Place Effects on Fertility Decision: Evidence from Movers Design*

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Abstract

This paper investigates the causal impact of place-based factors on fertility decision using movers design and data from the Panel Study of Income Dynamics (1968-2019). We find that moving to a state with a 1 percentage point higher birth rate increases the probability of childbirth by 0.9 percentage points, with cumulative effects reaching 3.8 percentage points three years post-move. The response is concentrated among first births and varies systematically with demographic characteristics—effects are largest for married, younger, and high-income women. Our variance decomposition shows the contribution of place effects to fertility variance increased from 4.7 percent to 26.0 percent before and after the Great Recession, with geographical variation in contraceptive access and healthcare infrastructure showing the strongest correlations with these place effects. This research emphasizes the importance of considering contextual factors in fertility research and policy interventions.

Keywords: Place Effects, Fertility, Movers Design

JEL codes: J13, J16, J48

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1 Introduction

The persistent decline in fertility rates across the United States has drawn significant attention from researchers and policymakers alike (Buckles et al., 2022). This decline, however, is not uniform across the country. West Coast states, for instance, have experienced a substantial fertility decline, with California seeing a drop of over 10 percent, while East Coast states have shown a milder reduction (Kearney et al., 2022). These geographic disparities in fertility trends raise important questions about the role of place-specific factors in shaping reproductive decisions.

Despite the growing body of research on fertility trends, the extent to which these geographical disparities reflect the causal impact of place, as opposed to the non-random sorting of families, remains unclear. Understanding this distinction is crucial for developing effective policies to address declining fertility rates and their associated demographic challenges. If place-specific factors significantly influence fertility decisions, then policies targeting local conditions could potentially impact fertility trends. Conversely, if these disparities primarily reflect sorting, a different policy approach may be necessary.

This paper provides new evidence on the role of place in determining fertility decisions, a key demographic behavior that influences population dynamics. Using data from the Panel Study of Income Dynamics (PSID) spanning 1968-2019, we employ a mover design to examine changes in fertility among individuals who relocate to regions with different birth rates. This research design, widely used in studying place effects on socioeconomic outcomes, allows us to control for time-invariant individual-side factors using individual fixed effects.[1] Therefore, any observed changes in an individual's fertility decision can be attributable to changes in place-side factors due to migration, shedding light on the relative importance of place effects in driving the geographic distribution of fertility rates.

Our first main result demonstrates that place-related factors significantly influence fertility decisions. Specifically, when a woman relocates to a state with a birth rate 1 percentage point (10 births per 1,000) higher (lower) than her original state, the probability of giving birth increases (decreases)

[1] This approach has been used in a variety of contexts, such as research on wage inequality (Card et al., 2013), mortality and health care spending (Finkelstein et al., 2016, 2021), earning (Chetty et al., 2018), and health and longevity (Deryugina & Molitor, 2020).

by 0.9 percentage points following migration. The cumulative effects are even more substantial, with a 1 percentage point difference in birth rates between origin and destination states leading to a 3.8 percentage point shift in individual fertility decisions three years post-move. These place effects primarily impact decisions regarding first children, with negligible influence on higher-order births. Our analysis also reveals that certain demographic groups—particularly married women, younger individuals, and those with higher income levels—are more responsive to these location-based influences.

Building on the decomposition analysis by Abowd, Kramarz, and Margolis (1999; hereafter AKM), our second main finding shows that both individual-related and place-based factors have gained significance in explaining fertility decisions post-recession. Our diagnostic test confirms that moving to states with higher birth rates increases the likelihood of childbirth, while relocating to states with lower birth rates decreases it. Through a variance decomposition analysis conducted before and after the recession, we find that individual fixed effects account for 18.7 percent of total fertility variance before 2008, increasing to 39.8 percent after. Meanwhile, place fixed effects contribute 4.7 percent before 2008, rising substantially to 26.0 percent thereafter. The covariance between individual and place effects remains negligible throughout both periods, suggesting that migration decisions are not primarily driven by fertility considerations.

To identify the place-specific factors most strongly associated with fertility decision, we examine area-level correlations between our estimated causal place effects and eight key characteristics identified by Kearney et al. (2022) and Grossman et al. (2025). These include long-acting reversible contraception (LARC) usage, childcare expenditure, other contraceptive methods, student loan debt, importance of religion, gender equality index, male-female wage ratio, and housing rental burden. Our findings show that contraception usage—particularly LARC—and medical infrastructure (eg., hospitals, clinics, reproductive health services) have the strongest correlations with place effects on fertility. The primacy of LARC usage aligns with Buckles et al.'s (2022) finding that declining unintended births, driven by improved contraceptive access and effectiveness, was a key factor in the post-Great Recession fertility decline. These results suggest that geographical variation in both contraceptive access and medical infrastructure plays a crucial role in shaping local fertility patterns.

These results rest on the key assumption that the fertility level of a mother's destination state is

uncorrelated with unobserved, time-varying determinants of her fertility decisions. To assess the validity of this assumption, we undertake three complementary approaches. First, we analyze self-reported migration motives in the PSID, finding no systematic differences in reasons for relocation—such as job-related, family-related, or housing-related factors—between women moving to states with higher versus lower fertility rates. Second, we conduct an event study comparing pre-move fertility trends between movers to high versus low birth rate states. Our findings indicate that these groups exhibit similar fertility trends prior to relocation, suggesting that unobserved factors influencing fertility decisions are not systematically correlated with the destination's fertility level. Third, we perform a series of robustness checks. These include changing restricting the sample to movers only, excluding job-related relocations, using balanced panels, focusing on individuals with consistent observable characteristics over time, considering alternative measures of birth rates that account for internal and international migration, adjusting the definitions of migration size, and clustering standard errors at the state-pair level. Our results remain consistent across these analyses.

Our study makes three contributions to the literature. First, our results complement previous studies on the causal impact of place on various socioeconomic outcomes, including earnings (Chetty et al., 2018), mortality (Deryugina & Molitor, 2020), and health-related activities (Finkelstein et al., 2016). While recent work by Grossman (2019) examines how a specific place-based welfare program affects fertility outcomes, our study breaks new ground by providing the first comprehensive analysis of how broader place-based factors influence fertility decisions, one of the most significant choices in the human life cycle. By applying the movers design to fertility decisions, we extend the methodological approach used in recent place effects literature (e.g., Chetty and Hendren, 2018; Finkelstein et al., 2021) to a novel and critically important domain. Furthermore, our decomposition analysis, inspired by the AKM framework, reveals that place effects have become increasingly important in explaining individual fertility decisions since the Great Recession. This finding offers novel insight into what Kearney et al. (2022) characterize as the "puzzle" of declining U.S. birth rates - while their aggregate analysis found no strong links between policy factors and fertility trends, our approach uncovers growing geographical heterogeneity in fertility determinants.

Second, we provide the first comprehensive quantification of place effects on fertility decisions while isolating individual factors. This approach stands in contrast to previous research, which has

primarily focused on how individual factors such as income, education levels, and opportunity costs affect fertility rates (Becker, 1960; Baudin et al., 2015). While some studies have highlighted specific contextual characteristics influencing fertility rates, such as labor market conditions (Adsera, 2005), children's schooling opportunities (Aaronson et al., 2014), contraceptive access (Grossman et al., 2025) and healthcare and childcare availability (Furtado & Hock, 2010; Herrera-Almanza & Rosales-Rueda, 2020), there has been no comprehensive attempt to isolate individual factors and estimate the total role of place effects on fertility decisions. Moreover, our methodological approach, which allows us to follow the same individual over time rather than relying on aggregate-level data, enables us to rule out changes in sample composition as a potential source of confounding variation for the effect of place. This methodological innovation is particularly valuable given recent evidence on how compositional changes, such as immigration patterns, can significantly influence fertility rates (Bailey et al., 2023).

Third, our study advances the literature by examining the relationship between geographic mobility and fertility behavior. While extensive research has documented how international migration shapes fertility patterns—with Fernández and Fogli (2006) establishing that origin-country fertility norms persistently influence immigrants' reproductive decisions—evidence on internal migration's fertility impacts remains limited. Although recent work by Kopriva (2024) and Daudin et al. (2019) demonstrates how internal migration drives fertility convergence in specific historical contexts, systematic evidence from contemporary settings is scarce. Our analysis fills this gap by providing quasi-experimental evidence on fertility responses to internal migration in a modern economic context. Moving to a state with a 1 percentage point higher birth rate increases fertility by 0.9 percentage points—a finding that contrasts instructively with the international migration literature, where Fernández and Fogli (2006) document substantially larger effects in their correlation analysis. This integration of migration and place-effects literature advances our understanding of how geographical location influence demographic behavior across different mobility scales.

The remainder of this paper is organized as follows. Section 2 describes our data and empirical strategy. Section 3 presents our main analysis and Section 4 explores the mechanism. Section 5 concludes.

2 Data and Method

2.1 Empirical Strategy

Our empirical strategy aims to decompose the variation in fertility outcomes into components attributable to the current environment and individual factors. We employ a mover design, leveraging the change in fertility environment experienced by individuals who relocate across states. This approach allows us to control for time-invariant individual characteristics while isolating the effect of place-specific factors on fertility decisions. The core of our analysis is based on a nonparametric event study regression. Specifically, we estimate the following equation for individual i in period t:

$$Y_{it} = \alpha + \sum_{r=-3, r\neq -1}^{3} \theta_{r(i,t)} \cdot \Delta_i + \lambda_i + \phi_t + \gamma_{age} + \tau_r + \epsilon_{it} \quad (1)$$

where the outcome variable Y_{it} is a binary variable indicating whether individual i had a childbirth in the past year. The coefficients of interest, $\theta_{r(i,t)}$, capture the effect of the move on fertility r years relative to the move year, with $r = 0$ denoting the first year after the move.

The size of the move Δ_i represents the difference in group-specific birth rates between destination and origin states at the time of migration, where we classify individuals into three racial categories (White, Black, and Other) to capture relevant fertility environment changes across major demographic groups.[2] We include a comprehensive set of fixed effects to account for various sources of heterogeneity: λ_i for individual fixed effects, ϕ_t for year fixed effects, γ_{age} for 5-year age group fixed effects, τ_r for relative year of move fixed effects. This rich set of controls allows us to isolate the effect of the change in environment from other potential confounding factors.[3] All standard errors are clustered at the household level to allow for arbitrary correlation within household over time.

