$$

If she works remotely,

$$c \leq w_1 + w_2^r - h(n, m).$$

If she does not work,

$$c \leq w_1.$$

Because utility is strictly increasing in consumption, these constraints bind in each case.

Remote work is preferred to onsite work if

$$w_1 + w_2^r - h(n, m) \geq w_1 + w_2 - pn\phi,$$

and preferred to home production if

$$w_1 + w_2^r - h(n, m) \geq w_1.$$

These two conditions simplify to

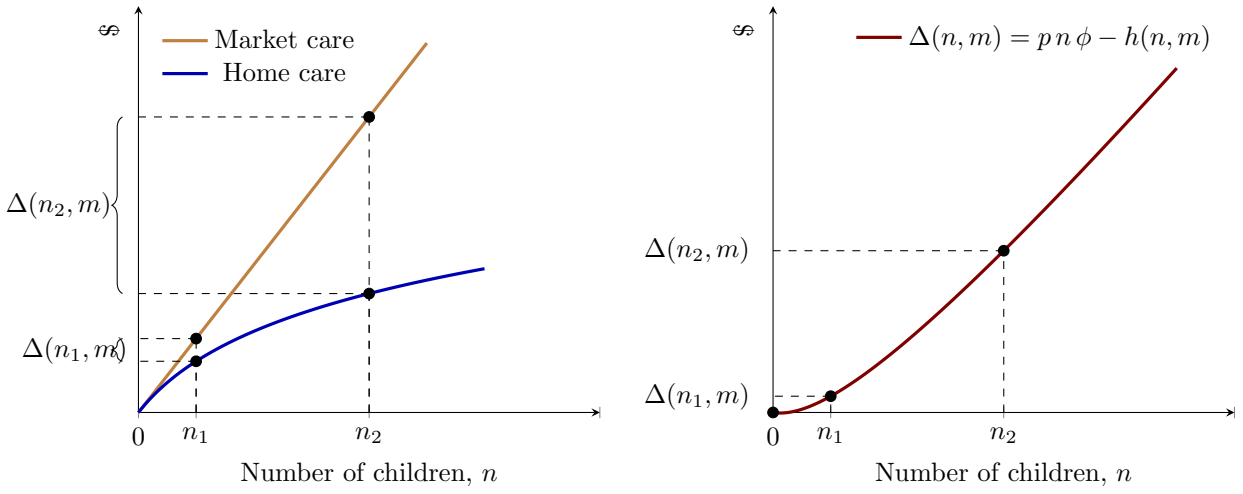
$$w_2 - w_2^r \leq pn\phi - h(n, m) \equiv \Delta(n, m),$$

and

$$w_2^r \geq h(n, m),$$

where $\Delta(n, m)$ denotes the net savings from avoiding market childcare costs.

Figure 4(a) illustrates that market childcare costs $pn\phi$ increase linearly in n, whereas multitasking costs $h(n, m)$ increase at a decreasing rate. Consequently, $\Delta(n, m)$ is increasing and convex in n, as illustrated in Figure 4(b). Higher fertility therefore relaxes the condition under which remote work is preferred to onsite work. At the same time, higher fertility raises $h(n, m)$, tightening the condition under which remote work is preferred to home production.



(a) Childcare costs.

(b) Cost differential.

Figure 4: Childcare costs and the cost differential between market and home care.

Proposition 1. Holding wages and childcare prices fixed, an increase in fertility raises the

likelihood that mothers choose remote work over onsite employment, but reduces the likelihood that they choose remote work over home production when multitasking costs are sufficiently large.

This logic is illustrated graphically in Figure 5. Define the wage differential $WD \equiv w_2 - w_2^r$ and let

$$f(n,m) = \Delta(n,m) - WD, \qquad g(n,m) = w_2^r - h(n,m).$$

Remote work is optimal if and only if $f(n,m) \geq 0$ and $g(n,m) \geq 0$. As shown in Figure 5, $f(n,m)$ is increasing in n, while $g(n,m)$ is decreasing. Let n_1 denote the threshold at which $f(n,m) = 0$ and n_2 the threshold at which $g(n,m) = 0$. Then remote work is optimal for $n \in [n_1, n_2]$. For $n < n_1$, onsite work is preferred; for $n > n_2$, home production is preferred.