The coefficients $\theta_{r(i,t)}$ measure how much an individual's fertility outcome changes relative to the gap in birth rates between two states, Δ_i. If, after the move, the mover's fertility outcome changes by the same amount as the gap, the coefficient θ equals one. However, if there is no change in fertility outcomes after the move, the coefficient θ equals zero. The value of the coefficient measures the

[2] We also employ aggregate state-level birth rates not differentiated by race in robustness check, which yields quantitatively similar results, validating our primary specification using race-specific rates.

[3] We augment our baseline specification with additional origin and destination state fixed effects to account for time-invariant differences across states. The estimates remain robust, suggesting our findings are not driven by systematic cross-state heterogeneity.

fraction of the difference between destination and origin that has been covered. Thus, these coefficients represent the fraction of the difference between destination and origin birth rates that is reflected in individual fertility outcomes.

In all our regressions, we include both movers and non-movers to further strengthen our identification. This inclusion serves a dual purpose. First, it allows us to examine the pre-trend between movers, as discussed earlier. Second, and more importantly, it enables us to compare the pre-move trends between movers and non-movers. If the pre-move trends are parallel between these two groups, it provides strong evidence supporting the identifying assumption that migration is plausibly exogenous to unobservable factors affecting fertility.

To account for potential lagged impacts on fertility, we also estimate a distributed lag model to recover the cumulative effects β_r. This specification allows us to examine how the effects of the move accumulate over time, providing a more comprehensive picture of the dynamic relationship between place and fertility decisions. The cumulative effects are calculated as follows:

$$\beta_r = \begin{cases} -\sum_{k=-3}^{-1} \theta_{k(i,t)}, & if\ -3 \le r \le -2; \\ 0, & if\ r = -1; \\ -\sum_{k=0}^{r} \theta_{k(i,t)}, & if\ 0 \le r \le 3; \end{cases} \tag{2}$$

Finally, to quantify the magnitude of estimated place effects on fertility outcomes, we employ a parametric event study approach. This specification focuses on the post-move period, allowing us to estimate the average treatment effect and cumulative effect of the move on fertility outcomes. The regression equation is as follows:

$$Y_{it} = \alpha' + \sum_{k=0}^{3} \theta'_{r(i,t)} \cdot \Delta_i + \lambda_i + \phi_t + \gamma_{age} + \tau_r + \delta_{ori} + \tau_{des} + \epsilon_{it} \tag{3}$$

Where the post-trend coefficients $\sum_{k=0}^{3} \theta'_{r(i,t)} \cdot \Delta_i$ capture the average treatment or cumulative fertility responses in the years following the move. These post-trend coefficients provide a measure of the average cumulative fertility responses relative to pre-move outcomes. By focusing on the post-move period, this approach allows us to isolate the immediate and short-term effects of changing fertility environments on individual reproductive decisions.

2.2 Data

Our empirical analysis draws on the Panel Study of Income Dynamics (PSID), a nationally

representative longitudinal survey that has tracked U.S. families from 1968 to 2019. The PSID's comprehensive documentation of demographic characteristics, socioeconomic indicators, and complete fertility histories provides an ideal setting for investigating place-based effects on reproductive decisions. We construct our analytical sample from individual-level PSID records, containing detailed information on gender, age, race, residential location, and childbirth trajectories. To optimize the relevance of our fertility analysis, we restrict the sample to women of childbearing age (15-44 years), encompassing both interstate movers and non-movers. For analytical precision, we define movers as individuals who changed state residence during the sample period, and for those with multiple moves, we retain only the first interstate migration to maintain clean identification of place effects.

To complement the individual-level data from the PSID, we incorporate race-specific state-level birth rates obtained from the Vital Statistics of the United States for the corresponding years. By merging these state-level fertility measures with the individual-level PSID data, we can examine how changes in the fertility environment, as proxied by state-level birth rates, influence individual fertility behavior in the context of migration. This matching strategy ensures that our measure of fertility environment change (Δ_i) reflects the relevant demographic context for each individual, accounting for substantial racial heterogeneity in fertility patterns across states. For instance, when a Black woman moves from Georgia to Michigan, we measure Δ_i as the difference in Black-specific birth rates between these states in her migration year.

The long panel structure of our data, spanning several decades, enables us to track individuals' fertility behavior over time and across different residential locations. This longitudinal aspect is crucial for identifying the place effects on fertility, as it allows for the comparison of fertility outcomes before and after migration events, while controlling for individual-specific characteristics and time-varying factors. Such a design helps mitigate concerns about unobserved heterogeneity and strengthens the causal interpretation of our findings. Despite being smaller than some administrative datasets, the PSID sample size still offers enough statistical power to analyze state-level place effects on fertility.

[Insert Table 1 here]

Table 1 presents summary statistics for our analysis sample from the 1968-2019 PSID, comprising 22,733 women aged 15-44. The sample includes 1,741 movers and 20,992 non-movers, generating

160,911 woman-year observations. A pivotal feature of our identification strategy lies in comparing pre-move characteristics between individuals relocating to states with different fertility environments, as systematic differences could potentially confound our estimates of place effects.

Examining columns 2 and 3, our results suggest that women moving to lower versus higher birth rate states exhibit similar pre-move characteristics across multiple dimensions. The demographic and socioeconomic profiles show comprehensive balance: average age (26.357 versus 26.407 years), educational attainment (13.883 versus 14.102 years), earnings ($20,997 versus $21,870), and fertility rates (7.8 versus 6.5 percent) all show minimal differences, none of which achieve statistical significance at conventional levels. The racial composition demonstrates similar consistency, with White individuals comprising 61.8 and 60.8 percent of movers to lower and higher birth rate states, respectively. Among all observed characteristics, only marriage rates present a statistically significant difference—66.7 versus 68.5 percent ($p < 0.10$)—though the 1.8 percentage point gap remains economically modest relative to the baseline marriage rate of 67.3 percent in the full mover sample.

Column 5 reveals that movers differ systematically from non-movers along several dimensions, being younger (26.9 versus 28.9 years), more educated (13.1 versus 12.2 years), and having different racial composition (60.9 versus 45.5 percent White). However, these level differences do not threaten our identification strategy for three reasons. First, our event study design relies primarily on comparing changes in fertility behavior among movers to different destinations rather than levels between movers and non-movers. Moreover, in our analysis, these differences among movers will be absorbed by household fixed effects. Finally, the inclusion of non-movers strengthens our identification by providing additional comparison groups and enabling us to examine the parallel trends assumption more rigorously.[4]

2.3 Identification Assumptions

Our empirical strategy hinges on the crucial assumption that the fertility level of a mother's destination state is uncorrelated with unobserved, time-varying determinants of her fertility decisions. Specifically, we assume that movers do not select their destination based on unobserved factors that

[4] In robustness checks, we estimate our baseline specification using only the mover sample, and the results remain quantitatively and qualitatively similar. See Appendix Figure A1 for event study estimates using the mover-only sample.

simultaneously affect their propensity to have children and the fertility rate of the destination. A violation of this assumption would occur if, for instance, individuals planning to have children systematically relocate to areas with higher birth rates, leading to endogenous migration decisions correlated with unobserved fertility preferences.

To further probe our identification assumption, we examine whether migration motives systematically differ between women moving to states with different fertility environments. Table 2 decomposes the self-reported reasons for interstate migration among women aged 15-44 in our PSID sample. The analysis reveals consistent similarities in migration motives across destination types, with differences that are both statistically and economically insignificant across most categories.

Panel A shows that job-related relocations exhibit minimal variation between destination types. The proportion citing new jobs or transfers differs by only 0.9 percentage points (7.7 versus 8.6 percent, $p < 0.10$) between those moving to lower versus higher birth rate states. Similarly, moves for workplace proximity show a small 0.6 percentage point difference (4.5 versus 3.9 percent). Panel B documents comparable patterns in family-related motives—a category particularly relevant for fertility intentions. Marriage or homeownership motivates 6.4 percent of moves to lower birth rate states compared to 6.8 percent for higher birth rate destinations, while neighborhood quality accounts for 2.3 percent of moves regardless of destination type.

Housing considerations in Panel C follow this pattern of similarity. Moves for more space or better housing quality differ by only 0.4 percentage points (7.7 versus 8.1 percent), while downsizing or seeking lower rent shows a mere 0.2 percentage point difference (3.0 versus 2.8 percent). Panel D reveals that involuntary moves (4.3 percent for both groups), mixed reasons (4.6 versus 4.5 percent), and non-responses (59.5 versus 58.7 percent) maintain nearly identical proportions across destination types.

The systematic similarity in migration motives across all categories provides strong support for our identification strategy. The evidence suggests that women's destination choices are not meaningfully influenced by factors correlated with fertility preferences or intentions. This balanced distribution of migration motives, combined with the demographic similarities documented in Table 1, indicates that the estimated place effects on fertility are less likely to be confounded by endogenous location selection.

[Insert Table 2 here]

The consistent lack of significant differences across these detailed categories provides strong support for our identification assumption. The evidence suggests that women's destination choices are not systematically driven by factors that correlate with fertility preferences, regardless of the specific motivation for moving. Therefore, our estimated place effects on fertility are less likely to be confounded by endogenous migration decisions or unobserved fertility preferences influencing destination selection.

3 Main Results

3.1 Baseline Results

Our baseline results provide evidence for the causal effect of place on fertility decisions. Figure 2 presents the event study estimates, offering a visual representation of these effects both before and after the move.