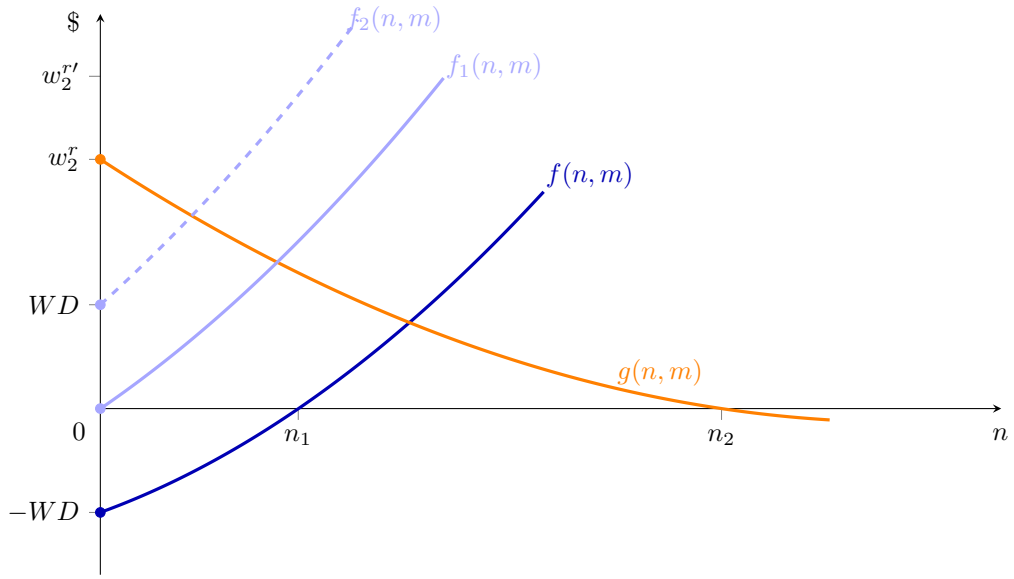


Figure 5: Illustration of the functions $f(n,m)$ and $g(n,m)$ under alternative assumptions on the wage differential $WD \equiv w_2 - w_2^r$.

Monitoring affects the attractiveness of remote work through $h(n,m)$. An increase in m raises multitasking costs, shifting both $f(n,m)$ and $g(n,m)$ downward and shrinking the region in which remote work is optimal.

Proposition 2. Holding wages, fertility, and childcare prices fixed, an increase in monitoring intensity reduces the likelihood that mothers choose remote work over both onsite employment and home production.

An increase in remote wages reduces the compensating wage differential WD and increases the attrac-

tiveness of remote work. As illustrated in Figures 5 and 6, an increase in w_2^r shifts both $f(n,m)$ and $g(n,m)$ upward, expanding the range of fertility levels for which remote work is optimal.

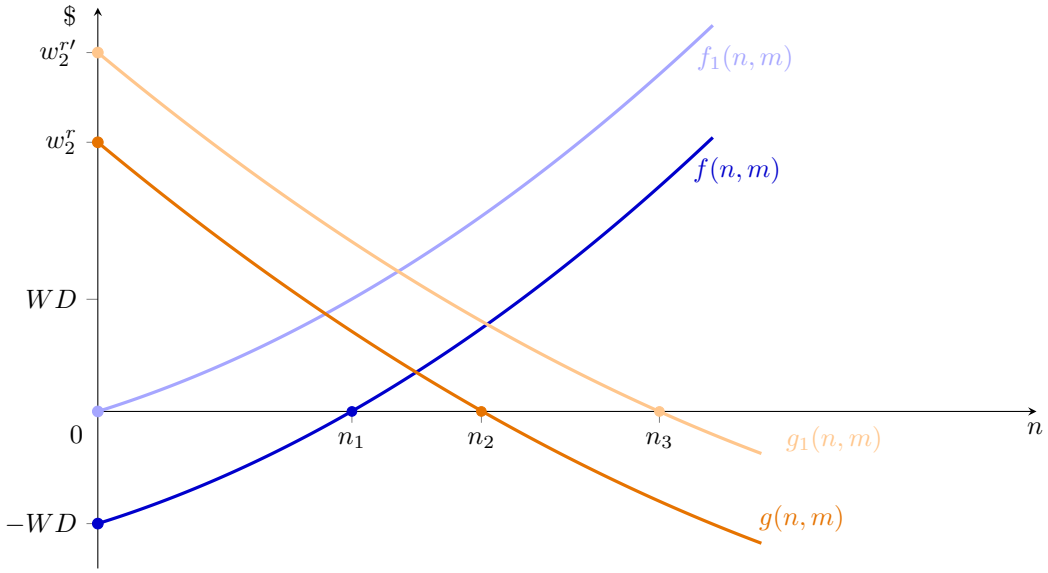


Figure 6: Graphical illustration of $f(n,m) = \Delta(n,m) - WD$ and $g(n,m) = w_2^r - h(n,m)$ as functions of the number of children n. The dark-blue curve $f(n,m)$ corresponds to $WD > 0$, while the light-blue curve $f_1(n,m)$ corresponds to the case in which w_2^r rises to $w_2^{r\prime}$ such that $w_2 = w_2^{r\prime}$ and hence $WD = 0$. The orange curve $g(n,m)$ starts at w_2^r, and the light-orange curve $g_1(n,m)$ starts at $w_2^{r\prime} > w_2^r$, shifting the zero crossing from n_2 to n_3.

Proposition 3. Holding fertility and childcare prices fixed, an increase in remote wages raises the likelihood that mothers choose remote work over both onsite employment and home production.

In sum, the model yields three key predictions. First, fertility increases the relative attractiveness of remote work compared to onsite employment by raising the cost of market childcare more than the cost of home-based childcare. Second, higher multitasking costs—driven by remote job characteristics such as how inflexible work hours are throughout the day—reduce the attractiveness of remote work relative to home production. Third, higher remote wages relative to onsite wages increase the attractiveness of remote work by reducing the compensating wage differential.

These theoretical predictions provide a useful framework for interpreting the empirical findings. Some evidence suggests that the post-pandemic expansion of remote work has been accompanied by a larger compensating wage differential for remote work, as workers have become increasingly willing to forgo earnings in exchange for the opportunity to work remotely (Barrero et al., 2022; Cullen et al., 2025). As a result, the net benefits of remote work for mothers with additional children may have declined. In particular, mothers facing greater childcare demands may be less willing to accept lower wages in exchange for remote-work flexibility, especially when the associated wage reduction exceeds market childcare costs.

At the same time, if remote work after the pandemic is more synchronous or is characterized by greater monitoring intensity, multitasking costs may have increased, further limiting the feasibility of combining remote work with childcare responsibilities. Together, these mechanisms provide an explanation for why fertility increased remote work among mothers with two or more children in the pre-pandemic period but not in the post-pandemic era.

7 Conclusion

This paper estimates the causal effect of fertility on mothers' work arrangements, with a particular focus on remote work. Using harmonized individual-level data from the American Community Survey (ACS) obtained through IPUMS USA for the period 2003–2024, we exploit exogenous variation in fertility generated by the sex composition of the first two children and twin births at the second parity. We find that fertility significantly reduces mothers' labor force participation across our entire sample period, consistent with a large body of existing evidence (Angrist and Evans, 1998; Vere, 2011; Aaronson et al., 2020). We also find that fertility increases the probability of working remotely during the pre-pandemic period. However, this effect becomes negative in the post-pandemic period (though generally indistinguishable from zero). These estimated effects of fertility on remote work are robust to a range of alternative specifications, including the use of an alternative fertility measure, conditioning on labor force participation, restricting the sample to mothers employed in teleworkable occupations and/or with college degrees, and excluding the transition year 2020.

To better understand the positive pre-pandemic effect of fertility on remote work and its subsequent decline, we investigate several potential mechanisms. The evidence indicates that the results are neither driven by changing selection into teleworkable occupations nor by changes in the observable characteristics of compliers over time. Instead, the disappearance of the pre-pandemic effect appears to reflect broader changes in the nature and allocation of remote work following the pandemic.

To rationalize these findings, we develop a simple theoretical framework highlighting the roles of compensating wage differentials and workplace monitoring in shaping mothers' remote work decisions. The model shows that a larger compensating wage differential associated with remote work, or greater workplace monitoring that reduces workers' ability to combine paid work and childcare at home, attenuates the responsiveness of remote work to fertility. These mechanisms provide a coherent explanation for why the positive effect of fertility on remote work largely disappears after 2020.

Overall, the results suggest that the expansion of remote work alone is unlikely to eliminate the negative labor-market consequences of fertility for mothers with two or more children. While remote work can provide

an important margin of flexibility, its effectiveness depends on job design, compensating wage differentials, and workplace monitoring. Policies aimed at strengthening mothers' labor-market attachment through remote work should therefore account for these factors.

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Appendix A: Using an Alternative Measure of Fertility

In the main analysis, fertility is measured by the number of children in the household. This section examines the robustness of our findings using an alternative measure of fertility—an indicator for whether a mother has a third child—as in Angrist and Evans (1998), Vere (2011), and Aaronson et al. (2020).

Table A1 reports the corresponding first-stage estimates. The instruments continue to exhibit strong, positive, and statistically significant first-stage effects, confirming their relevance under this alternative measure of fertility. Over the full 2003–2024 period, the same-sex instrument increases the probability of having a third child by approximately 5 percentage points, while the twin instrument increases it by about 66 percentage points. Both estimates are statistically significant at the 1 percent level and closely match those reported in the previous literature (Vere, 2011; Aaronson et al., 2020).

Table A1: First-Stage Effects of Instruments on the Probability of Having a Third Child

	Dependent variable: Third child Indicator			
	(1) 2003–2024	(2) 2003–2019	(3) 2015–2019	(4) 2020–2024
Same-sex siblings	0.051***	0.052***	0.052***	0.050***
	(0.001)	(0.001)	(0.001)	(0.001)
Twin at 2nd birth	0.658***	0.659***	0.657***	0.653***
	(0.001)	(0.001)	(0.001)	(0.001)
Mean dep. var	0.356	0.355	0.360	0.361
Observations	3,666,277	2,834,254	856,222	832,021

Notes: Each coefficient comes from a separate first-stage regression of an indicator for having a third child on the indicated instrument. All specifications include controls for age, education, marital status, race, Hispanic origin, year fixed effects, industry fixed effects, occupation fixed effects, and occupation teleworkability-by-year fixed effects, and are weighted using person weights. Robust standard errors are reported in parentheses. Coefficients and standard errors are rounded to three decimals.
$^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$.