Panel A shows the non-parametric event study estimates. The coefficients for the years leading up to the move are consistently close to zero, suggesting no differential pre-trends in fertility decisions among movers that correlate systematically with moving directions. This pattern supports the validity of our research design. In the year of move, we find no significant effect on fertility, which is consistent with the biological constraint that conception preparation to birth typically requires a full year. Following the move, we observe positive effects that persist throughout the post-move period, indicating that the current environment plays a substantial role in shaping fertility outcomes. Panel B illustrates the cumulative place effects. We find that the cumulative fertility impact continues to rise after the move, reaching approximately 0.04 by the third year post-migration. Both specifications—our baseline model with individual, year, and age group fixed effects, and an extended model incorporating origin and destination state fixed effects—yield quantitatively similar results, suggesting our findings are not driven by time-invariant characteristics of origin or destination states.

[Insert Figure 2 here]

Table 3 presents the parametric event study results, complementing our graphical evidence. Panel A shows the dynamic impacts of moving to a location with a 1 pp higher (lower) birth rate, with effects remaining positive and significant up to three years post-move. While there is no effect in the year of move, we find significant positive effects emerging from the first year post-move. The effect size of 0.014 is significant at the 1 percent level and persists through the second year and third year. Panel B reports average treatment effects, indicating that moving to a state with a 1 pp higher birth (lower) rate increases (decreases) the likelihood of giving birth by 0.9 pp, representing about 14 percent of the pre-move mean fertility rate of 0.065. Panel C in column 3 presents cumulative treatment effects, with our most comprehensive specification suggesting that relocating to a state with a birth rate 1 pp higher (lower) increases (decreases) cumulative fertility by 3.8 pp over subsequent years. The consistency of

these results across specifications, from baseline controls to the inclusion of various fixed effects, underscores the robustness of our findings and provides strong evidence for significant, persistent place effects on fertility decisions.

[Insert Table 3 here]

3.2 Tempo versus Quantity Effects

A central question in fertility research is whether place effects primarily influence the timing of births (tempo effects) or the total number of children (quantity effects). By examining heterogeneous effects across birth parities, we can disentangle these mechanisms: if place effects predominantly operate through tempo adjustments, we should observe stronger responses for first births, whereas quantity effects would manifest across all birth orders.

Figure 3 illustrates the heterogeneous effects of place on fertility by parity, revealing that place-based factors primarily influence the timing of initial childbearing rather than total fertility. Panel A shows the non-parametric event study estimates for first births, demonstrating a clear positive response that emerges one year post-move and persists throughout the observation period. The coefficients for years preceding the move remain consistently close to zero, supporting our identification strategy. In contrast, Panels B and C reveal negligible effects on second and higher-order births, with estimates that are both economically and statistically insignificant.

The cumulative effects, depicted by the orange lines in each panel, further emphasize this pattern. For first births, we observe a steadily increasing cumulative effect that reaches statistical significance by the third year post-move. However, the cumulative trajectories for second and higher-order births remain flat and statistically indistinguishable from zero, indicating that place effects do not meaningfully influence fertility decisions beyond the first child.

[Insert Figure 3 here]

Table 4 quantifies these differential impacts across parities. For first births, we find that moving to a state with a 1 pp higher (lower) birth rate increases (decreases) the probability of childbirth by 0.8-0.9 percentage points in each of the three years following relocation (Panel A), culminating in a significant cumulative effect of 4.1 percentage points (Panel C). The average treatment effect of 1.3 percentage points (Panel B) represents a substantial increase relative to baseline fertility rates. In

contrast, the estimates for second and higher-order births are precisely estimated zeros, with standard errors small enough to rule out economically meaningful effects.

These findings strongly suggest that place effects operate primarily through tempo adjustments rather than quantity adjustments. The concentration of effects among first births indicates that geographical context influences when individuals transition into parenthood but has limited impact on subsequent fertility decisions. This pattern aligns with theoretical predictions that location-specific factors—such as healthcare and childcare availability, housing costs, or social norms—may be particularly salient for the initial childbearing decision, while subsequent fertility choices may be more influenced by family-specific preferences or constraints that are less sensitive to geographical context.

[Insert Table 4 here]

3.3 Heterogeneity Analysis

We examine heterogeneity in place effects across demographic characteristics to understand which populations are most responsive to geographical variation in fertility environments and to shed light on potential mechanisms driving these effects.

Heterogeneity by marriage. Given the fundamental role of household structure in fertility decisions, we first analyze whether place effects vary by marital status. Figure 4 reveals that fertility responses to place are exclusively concentrated among married women. Moving to a state with a 1 percentage point higher birth rate increases married women's fertility by 1.5 percentage points in the first year post-move, with effects persisting at 1.2-1.4 percentage points in subsequent years. The cumulative impact reaches 4.7 percentage points by the third year after relocation, reflecting substantial responsiveness to local fertility environments.

[Insert Figure 4 here]

Single women, by contrast, show no measurable response to geographical variation in fertility rates. Their point estimates are close to zero and statistically insignificant across all post-move years, with confidence intervals that rule out even modest effects. The stark difference in responses between

married and single women suggests that household structure plays a crucial role in mediating place effects on fertility.

[Insert Table 5 here]

To ensure these differential responses reflect genuine heterogeneity rather than compositional changes, we examine whether place effects influence marriage formation decisions. Figure A1 presents event study estimates of the impact of moving on marriage rates. We find no evidence that relocating to different fertility states affects marriage probabilities, with precisely estimated zeros throughout the post-move period. This pattern confirms that our main results capture true heterogeneity in fertility responses rather than selective changes in household composition.

Heterogeneity by age, income, race. We next examine whether place effects vary systematically across demographic characteristics to understand which populations are most responsive to geographical variation in fertility environments. Figure 5 and Table 6 present heterogeneous treatment effects by age, income, and race.

[Insert Figure 5 here]

Age emerges as a critical moderator of place effects on fertility. Young women below median age 27 exhibit substantial and statistically significant responses to geographical relocation. Moving to a state with higher fertility rates generates both immediate effects in the first year and persistent effects through the third-year post-move. The cumulative impact for young women is more than twenty times larger than that for older women, whose responses remain statistically indistinguishable from zero throughout the post-move period.

[Insert Table 6 here]

The analysis by income reveals an unexpected pattern. High-income women demonstrate

significant responsiveness to place, with effects materializing immediately upon moving and strengthening over time. The third-year effects for high-income movers are particularly pronounced and highly significant. Low-income women, despite having higher baseline fertility rates, show more muted responses that never achieve statistical significance. This pattern suggests that resource constraints may limit the ability of lower-income households to adjust fertility in response to local conditions.

Racial differences in place effects are modest but notable. White women exhibit positive and statistically significant responses to moving to higher-fertility environments, with effects concentrated in the second and third years after relocation. The response pattern for non-White women is consistently smaller and statistically indistinguishable from zero across all post-move years. These racial differences in responsiveness to place could reflect varying cultural norms, economic opportunities, or access to reproductive healthcare across communities.

3.4 Robustness Checks

To ensure the validity and reliability of our baseline results, we conduct a comprehensive series of robustness checks across different specifications, samples, and estimation strategies. These checks systematically address potential concerns about identification assumptions, measurement choices, and statistical inference.

Our analysis begins by examining the role of non-movers in our estimation. While the inclusion of non-movers strengthens our identification by providing additional comparison groups, the differences between movers and non-movers documented in Table 1 raise potential concerns about sample composition. Figure A2 presents estimates using only the mover subsample. The results closely mirror our baseline findings in both magnitude and temporal pattern, indicating that our effects are not driven by the contrast between movers and non-movers.

We then implement a series of increasingly stringent tests of our research design, summarized in Figure 6. The first set of checks focuses on sample selection and compositional changes. A balanced

panel analysis restricting to individuals observed continuously from three years before to three years after migration produces estimates nearly identical to our baseline specification. To address concerns that employment-related mobility might correlate with unobserved fertility preferences, we exclude moves driven by job changes. The results remain stable. Similarly, restricting to movers with constant demographic characteristics throughout the study period—effectively holding fixed potential confounders like employment status, education, income, and occupation—does not materially affect our findings.

[Insert Figure 6 here]

The second set of checks examines the robustness of our results to alternative measurements of local fertility environments. Recent work by Bailey et al. (2023) and Kearney and Levine (2023) highlights the importance of migration-induced changes in population composition for local birth rates. We address this by reconstructing state-level birth rates using U.S. Decennial Census (pre-2001) and the American Community Survey (ACS) from 2001-2019 to exclude births to recent international and internal migrants. These adjustments leave our estimates unchanged. Moreover, using aggregate birth rates without racial stratification yields similar results, validating our primary specification using race-specific rates.

We further probe measurement choices by varying the temporal window used to calculate birth rates. Constructing measures using only data from two years immediately before and after migration—rather than our baseline approach using all available years—produces virtually identical estimates. This consistency across different measurement horizons demonstrates that our results do not depend on specific choices about temporal aggregation.

Finally, we address inferential concerns related to spatial correlation. While our baseline analysis clusters standard errors at the household level, fertility patterns might exhibit spatial dependence across geographically proximate areas. We therefore implement clustering at the level of origin-destination state pairs. The stability of our estimates and confidence intervals under this alternative clustering strategy indicates that spatial correlation patterns do not meaningfully affect our statistical inference.

Collectively, these robustness checks provide strong support for our main findings. The stability of our estimates across diverse specifications, sample restrictions, and measurement approaches reinforces the credibility of our conclusions regarding the causal impact of place-based factors on

fertility decisions.

4 Mechanism

4.1 AKM Model

To quantitatively decompose the variance in fertility outcomes into components attributable to individual and place-based factors, we employ an adapted version of the AKM model (Abowd et al., 1999). The specification is as follows:

$$Y_{it} = \alpha_i + \psi_{J(i,t)} + \mathrm{x}'_{it}\beta + \mathrm{r}_{it} \tag{4}$$

where Y_{it} represents the fertility outcome for individual i in year t, α_i captures individual fixed effects, the key estimator $\psi_{J(i,t)}$ denotes the place fixed effect for the state J in which individual i resides in year t. The term $\mathrm{x}'_{it}\beta$ represents a vector of time-varying covariates, and r_{it} is the error term. For all movers, we exclude the year of moving; for non-movers, this term is set to zero.