Table A2 reports the OLS and second-stage IV estimates of the effects of having a third child on labor force participation and remote work. As in the main analysis, results are presented for the 2003–2024, 2003–2019, 2015–2019, and 2020–2024 periods. Among mothers with at least two children, the estimated effects of having a third child are broadly similar to those obtained when fertility is measured by the total number of children, although the point estimates are somewhat larger.

Across specifications and periods, the estimated effects on labor force participation are consistently negative and statistically significant, in line with the main results. The remote-work estimates also follow a similar pattern as the baseline results. During 2003–2019, having a third child increases the probability of working remotely under both the twin and same-sex specifications. These effects weaken over time and become negative and statistically indistinguishable from zero during 2020–2024.

Overall, these results reinforce the main conclusion that fertility reduces mothers' labor force participation across periods, while its effects on remote work are positive before the pandemic but decline over time and become negative and insignificant thereafter.

Table A2: Effects of Having a Third Child on Remote Work and Labor Force Participation

	Remote work		Labor force participation		OLS	
	Same-sex IV	Twin IV	Same-sex IV	Twin IV	Remote	Labor force
Panel A. 2003–2024						
Third child	0.004	0.001	-0.079***	-0.044***	0.004***	-0.072***
	(0.006)	(0.002)	(0.010)	(0.003)	(0.000)	(0.001)
Mean of dep. var.	0.066	0.066	0.717	0.717	0.066	0.717
Observations	3,666,277	3,666,277	4,672,016	4,672,016	3,666,277	4,672,016
Panel B. 2003–2019						
Third child	0.013**	0.003**	-0.074***	-0.049***	0.007***	-0.072***
	(0.006)	(0.002)	(0.012)	(0.004)	(0.000)	(0.001)
Mean of dep. var.	0.043	0.043	0.711	0.711	0.043	0.711
Observations	2,834,254	2,834,254	3,620,574	3,620,574	2,834,254	3,620,574
Panel C. 2015–2019						
Third child	0.009	0.003	-0.079***	-0.034***	0.007***	-0.071***
	(0.011)	(0.003)	(0.021)	(0.006)	(0.001)	(0.001)
Mean of dep. var.	0.052	0.052	0.722	0.722	0.052	0.722
Observations	856,222	856,222	1,103,006	1,103,006	856,222	1,103,006
Panel D. 2020–2024						
Third child	-0.031*	-0.005	-0.097***	-0.026***	-0.004***	-0.069***
	(0.018)	(0.005)	(0.022)	(0.007)	(0.001)	(0.001)
Mean of dep. var.	0.141	0.141	0.738	0.738	0.141	0.738
Observations	832,021	832,021	1,051,442	1,051,442	832,021	1,051,442
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Occupation FE	Yes	Yes	No	No	Yes	No
Industry FE	Yes	Yes	No	No	Yes	No
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Teleworkability × Year FE	Yes	Yes	No	No	Yes	No

Notes: Each panel reports second-stage estimates of the effect of having a third child on remote work and labor force participation. The same-sex IV specifications instrument having a third child using an indicator for whether the first two children are of the same sex, while the twin-IV specifications use an indicator for twins at the second birth. The OLS columns report weighted linear regressions of each outcome on having a third child. Remote-work specifications include controls, year fixed effects, industry fixed effects, occupation fixed effects, and occupation teleworkability-by-year fixed effects. Labor force participation specifications include controls and year fixed effects only. Controls include age, education, marital status, race, Hispanic origin, and sex of the first child. Regressions are weighted using person weights, and robust standard errors are reported in parentheses. Differences in sample size between the remote-work and labor force participation regressions arise because the remote-work specifications exclude women without applicable occupation and industry codes or with missing occupation-level teleworkability measures.
$^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.10$.

Appendix B: Effects of Fertility on Mothers' Remote Work After Removing 2020

In this section, we assess the robustness of the main findings by excluding the year 2020, which marked the onset of the COVID-19 pandemic and the associated disruption of the labor market. Table B1 reports the results. Overall, the estimates are consistent with those obtained from the full sample, indicating that our

main findings are robust to excluding this transition year.

Table B1: Effects of Fertility on Remote Work and Labor Force Participation: Excluding 2020

	Remote work		Labor force participation		OLS	
	Same-sex IV	Twin IV	Same-sex IV	Twin IV	Remote	Labor force
Panel A. 2003–2024, excluding 2020						
Number of children	0.003	0.002	-0.057***	-0.030***	0.003***	-0.050***
	(0.004)	(0.001)	(0.007)	(0.002)	(0.000)	(0.000)
Mean of dep. var.	0.051	0.051	0.716	0.716	0.051	0.716
Observations	3,529,561	3,529,561	4,499,104	4,499,104	3,529,561	4,499,104
Panel B. 2003–2019						
Number of children	0.009**	0.002**	-0.053***	-0.033***	0.005***	-0.051***
	(0.004)	(0.001)	(0.008)	(0.002)	(0.000)	(0.000)
Mean of dep. var.	0.036	0.036	0.711	0.711	0.036	0.711
Observations	2,834,254	2,834,254	3,620,574	3,620,574	2,834,254	3,620,574
Panel C. 2015–2019						
Number of children	0.007	0.002	-0.057***	-0.023***	0.005***	-0.049***
	(0.008)	(0.002)	(0.015)	(0.004)	(0.000)	(0.001)
Mean of dep. var.	0.042	0.042	0.722	0.722	0.042	0.722
Observations	856,222	856,222	1,103,006	1,103,006	856,222	1,103,006
Panel D. 2021–2024						
Number of children	-0.023	0.000	-0.077***	-0.018***	-0.001**	-0.047***
	(0.014)	(0.004)	(0.016)	(0.005)	(0.001)	(0.001)
Mean of dep. var.	0.119	0.119	0.741	0.741	0.119	0.741
Observations	695,306	695,306	878,530	878,530	695,306	878,530
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Occupation FE	Yes	Yes	No	No	Yes	No
Industry FE	Yes	Yes	No	No	Yes	No
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Teleworkability × Year FE	Yes	Yes	No	No	Yes	No

Notes: The sample is restricted to mothers aged 25–55 with at least two children. Each panel reports estimates of the effect of the number of children on remote work and labor force participation. Same-sex IV instruments the number of children using an indicator for whether the first two children are of the same sex. Twin IV instruments the number of children using an indicator for twins at the second birth. The OLS columns report weighted linear regressions of each outcome on the number of children. Remote-work specifications include controls, occupation fixed effects, industry fixed effects, year fixed effects, and occupation teleworkability-by-year fixed effects. Labor force participation specifications include controls and year fixed effects only. Controls include age, education, marital status, race, Hispanic origin, and sex of the first child. Regressions are weighted using person weights, and robust standard errors are reported in parentheses. Differences in sample size between the remote-work and labor force participation regressions arise because the remote-work specifications exclude women without applicable occupation and industry codes or with missing occupation-level teleworkability measures. Year 2020 is excluded from all specifications.
$^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.10$.

Appendix C: Heterogeneity by the Age of the Second Child

We next examine whether the effects of fertility vary with the age of the youngest child in the household. Because the sample is restricted to mothers with at least two children, we use the age of the second child as a proxy for the age of the youngest child. We then re-estimate the main specifications separately for mothers

whose second child is aged 0–5, 6–12, and 13 or older.

Table C1 reports the results. The negative effects of fertility on labor force participation are concentrated among mothers with younger children, while the positive effects on remote work are strongest among mothers with school-aged children.

Among mothers whose second child is aged 0–5, fertility substantially reduces labor force participation. Using the same-sex instrument, an additional child lowers labor force participation by 7.5 percentage points in the 2003–2019 period and by 16,4 percentage points in the 2020–2024 period. In contrast, fertility has little effect on remote work for this group. Although the remote-work estimates are positive before the pandemic and negative afterward, they are statistically indistinguishable from zero. The only exception is the twin-IV estimate for the post-pandemic period, which indicates a small and significant negative effect.

For mothers whose second child is aged 6–12, the decline in labor force participation associated with fertility is considerably smaller. This pattern is consistent with the idea that school-aged children require less direct supervision than preschool-aged children, thereby reducing the need for mothers to withdraw from the labor market. At the same time, this group exhibits the strongest remote-work responses. In the 2003–2019 period, both instruments indicate meaningful increases in likelihood of remote work. The twin-IV estimates imply that an additional child increases the probability of working remotely by approximately 0.4 percentage points, while the same-sex IV estimates imply an increase of about 1.1 percentage points. By contrast, the post-pandemic estimates are close to zero, negative in sign, and statistically insignificant.

The results are significantly different for mothers whose second child is aged 13 or older. For this group, fertility has little effect on either labor force participation or remote work. With the exception of negative labor force participation estimates in the 2003-2019 period, the IV estimates are small and statistically insignificant. This finding is consistent with the notion that older children require substantially less parental time and supervision, reducing the need for mothers to adjust either their labor supply or work arrangements in response to an additional child.

Taken together, these results reinforce the central findings of the paper. First, the positive effect of fertility on remote work remains concentrated in the pre-pandemic period. Second, the heterogeneity analysis reveals that the mechanisms underlying mothers' responses to fertility vary across stages of child development. The labor force participation effects are strongest when children are very young, whereas the remote-work effects are concentrated among mothers with school-aged children. These patterns are consistent with remote work serving as a flexibility margin that allows mothers to remain in the labor force when childcare demands are substantial but not so intensive as to necessitate leaving the labor market.