We interpret α_i as encompassing individual characteristics and preferences that are portable across locations, such as genetic predispositions, family background, or deeply held personal values influencing fertility decisions regardless of place. The place effect $\psi_{J(i,t)}$ captures the impact of living in state J on fertility outcomes, which could reflect local economic conditions, cultural norms, healthcare access, or policy environments affecting fertility decision. The vector $\mathrm{x}'_{it}\beta$ includes controls for calendar year, relative years, and age group effects, accounting for time-related fertility influences.

Identification of individual and place effects relies on individuals migrating across states. Consistent with standard practice, we restrict our analysis to the largest connected set of states linked by migration flows, ensuring that place effects are identified relative to a common reference point, thereby allowing meaningful comparisons across states.

The key identifying assumption is that the assignment of individuals to places is exogenous with respect to the error term r_{it}, conditional on the included fixed effects and covariates:

$$E\left(\mathrm{r}_{it} \middle| \alpha_i, \psi_{J(i,t)}, \mathrm{x}'_{it}\beta\right) = 0 \tag{5}$$

This assumption allows for systematic migration patterns related to individual or place characteristics but precludes mobility driven by time-varying, individual-specific shocks correlated with fertility outcomes. For example, individuals may choose to move to states with higher or lower

birth rates based on their personal preferences (captured by α_i) or observable characteristics (included in $x'_{it}\beta$), but not due to unobserved, time-varying factors directly affecting their fertility. Our earlier analyses show no significant pre-trend differences in fertility rates prior to moving, providing strong evidence against selection effects. To further examine the symmetry of fertility changes among individuals moving between states with different fertility rates, we employ a diagnostic test following the methodology of Card et al. (2013).

4.2 Diagnostic Test

Following Card et al. (2013), we implement a diagnostic test to validate the key identifying assumption of our AKM specification—that mobility patterns are not systematically driven by person-specific transitory shocks correlated with fertility outcomes. If sorting based on unobserved fertility preferences dominates, individuals moving to high-fertility states should exhibit different pre-move fertility trajectories compared to those moving to low-fertility states. Conversely, if our additive worker and place effects model is appropriate, we should observe symmetric fertility responses to moves between states with different birth rates, with the magnitude of changes proportional to the difference in state-level fertility environments.[5]

Our estimation equation simplifies by focusing on the relative year of move as the key treatment variable, without interaction terms with the size of the move:

$$Y_{it} = \alpha' + \sum_{k=0}^{3} \theta'_{r(i,t)} + \lambda_i + \phi_t + \gamma_{age} + \epsilon_{it} \quad (6)$$

Where we control for individual, calendar year, and five-year age group fixed effects. This specification allows us to examine whether fertility transitions exhibit the symmetry and proportionality patterns that would be consistent with our AKM framework's assumptions about plausibly exogenous mobility conditional on rich fixed effects.

[Insert Figure 7 here]

Figure 7 presents event studies for individuals moving to places with birth rate changes of ±5 percent, ±10 percent, and ±15 percent. This analysis serves both to validate the additive separability assumption of our AKM specification and to examine the dose-response relationship in fertility

[5] While similar diagnostic tests are often referred to as "dose-response" relationships in other settings, our implementation serves the dual purpose of examining both the dose-response pattern and validating the key assumption underlying the AKM decomposition—the additive separability of person and place effects.

behavior.

The results reveal several empirical regularities that support our identification strategy. First, we observe consistently flat and near-zero pre-move trends across all six groups, indicating that selection into moves is not driven by differential fertility trajectories. Second, the post-move period exhibits clear evidence of symmetry—moves to higher-fertility states generate increases in fertility while moves to lower-fertility states produce corresponding decreases. This symmetry in responses supports the additive separability assumption underlying our AKM decomposition.

The dose-response relationship further strengthens our empirical framework. For negative moves, the fertility response increases monotonically with the magnitude of the birth rate differential—moves to states with 15 percent lower birth rates generate larger decreases than moves to states with 5 percent lower rates. A similar pattern emerges for positive moves, though with somewhat attenuated magnitude. This systematic variation in fertility responses proportional to the size of birth rate changes provides strong support for the causal interpretation of our estimated place effects.

These diagnostic results provide compelling support for both the identification assumptions underlying our AKM specification and the causal interpretation of our estimated place effects. The systematic patterns we observe—symmetric responses to moves across the fertility distribution and proportional changes based on the magnitude of birth rate differentials—indicate that our empirical framework isolates the influence of geographical context on reproductive decisions. Moreover, the consistent absence of differential pre-trends across all mobility categories effectively mitigates concerns about endogenous sorting driven by time-varying fertility preferences.

4.3 Variance Decomposition

To quantify the relative contributions of individual effects, place effects, and their covariance to changes in fertility variance over time, we conduct a variance decomposition based on two periods: Period 1 (1968–2007) and Period 2 (2008–2019) using the following decomposition equation:

$$Var(y_{it}) = Var(\alpha_i) + Var\left(\psi_{J(i,t)}\right) + Var(\mathrm{x}'_{it}\beta) + 2Cov\left(\alpha_i, \psi_{J(i,t)}\right) + 2Cov\left(\alpha_i, \psi_{J(i,t)}\right)$$
$$+2Cov\left(\alpha_i, \psi_{J(i,t)}\right) + Var(\mathrm{r}_{it}) \quad (7)$$

Our choice to divide the analysis at 2008 is motivated by the work of Kearney et al. (2022), who highlight the puzzling decline in U.S. birth rates since the Great Recession. This temporal division

allows us to examine how the determinants of fertility have evolved in response to this significant economic event and its aftermath.

[Insert Table 7 here]

Table 7 reveals substantial changes in both the magnitude and composition of fertility variance across these periods. While the total variance of fertility declined modestly from 0.0624 to 0.0544, the relative contributions of different components shifted dramatically. The variance of individual effects $Var(\alpha_i)$ increases from 0.0117 to 0.0217, accounting for 21.1 percent of the total change in fertility variance. Simultaneously, the variance of place effects $Var(\psi_{J(i,t)})$ rise from 0.0030 to 0.0142, contributing 21.3 percent to the change in total variance. Together, these changes indicate that both individual characteristics and geographical factors have become increasingly important determinants of fertility decisions in the post-recession era.

The evolution of variance components offers novel insights into the post-Great Recession fertility decline. Individual effects' share of total variance rose from 18.7 to 39.8 percent, suggesting growing heterogeneity in personal fertility preferences or constraints. Notably, the increase in place effects' contribution, from 4.7 to 26.0 percent of total variance. This more than fivefold increase in the importance of geographical factors provides a new perspective on Kearney et al.'s (2022) "puzzle." While their aggregate analysis found limited evidence linking policy variables to overall fertility trends, our decomposition reveals that place-specific factors have become dramatically more important in explaining individual-level fertility variation.

The covariance between individual and place effects remains negligible throughout both periods, shifting only slightly from 0.0000 to -0.0001. This minimal sorting on fertility preferences across locations strengthens our identification strategy by suggesting that migration decisions are not primarily driven by fertility considerations. The variance contribution of time-varying controls x'_{it} declines from 3.4 to 1.5 percent, indicating that observable demographic and temporal factors explain a diminishing share of fertility variation.

These findings point to a fundamental transformation in the determinants of U.S. fertility patterns. The sharp increase in both individual and place effects' explanatory power suggests that fertility decisions have become increasingly influenced by both personal circumstances and geographical

context, particularly since the Great Recession. This shift motivates our subsequent investigation of specific place-based mechanisms that might account for the growing importance of geographical factors in shaping reproductive choices.

4.4 Correlates of Place Effects

To delve deeper into the mechanisms underlying the place effects on fertility decisions, we examine how our estimated place effects correlate with various state-level characteristics. Identifying these correlates is essential for understanding which specific factors associated with different locations are influencing fertility outcomes. Following Kearney et al. (2022), Grossman et al.,(2025), and Herrera-Almanza & Rosales-Rueda (2020), we analyze eight key dimensions of state environments: healthcare access (measured by hospital density), family planning resources (LARC usage and other contraceptive methods), economic factors (childcare costs and student loan debt), and socio-cultural characteristics (religious importance, gender equality, and housing costs).

[Insert Figure 8 here]

Figure 8 reveals systematic patterns in how these state-level factors correlate with fertility place effects. The analysis yields three main findings. First, family planning resources demonstrate most significant correlations with place effects. LARC usage exhibits a strong negative relationship with fertility, consistent with recent evidence from Buckles et al. (2022) on the role of contraceptive access in post-recession fertility trends. This pattern suggests that geographical variation in family planning infrastructure may constitute a primary mechanism through which place influences reproductive decisions. The usage of other contraceptive methods shows a similar negative correlation, though smaller in magnitude.

Second, healthcare access, measured by hospital density, shows a positive and statistically significant correlation with fertility place effects. This relationship suggests that medical infrastructure may play a facilitating role in reproductive decisions. Similarly, the large positive correlation with religious importance aligns with extensive literature documenting the role of cultural and religious factors in shaping fertility preferences and outcomes (Lehrer, 1996).

Third, several economic indicators display meaningful associations with place effects. Both student loan debt and housing costs correlate negatively with fertility, consistent with theoretical

predictions about financial constraints and reproductive choices. More modest correlations emerge for childcare expenditure and the male-female wage ratio, suggesting that while these factors influence fertility decisions, their impact may be less pronounced than conceptive use and healthcare access.

These correlational patterns offer new perspectives on the post-recession fertility puzzle documented by Kearney et al. (2022). While their aggregate analysis found limited evidence linking policy variables to fertility trends, our results indicate that the interaction between healthcare infrastructure and family planning resources may help explain growing geographical heterogeneity in fertility patterns. The substantial correlations with both healthcare access and religious importance point to the role of both institutional and cultural mechanisms in shaping fertility outcomes.

We emphasize that these correlations, while informative, warrant careful interpretation given the limitations of state-level analysis. The relatively small sample of states (50 states) and potential for unmeasured confounding factors preclude definitive causal interpretations. Nevertheless, these systematic patterns provide valuable guidance for future research into the specific mechanisms through which place shapes fertility decisions.