Table C1: Effects of Fertility on Remote Work and Labor Force Participation by Age of Second Child

	Remote work		Labor force participation	
	Same-sex IV	Twin IV	Same-sex IV	Twin IV
Panel A. Second child aged 0–5 (2003–2019)				
Number of children	0.021	0.001	-0.075**	-0.056***
	(0.018)	(0.002)	(0.036)	(0.005)
Mean of dep. var.	0.037	0.037	0.657	0.657
Observations	759,863	759,863	956,745	956,745
Panel B. Second child aged 0–5 (2020–2024)				
Number of children	-0.062	-0.011*	-0.164**	-0.036***
	(0.057)	(0.007)	(0.068)	(0.009)
Mean of dep. var.	0.132	0.132	0.703	0.703
Observations	220,836	220,836	271,581	271,581
Panel C. Second child aged 6–12 (2003–2019)				
Number of children	0.011*	0.004**	-0.068***	-0.025***
	(0.006)	(0.002)	(0.012)	(0.004)
Mean of dep. var.	0.037	0.037	0.715	0.715
Observations	1,058,479	1,058,479	1,367,034	1,367,034
Panel D. Second child aged 6–12 (2020–2024)				
Number of children	-0.012	-0.001	-0.109***	-0.018**
	(0.021)	(0.006)	(0.024)	(0.007)
Mean of dep. var.	0.124	0.124	0.745	0.745
Observations	304,061	304,061	385,176	385,176
Panel E. Second child aged 13+ (2003–2019)				
Number of children	0.005	0.000	-0.045***	-0.018***
	(0.005)	(0.002)	(0.011)	(0.004)
Mean of dep. var.	0.033	0.033	0.748	0.748
Observations	1,015,904	1,015,904	1,296,795	1,296,795
Panel F. Second child aged 13+ (2020–2024)				
Number of children	-0.023	-0.002	-0.020	-0.006
	(0.018)	(0.005)	(0.019)	(0.007)
Mean of dep. var.	0.106	0.106	0.754	0.754
Observations	307,115	307,115	394,685	394,685
Controls	Yes	Yes	Yes	Yes
Occupation FE	Yes	Yes	No	No
Industry FE	Yes	Yes	No	No
Year FE	Yes	Yes	Yes	Yes
Teleworkability × Year FE	Yes	Yes	No	No

Notes: This table reports IV estimates of the effect of the number of children on remote work and labor force participation by the age of the second child. Same-sex IV instruments the number of children using an indicator for whether the first two children are of the same sex. Twin IV instruments the number of children using an indicator for twins at the second birth. Remote-work specifications include controls, year fixed effects, industry fixed effects, occupation fixed effects, and occupation teleworkability-by-year fixed effects. Labor force participation specifications include controls and year fixed effects only. Controls include age, education, marital status, race, Hispanic origin, and sex of the first child. Regressions are weighted using person weights, and robust standard errors are reported in parentheses. Differences in sample size between the remote-work and labor force participation regressions arise because the remote-work specifications exclude women without applicable occupation and industry codes or with missing occupation-level teleworkability measures. $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.10$.

Appendix D: Effects on Mothers in Teleworkable Occupations and College Educated Mothers

This section examines the effects of fertility among mothers i) in teleworkable occupations, ii) who are college-educated, and iii) who are both.

Table D1 reports the results for mothers in teleworkable occupations. During the 2003-2019 period, the same-sex IV indicates that an additional child increases the likelihood of working remotely by 1.3 percentage points, which is larger than the corresponding baseline estimate. The twin IV estimate is considerably smaller, at 0.1 percentage point, and is statistically insignificant. Consistent with the baseline findings, these estimates decline over time and become negative and statistically insignificant in the post pandemic period.

Table D1: Effects of Fertility on Remote Work Among Mothers in Teleworkable Occupations

	IV (2SLS)		OLS
	Same-sex IV	Twin IV	Remote Work
Panel A: 2003–2024			
Number of Children	0.003	-0.001	0.004***
	(0.008)	(0.002)	(0.000)
Observations	1,910,817	1,910,817	1,910,817
Mean of dep. var.	0.099	0.099	0.099
Panel B: 2003–2019			
Number of Children	0.013*	0.001	0.008***
	(0.007)	(0.002)	(0.000)
Observations	1,466,547	1,466,547	1,466,547
Mean of dep. var.	0.064	0.064	0.064
Panel C: 2015–2019			
Number of Children	0.003	0.002	0.008***
	(0.014)	(0.004)	(0.001)
Observations	444,762	444,762	444,762
Mean of dep. var.	0.077	0.077	0.077
Panel D: 2020–2024			
Number of Children	-0.035	-0.007	-0.004***
	(0.023)	(0.006)	(0.001)
Observations	444,270	444,270	444,270
Mean of dep. var.	0.212	0.212	0.212

Notes: Each column reports second-stage estimates of the effect of number of children on remote work among mothers with at least two children in teleworkable occupations. Same-sex IV uses the sex composition of the first two children as an instrument; Twin IV uses twin births at second parity. All regressions include controls for age, education, marital status, race, Hispanic origin, sex of first child, year fixed effects, industry fixed effects, and occupation fixed effects, and use ACS person weights. Robust standard errors in parentheses.
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

We next examine the effects for college-educated mothers, reported in Table D2. The estimated effects of fertility on remote work for mothers in this group follow the same temporal pattern observed in the full sample of mothers with two or more children. During the 2003–2019 period, an additional child increases the likelihood of working remotely under both the same-sex and twin instruments, although both estimates are significant only at the 10 percent level. These effects subsequently decline, becoming negative and statistically insignificant in the post-pandemic period. Overall, the point estimates are somewhat larger relative to the baseline estimates, suggesting that college-educated mothers are more likely to respond to an additional child by shifting to remote work.

A different pattern emerges for labor force participation. Under the twin instrument, an additional child reduces labor force participation in every period, although the estimated effects are modest and similar to those observed for the full sample of mothers with two or more children. Under the same-sex instrument, the pre-pandemic estimates are small and statistically insignificant, whereas the post-pandemic estimate is larger, negative, and statistically significant. Across the sample periods, the same-sex IV estimates for college-educated mothers are smaller in magnitude than those for the full sample of mothers with two or more children, suggesting that college-educated mothers are less likely to leave the labor force after an additional birth.

Taken together, these findings suggest that, before the pandemic, college-educated mothers were relatively more likely to respond to an additional child by adjusting their work arrangements rather than leaving the labor market. The larger pre-pandemic effects on remote work, coupled with relatively modest effects on labor force participation under the twin instrument, are consistent with remote work providing an important margin of flexibility that enabled these mothers to remain employed while accommodating childcare demands.

Table D2: Effects of Fertility on Remote Work and Labor Force Participation: Mothers with BA or Higher

	Remote work		Labor force participation		OLS	
	Same-sex IV	Twin IV	Same-sex IV	Twin IV	Remote	Labor force
Panel A. 2003–2024						
Number of children	0.008	-0.000	-0.032***	-0.027***	0.003***	-0.064***
	(0.010)	(0.002)	(0.012)	(0.003)	(0.000)	(0.001)
Mean of dep. var.	0.103	0.103	0.780	0.780	0.103	0.780
Observations	1,383,810	1,383,810	1,683,541	1,683,541	1,383,810	1,683,541
Panel B. 2003–2019						
Number of children	0.016*	0.004*	-0.021	-0.033***	0.007***	-0.066***
	(0.009)	(0.002)	(0.015)	(0.004)	(0.000)	(0.001)
Mean of dep. var.	0.062	0.062	0.766	0.766	0.062	0.766
Observations	1,002,069	1,002,069	1,227,798	1,227,798	1,002,069	1,227,798
Panel C. 2015–2019						
Number of children	0.017	0.001	-0.019	-0.025***	0.006***	-0.061***
	(0.017)	(0.004)	(0.024)	(0.006)	(0.001)	(0.001)
Mean of dep. var.	0.073	0.073	0.794	0.794	0.073	0.794
Observations	349,845	349,845	424,634	424,634	349,845	424,634
Panel D. 2020–2024						
Number of children	-0.011	-0.008	-0.058***	-0.011*	-0.006***	-0.058***
	(0.024)	(0.006)	(0.021)	(0.006)	(0.001)	(0.001)
Mean of dep. var.	0.208	0.208	0.816	0.816	0.208	0.816
Observations	381,722	381,722	455,743	455,743	381,722	455,743
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Occupation FE	Yes	Yes	No	No	Yes	No
Industry FE	Yes	Yes	No	No	Yes	No
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Teleworkability × Year FE	Yes	Yes	No	No	Yes	No

Notes: The sample is restricted to mothers with a BA degree or higher. Each panel reports second-stage estimates of the effect of the number of children on remote work and labor force participation. Same-sex IV instruments the number of children using an indicator for whether the first two children are of the same sex. Twin IV instruments the number of children using an indicator for twins at the second birth. The OLS columns report weighted linear regressions of each outcome on the number of children. Remote-work specifications include controls, year fixed effects, industry fixed effects, occupation fixed effects, and occupation teleworkability-by-year fixed effects. Labor force participation specifications include controls and year fixed effects only. Controls include age, marital status, race, Hispanic origin, and sex of the first child. Regressions are weighted using person weights, and robust standard errors are reported in parentheses. Differences in sample size between the remote-work and labor force participation regressions arise because the remote-work specifications exclude women without applicable occupation and industry codes or with missing occupation-level teleworkability measures.
$^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.10$.

We also examine the effects of fertility on remote work among college-educated mothers in teleworkable occupations. Table D3 reports the results. For the 2003–2019 period, the same-sex IV estimate is slightly larger than the corresponding estimate for all college-educated mothers with two or more children, while the twin-IV instrument is smaller and statistically insignificant. The larger same-sex IV estimate provides suggestive evidence that, in addition to having a college degree, having a teleworkable occupation enables mothers to adjust to an additional child by shifting to remote work. This interpretation is consistent with

prior work that suggests that women in teleworkable occupations experience smaller employment first child penalties (Arnon et al., 2025).