5 Conclusion

This paper provides robust evidence that place-based factors have a significant causal impact on fertility decision. By analyzing the fertility outcomes of individuals who move across states, we find that if a woman moves to a state with a birth rate 1 pp higher (lower) than her original state, the probability of giving birth increases (decreases) by 0.9 pp after migration. The cumulative effects over time are even more pronounced: a 1 pp change in the destination state's birth rate leads to a 3.8 pp shift in an individual's fertility decision three years post-move. Importantly, these effects are predominantly concentrated among first births, suggesting that place effects primarily influence the timing of initial parenthood rather than overall fertility quantum.

Our heterogeneity analysis reveals systematic variations in responsiveness to place-based factors across demographic subgroups. The effects are particularly pronounced among married women, younger individuals, and those with higher income levels. This pattern of heterogeneous responses provides crucial insights into the mechanisms through which geographical context influences reproductive decisions. The concentrated effects among married women, with no discernible impact on single women, underscore the importance of household structure in mediating place effects on fertility.

The variance decomposition analysis, implemented through the AKM framework, documents a dramatic increase in the importance of place-based factors in explaining fertility variations over time. The contribution of place effects to total fertility variance increased markedly from 4.7 percent in 1968-2007 to 26.0 percent in 2008-2019, underscoring the growing importance of geographical factors in the post-Great Recession era.

Examining the correlate mechanisms underlying these place effects, we find that contraceptive accessibility—particularly LARC usage—and healthcare infrastructure demonstrate the strongest correlations with fertility outcomes. These findings suggest that geographical variation in both family planning resources and medical access plays a fundamental role in shaping local fertility patterns. Additional factors, including religious importance and economic indicators such as housing costs and student loan debt, show meaningful but relatively smaller associations.

These results have important implications for policymakers addressing demographic challenges.

The substantial magnitude of place effects, combined with their increasing importance over time, suggests that geographical context plays a crucial role in shaping fertility decisions. Policy interventions should therefore consider both the direct effects of place-based factors and their differential impacts across demographic groups. Particularly, our findings suggest that policies targeting contraceptive access and healthcare infrastructure could significantly influence fertility patterns.

Several limitations and directions for future research warrant consideration. First, our reliance on state-level data, while methodologically necessary given PSID sample sizes, may mask important within-state heterogeneity in fertility environments. Future research using larger administrative datasets could estimate place effects at more granular geographical levels, potentially uncovering additional mechanisms through which location influences fertility. Second, while our analysis focuses on domestic migration, examining how these effects interact with international migration patterns could provide additional insights into fertility determinants. Finally, research investigating the long-term persistence of place effects and their intergenerational transmission would further enhance our understanding of how geographical context shapes demographic outcomes.

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Table

Table 1: Summary Statistics for Mover and Non-mover Samples

	(1)	(2)	(3)	(4)	(5)
	Mover				Non-mover
	All Years	Δ<0, Pre-move	Δ>0, Pre-move	Mean Diff.	
Age	26.949	26.357	26.407	-0.050	28.864
Education year	13.128	13.883	14.102	-0.218	12.229
Earning	23101.87	20997.4	21870.5	-873.1	24999.6
Family Size	3.339	3.532	3.427	0.105	0.395
Married (Yes = 1)	0.673	0.667	0.685	-0.018*	3.968
Race (White = 1)	0.609	0.618	0.608	-0.010	0.667
Fertility (Yes = 1)	0.080	0.078	0.065	0.013	0.064
# Women			2,041		20,992
# Woman-years			10,984		149,927

Notes: This table presents summary statistics for our analysis sample of women aged 15-44 from the Panel Study of Income Dynamics (PSID) spanning 1968-2019, distinguishing between movers (individuals who changed state residence once during the sample period) and non-movers. Among movers, columns (1-4) report means for the full mover sample, pre-move characteristics for those relocating to states with lower and higher birth rates, and the difference between these groups (with asterisks denoting t-test statistical significance), respectively. Column (5) presents corresponding statistics for non-movers. All variables are measured annually, with age and education in years, earnings adjusted to 2019 dollars using the Consumer Price Index, and binary indicators for marriage, race (White), and fertility (childbirth within the past year). Pre-move characteristics for movers are measured one year before relocation. ***, **, and * indicating significance at the 1, 5, and 10 percent levels, respectively.

Table 2 Reasons of moving across states

	(1)	(2)	(3)
	Δ<0	Δ>0	Mean Diff.
Panel A: Job-related Reasons			
New jobs or transfer	0.077	0.086	-0.010*
Closer to workplace	0.045	0.039	0.006
Panel B: Family-related reasons			
Marriage or own home	0.064	0.068	-0.004
Better neighborhood	0.023	0.023	-0.000
Panel C: Housing-related reasons			
More space or better place	0.077	0.081	-0.004
Less space or lower rent	0.030	0.028	0.002
Panel D: Other reasons			
Involuntary or health reasons	0.043	0.043	-0.000
Mixed reasons	0.046	0.045	0.001
No Response	0.595	0.587	0.008
Observations	5,172	5,812	

Notes: This table examines the distribution of interstate migration motives among women aged 15-44 in our PSID sample (1968-2019), comparing individuals who moved to states with lower birth rates (column 1) versus higher birth rates (column 2) relative to their origin state. The classification of destination states is based on the differential between origin and destination state birth rates, constructed by merging PSID mover with state-level fertility measures in moving year. Column 3 presents the difference in proportions between these groups. ***, **, and * indicating significance at the 1, 5, and 10 percent levels, respectively.

Table 3 Parametric Event Study: Baseline Results

Variable	(1) Fertility (Yes = 1)	(2) Fertility (Yes = 1)
Pre-Move Mean of Y: 0.065		
Panel A: Dynamic Impacts on Fertility		
Δ*0	-0.001	-0.001
	(0.013)	(0.013)
Δ*1	0.014***	0.014***
	(0.005)	(0.005)
Δ*2	0.010**	0.010**
	(0.005)	(0.005)
Δ*3	0.014***	0.014***
	(0.005)	(0.005)
Panel B: Average Impacts on Fertility		
Average Treatment Effects	0.009**	0.009**
	(0.004)	(0.004)
Panel C: Cumulative Impacts on Fertility		
Cumulative Treatment Effects	0.038***	0.038***
	(0.014)	(0.014)
Individual FEs	YES	YES
Year FEs	YES	YES
Relative Year FEs	YES	YES
Age group FEs	YES	YES
Original State FEs	NO	YES
Destination State FEs	NO	YES

Notes: This table presents parametric event study estimates based on Equation (3). Panel A reports dynamic impacts of place on fertility, Panel B presents average post-move treatment effects, and Panel C shows cumulative treatment effects. Column (1) includes individual fixed effects, calendar year fixed effects, relative year fixed effects, and five-year age group fixed effects, while column (2) additionally incorporates origin and destination state fixed effects. The dependent variable is a binary indicator for childbirth in the past 12 months, with a pre-move mean of 0.065. Δ*0 captures the difference in birth rates between the destination and origin states, interacted with years relative to the move. Standard errors, clustered at the household level, are reported in parentheses, with ***, **, and * indicating statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 4 Parametric Event Study: Heterogeneity Analysis by Parity

Variable	(1) First Birth (Yes = 1)	(2) Second Birth (Yes = 1)	(3) Higher-order Birth (Yes = 1)
Panel A：Dynamic Impacts on Fertility			
Δ*0	0.027	-0.022	-0.003
	(0.020)	(0.020)	(0.016)
Δ*1	0.008*	0.006	0.003
	(0.004)	(0.004)	(0.002)
Δ*2	0.007*	0.006	0.003
	(0.004)	(0.004)	(0.002)
Δ*3	0.009**	0.006	-0.005
	(0.004)	(0.004)	(0.007)
Panel B：Average Impacts on Fertility			
Average Treatment Effects	0.013**	-0.001	-0.000
	(0.006)	(0.006)	(0.005)
Panel C：Cumulative Impacts on Fertility			
Cumulative Treatment Effects	0.041**	-0.003	-0.002
	(0.002)	(0.025)	(0.020)
Individual FEs	YES	YES	YES
Year FEs	YES	YES	YES
Relative Year FEs	YES	YES	YES
Age Group FEs	YES	YES	YES

Notes: This table presents parametric event study estimates examining heterogeneous place effects on fertility by parity. Panel A reports dynamic impacts of place on fertility, Panel B presents average post-move treatment effects, and Panel C shows cumulative treatment effects. Columns (1), (2), and (3) capture the impacts on first births, second births, and higher-order births, respectively. All specifications include individual fixed effects, calendar year fixed effects, relative year fixed effects, and five-year age group fixed effects. Standard errors, clustered at the household level, are reported in parentheses, with ***, **, and * denoting statistical significance at the 1%, 5%, and 10% levels, respectively. The results highlight the differential influence of place effects across birth orders, with first births exhibiting the most pronounced responses.

Table 5 Parametric Event Study: Heterogeneity Analysis by Marital Status

Variable	(1) Married (Yes = 1)	(2) Single (Yes = 1)
Panel A：Dynamic Impacts on Fertility		
Δ*0	0.007	-0.052
	(0.015)	(0.074)
Δ*1	0.015***	0.005
	(0.005)	(0.083)
Δ*2	0.012**	0.006
	(0.005)	(0.083)
Δ*3	0.014***	0.028
	(0.005)	(0.083)
Panel B：Average Impacts on Fertility		
Average Treatment Effects	0.012**	-0.003
	(0.005)	(0.057)
Panel C：Cumulative Impacts on Fertility		
Cumulative Treatment Effects	0.047**	-0.014
	(0.022)	(0.228)
Individual FEs	YES	YES
Year FEs	YES	YES
Relative Year FEs	YES	YES
Age group FEs	YES	YES

Notes: This table presents parametric event study estimates examining the heterogeneous effects of place on fertility by marital status. Panel A reports dynamic impacts of place on fertility, Panel B presents average post-move treatment effects, and Panel C shows cumulative treatment effects. Columns (1) and (2) capture the impacts for married and single individuals, respectively. All specifications include individual fixed effects, calendar year fixed effects, relative year fixed effects, and five-year age group fixed effects. Standard errors, clustered at the household level, are reported in parentheses, with ***, **, and * denoting statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 6 Parametric Event Study: Heterogeneity Analysis by Demographic Characteristics

Variables	(1)	(2)	(3)	(4)	(5)	(6)
	Fertility (Yes = 1)					
	By Age		By Income		By Race	
	Young	Old	High	Low	White	Non-White
Pre-Move Mean of Y:	0.092	0.046	0.058	0.082	0.060	0.065
Panel A：Dynamic Impacts on Fertility						
Δ*0	0.014*	-0.003	0.011**	0.009	0.009	0.003
	(0.007)	(0.006)	(0.005)	(0.008)	(0.006)	(0.006)
Δ*1	0.013*	-0.004	0.009	0.008	0.003	0.008
	(0.008)	(0.006)	(0.007)	(0.008)	(0.009)	(0.006)
Δ*2	0.007	0.007	0.008	0.005	0.017**	-0.008
	(0.008)	(0.005)	(0.007)	(0.007)	(0.007)	(0.006)
Δ*3	0.016**	0.002	0.018***	0.006	0.016**	0.006
	(0.007)	(0.005)	(0.005)	(0.006)	(0.007)	(0.005)
Panel B：Average Impacts on Fertility						
Average Treatment Effects	0.012**	0.001	0.012***	0.007	0.011*	0.002
	(0.005)	(0.004)	(0.004)	(0.006)	(0.006)	(0.004)
Panel C：Cumulative Impacts on Fertility						
Cumulative Treatment Effects	0.050**	0.002	0.046***	0.027	0.045*	0.009
	(0.020)	(0.016)	(0.016)	(0.062)	(0.024)	(0.016)
Individual FEs	YES	YES	YES	YES	YES	YES
Year FEs	YES	YES	YES	YES	YES	YES
Relative Year FEs	YES	YES	YES	YES	YES	YES
Age group FEs	YES	YES	YES	YES	YES	YES

Notes: This table presents parametric event study estimates examining the heterogeneous effects of place on fertility across demographic subgroups. The dependent variable is a binary indicator for childbirth, with a pre-move mean fertility rate of 0.065. Panel A reports dynamic impacts of place on fertility, Panel B presents average post-move treatment effects, and Panel C shows cumulative treatment effects. Columns (1) and (2) stratify the sample by median age (27 years), columns (3) and (4) by median income ($21,542.32), and columns (5) and (6) by racial background (White vs. non-White). All specifications include individual fixed effects, calendar year fixed effects, relative year fixed effects, and five-year age group fixed effects. Standard errors are clustered at the household level, with ***, **, and * denoting statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 7 Decomposition of the Variance of the Fertility

	Period 1 (1968-2007)		Period 2 (2008-2019)		Change from Period 1 to 2
	(1) Var. component	(2) Share of total	(3) Var. component	(4) Share of total	(5) Share of total
Total variance of fertility	0.0624	100.0	0.0544	100.0	100.0
Components of variance:					
Variance of individual effect	0.0117	18.7	0.0217	39.8	21.1
Variance of place effect	0.0030	4.7	0.0142	26.0	21.3
Variance of X_β	0.0021	3.4	0.0008	1.5	-1.9
2cov(individual, place.)	0.0000	0.0	-0.0001	-0.1	-0.1

Notes: This table decomposes the variance of fertility into individual effects, place effects, and their covariance, comparing two periods: 1968–2007 (Period 1) and 2008–2019 (Period 2). The sample consists of female migrants aged 15–44, excluding states with fewer observations. Results are derived from OLS estimation of Equation (4), where X_β includes fixed effects for calendar year, relative year, and age. Column (5) reports the change in each variance component from Period 1 to Period 2.

Figure

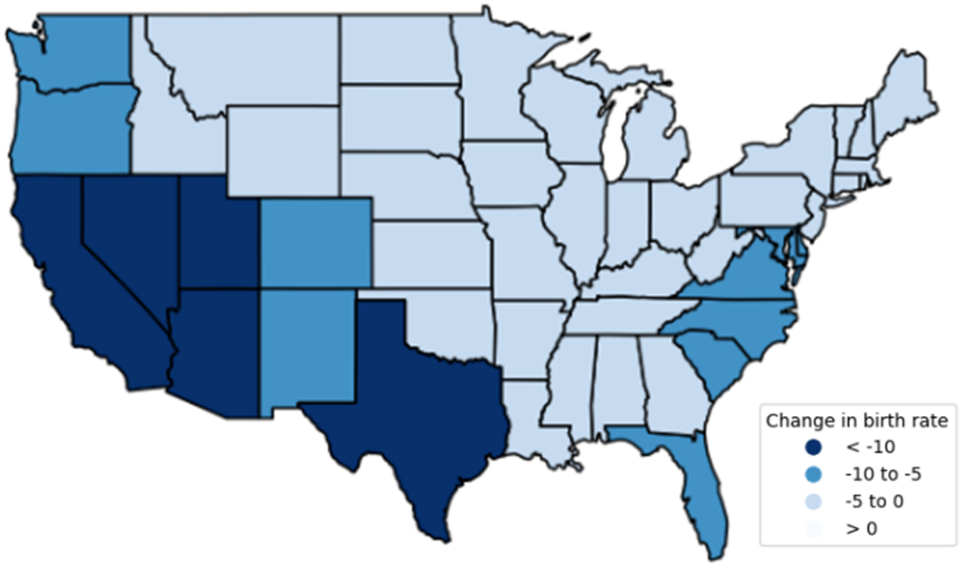
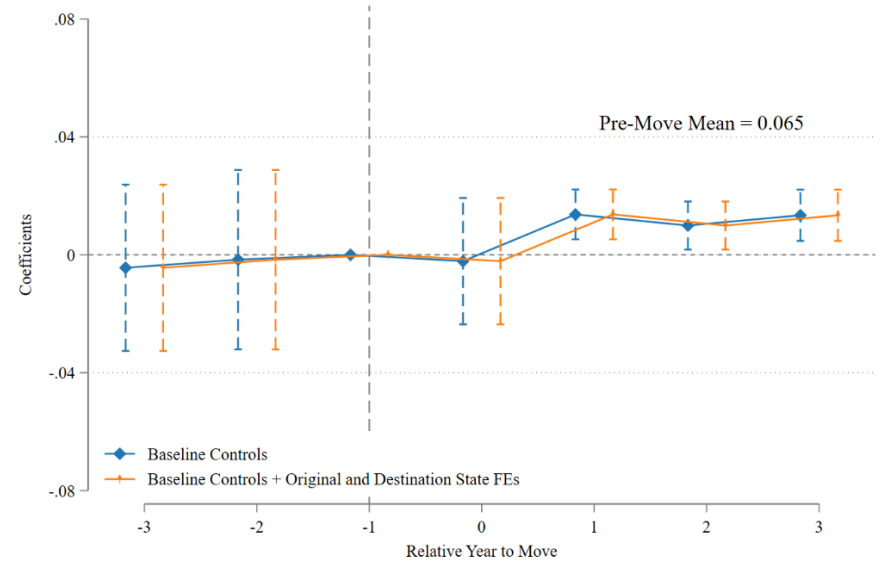
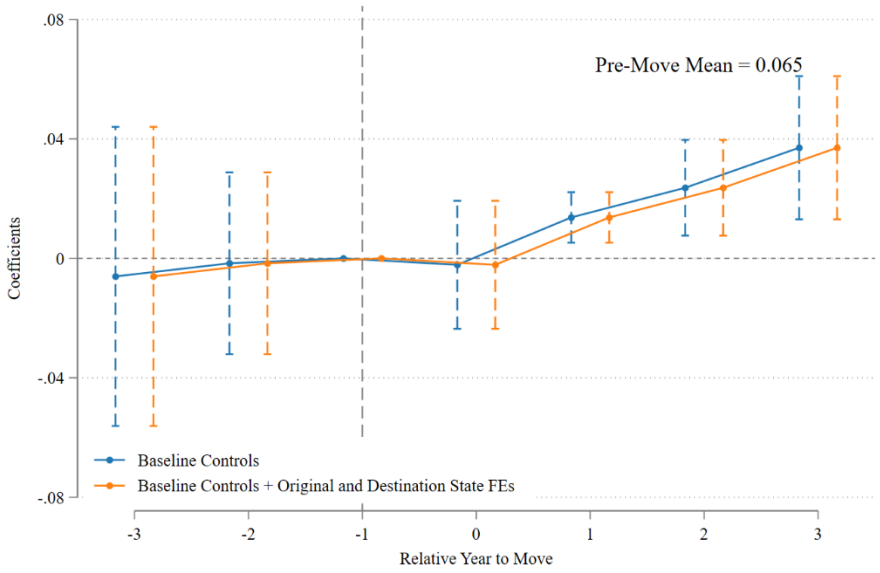


Figure 1 Change in Birth Rates by State, 2004-2008 to 2015-2019

Source: Reproduced from Kearney et al. (2022), "The Puzzle of Falling US Birth Rates Since the Great Recession," Journal of Economic Perspectives, 36(1): 151-176. Birth data are from NCHS Vital Statistics. Population data are from CDC Surveillance, Epidemiology, and End Results (SEER) program. Note: Birth rates are calculated among women aged 15 to 44.