Table D3: Effects of Fertility on Remote Work Among College-Educated Mothers in Teleworkable Occupations

	IV (2SLS)		OLS
	Same-sex IV	Twin IV	Remote Work
Panel A: 2003–2024			
Number of children	0.011	-0.004	0.003***
	(0.012)	(0.003)	(0.001)
Observations	982,523	982,523	982,523
Mean of dep. var.	0.120	0.120	0.120
Panel B: 2003–2019			
Number of children	0.021*	0.001	0.008***
	(0.012)	(0.003)	(0.001)
Observations	716,269	716,269	716,269
Mean of dep. var.	0.071	0.071	0.071
Panel C: 2015–2019			
Number of children	0.022	0.001	0.007***
	(0.022)	(0.005)	(0.001)
Observations	248,272	248,272	248,272
Mean of dep. var.	0.084	0.084	0.084
Panel D: 2020–2024			
Number of children	-0.009	-0.015**	-0.008***
	(0.030)	(0.007)	(0.001)
Observations	266,254	266,254	266,254
Mean of dep. var.	0.248	0.248	0.248

Notes: Each column reports estimates of the effect of the number of children on remote work among mothers with at least two children, a BA degree or higher, and a teleworkable occupation. Same-sex IV instruments the number of children using an indicator for whether the first two children are of the same sex. Twin IV instruments the number of children using an indicator for twins at the second birth. The OLS column reports weighted linear regressions of remote work on the number of children. All specifications include controls for age, marital status, race, Hispanic origin, and sex of the first child, as well as year, industry, and occupation fixed effects. Regressions are weighted using ACS person weights, and robust standard errors are reported in parentheses.
$^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.10$.

Appendix E: Effects of Fertility on Spouses' likelihood of Working Remotely: College-educated Spouses

This section extends the analysis in Section 5.3 by examining the effects of additional children on remote work among college-educated spouses. Table E1 presents the results. The OLS estimates indicate a positive association between fertility and spouses' remote work before the pandemic, but this association becomes

negative afterward. The same-sex IV estimates are negative and statistically insignificant in the pre-pandemic periods and positive but insignificant after the pandemic. Conversely, the twin IV estimates are positive and insignificant before the pandemic and negative and insignificant afterward. The estimated effects on labor-force participation are generally small, negative, and insignificant under both instruments; the only exception is the post-pandemic twin IV estimate, which is positive but also insignificant.

Overall, these results corroborate the findings in Section 5.3: there is no evidence that additional children significantly increase spouses' likelihood of working remotely. The results therefore do not support increased remote work among co-resident spouses as an explanation for the post-pandemic decline in the effect of fertility on remote work among mothers with two or more children.

Table E1: Effects of Fertility on Spouses' Remote Work and Labor Force Participation: Spouses with a BA or Higher

	Remote work		Labor force participation		OLS	
	Same-sex IV	Twin IV	Same-sex IV	Twin IV	Remote	Labor force
Panel A. 2003–2024						
Number of children	-0.001	0.000	-0.008	0.000	-0.001*	0.000
	(0.009)	(0.003)	(0.006)	(0.002)	(0.000)	(0.000)
Mean of dep. var.	0.106	0.106	0.968	0.968	0.106	0.968
Observations	1,273,664	1,273,664	1,383,294	1,383,294	1,273,664	1,383,294
Panel B. 2003–2019						
Number of children	-0.005	0.001	-0.004	-0.001	0.002***	0.001***
	(0.008)	(0.003)	(0.006)	(0.002)	(0.000)	(0.000)
Mean of dep. var.	0.058	0.058	0.969	0.969	0.058	0.969
Observations	946,028	946,028	1,030,078	1,030,078	946,028	1,030,078
Panel C. 2015–2019						
Number of children	-0.006	0.004	-0.008	-0.004	0.002**	0.000
	(0.016)	(0.005)	(0.011)	(0.003)	(0.001)	(0.001)
Mean of dep. var.	0.071	0.071	0.970	0.970	0.071	0.970
Observations	309,550	309,550	335,561	335,561	309,550	335,561
Panel D. 2020–2024						
Number of children	0.009	-0.003	-0.017	0.002	-0.008***	-0.002***
	(0.026)	(0.007)	(0.012)	(0.003)	(0.001)	(0.001)
Mean of dep. var.	0.241	0.241	0.966	0.966	0.241	0.966
Observations	327,635	327,635	353,216	353,216	327,635	353,216
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Occupation FE	Yes	Yes	No	No	Yes	No
Industry FE	Yes	Yes	No	No	Yes	No
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Teleworkability × Year FE	Yes	Yes	No	No	Yes	No

Notes: The sample is restricted to mothers whose legally married, co-resident spouse has a bachelor's degree or higher. Each panel reports estimates of the effect of the number of children on the spouse's remote work and labor-force participation. Same-sex IV instruments fertility using an indicator for whether the first two children are of the same sex. Twin IV instruments fertility using an indicator for twins at the second birth. The OLS columns report weighted linear regressions of each outcome on the number of children. Remote-work specifications include spouse characteristics, year fixed effects, industry fixed effects, occupation fixed effects, and spouse occupation teleworkability-by-year fixed effects. Labor-force participation specifications include spouse characteristics and year fixed effects. Controls include the spouse's age, race, Hispanic origin, and sex, together with the sex of the first child. Education is omitted from the controls because all spouses in this subsample have a bachelor's degree or higher. Regressions are weighted using the spouse's person weight, and robust standard errors are reported in parentheses. Reported means are probability-weighted means for the corresponding estimation samples. Observation counts reflect singleton removal by the fixed-effects estimator.

$^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.10$.