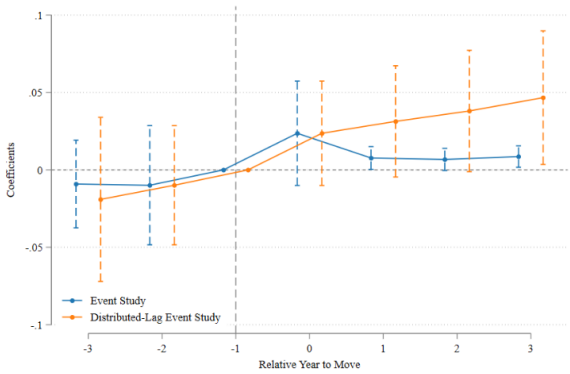
Panel A. Event Study Approach



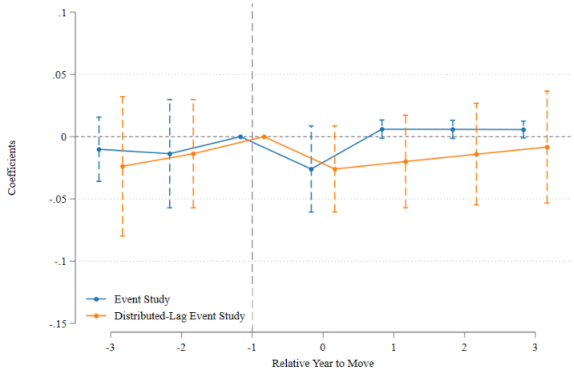
Panel B. Distributed-Lag Event Study Approach

Figure 2 Place Effects on Fertility: Non-Parametric Event Study Estimates

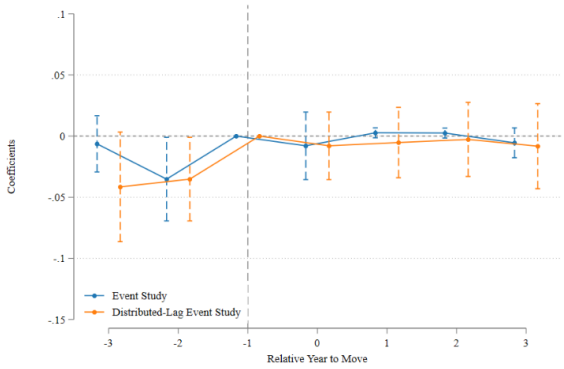
Notes: This figure analyzes the impact of place effects on fertility, presenting coefficients with 90% confidence intervals across different specifications. Panel A illustrates the dynamic effects of place on fertility using two specifications based on Equation (1): a baseline model with individual, calendar year, relative year, and five-year age group fixed effects, and an extended model that additionally incorporates origin and destination state fixed effects. Panel B examines cumulative place effects over time using the two same specifications, based on Equation (2). Standard errors are clustered at the household level.



Panel A. First Birth



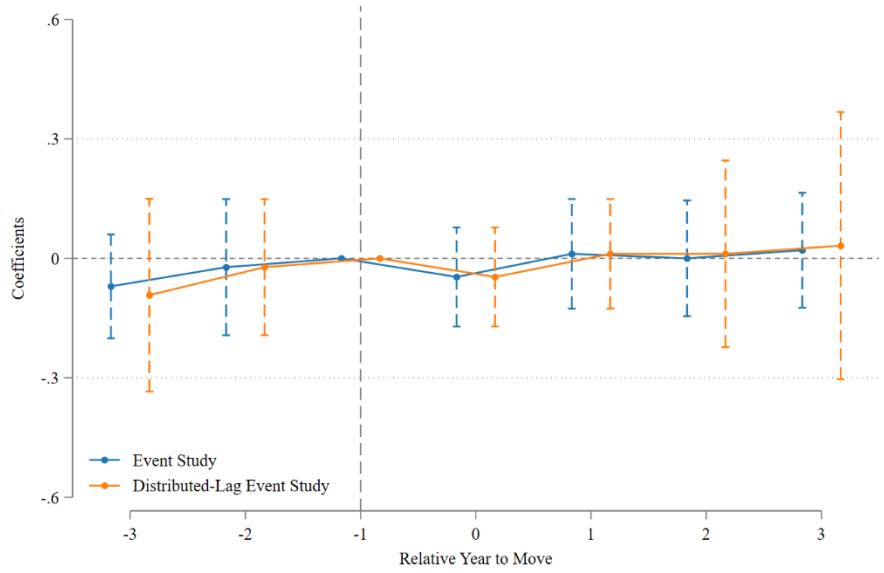
Panel B. Second Birth



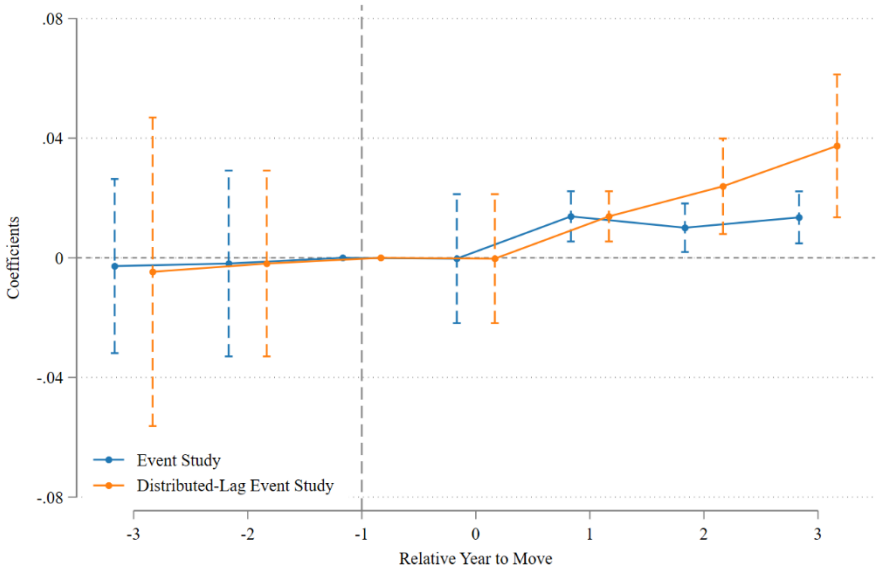
Panel C. Higher-order Birth

Figure 3 Heterogeneous Effects of Place on Fertility by Parity

Notes: This figure examines the heterogeneous effects of place on fertility by parity, presenting coefficients with 90% confidence intervals across years relative to the year before moving. Panels A, B, and C show the place effects on fertility among first births, second births, and higher-order births, respectively. The blue line represents dynamic effects based on Equation (1), while the orange line illustrates cumulative effects based on Equation (2). All regression specifications include individual fixed effects, calendar year fixed effects, relative year fixed effects, and five-year age group fixed effects. Standard errors are clustered at the household level.



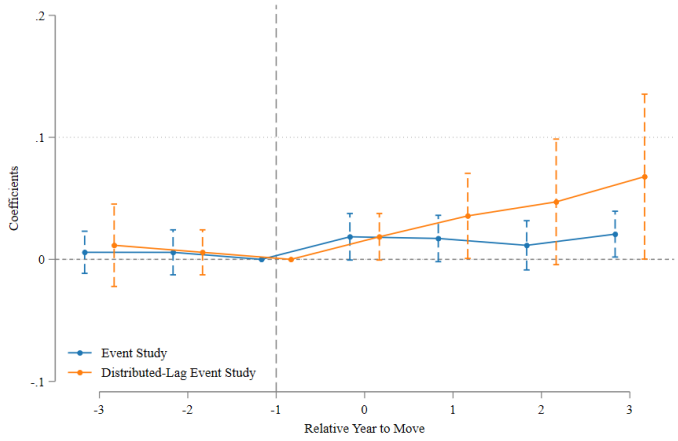
Panel A. Single



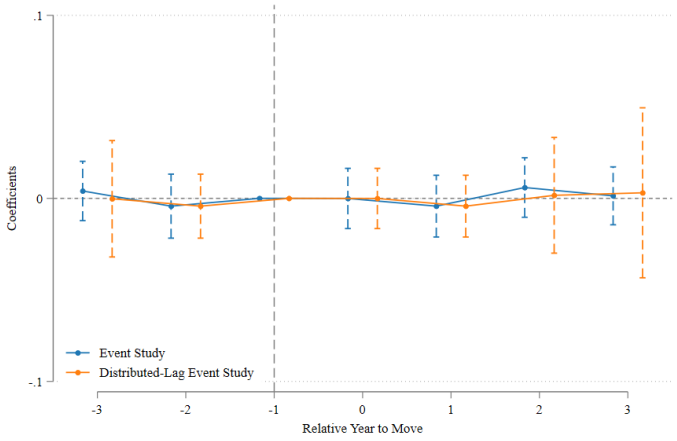
Panel B. Married

Figure 4 Heterogeneous Effects of Place on Fertility by Marital Status

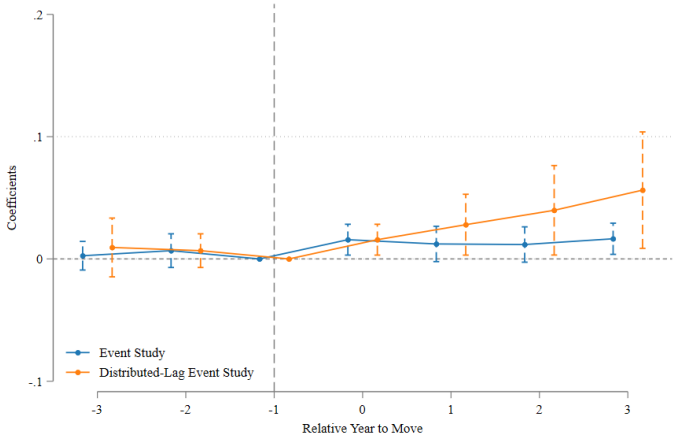
Notes: This figure examines the heterogeneous effects of place on fertility by marital status, presenting coefficients with 90% confidence intervals across years relative to the year before moving. Panels A and B show the place effects on fertility among single and married women, respectively. The blue line represents dynamic effects based on Equation (1), while the orange line illustrates cumulative effects based on Equation (2). All regression specifications include individual, calendar year, relative year fixed effects, and five-year age group fixed effects. Standard errors are clustered at the household level.



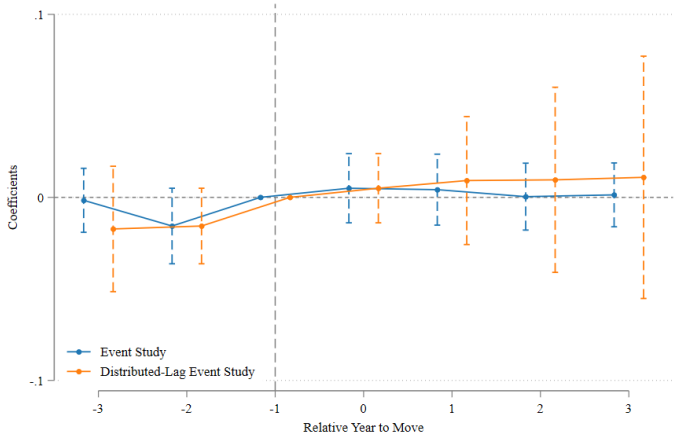
Panel A. Young



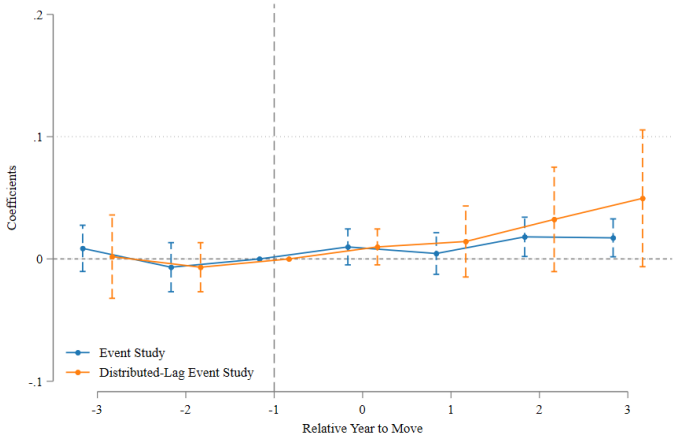
Panel B. Old



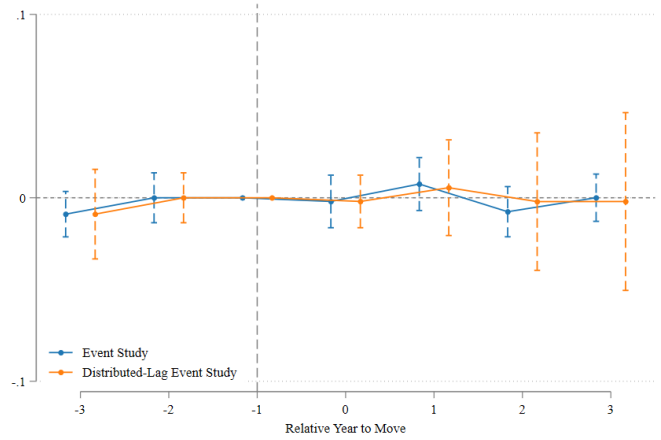
Panel C. High Income



Panel D. Low Income



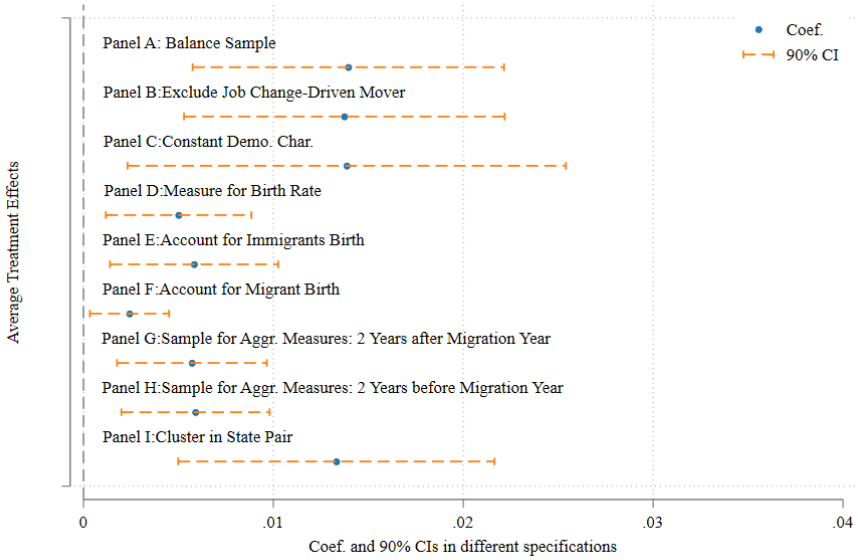
Panel E. White



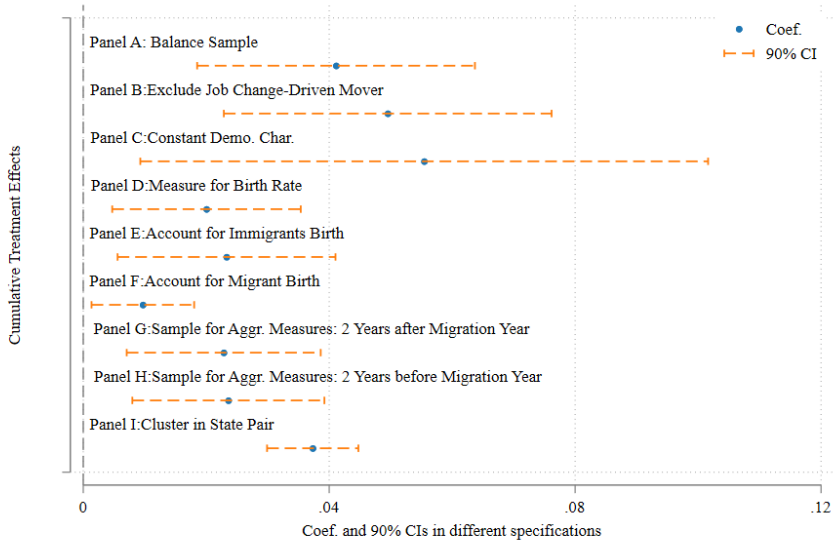
Panel F. Non-White

Figure 5 Heterogeneous Effects of Place on Fertility by Age, Income and Race

Notes: This figure examines the heterogeneous effects of place on fertility across demographic subgroups, presenting coefficients with 90% confidence intervals across years relative to the year before moving. Panels A and B stratify the sample by median age (27 years), Panels C and D by median income ($21,542.32), and Panels E and F by racial background (White vs. non-White). All specifications include individual fixed effects, calendar year fixed effects, relative year fixed effects, and five-year age group fixed effects. Standard errors are clustered at the household level.



Panel A. Average Treatment Effects



Panel B. Cumulative Treatment Effects

Figure 6 Robustness Checks

Notes: This figure presents the robustness checks for average treatment effects in Panel A (top) and cumulative effects in Panel B (bottom). Each row represents distinct regression specifications that systematically address potential identification concerns. We implement multiple alternative specifications: a balanced panel analysis spanning three years pre- and post-migration (Panel A); exclusion of job change-driven migration to address potential endogeneity concerns (Panel B); and a restricted sample of movers with consistent demographic characteristics including employment status, education, income, and occupation throughout the study period (Panel C). Panels D-H examine sensitivity to alternative birth rate measurements: Panel D employs aggregate birth rates without racial stratification, while Panels E and F incorporate adjustments for international and internal migration childbirths, respectively, using data from decennial censuses and the American Community Survey (1960-2019). Panels G and H focus on temporal variations, analyzing data from two years after and before the migration year, respectively. Panel I addresses spatial correlation concerns by implementing state pair-level clustering rather than household-level clustering. All specifications report point estimates with corresponding 90% confidence intervals.

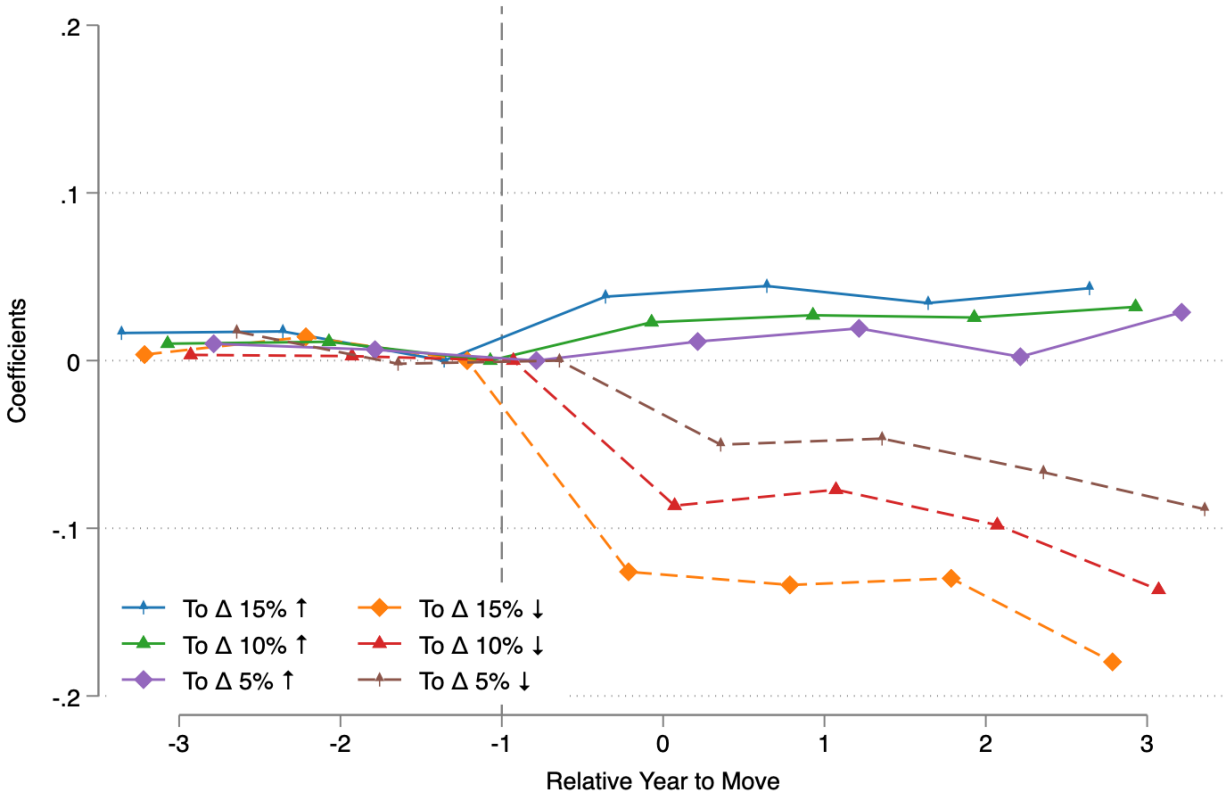


Figure 7 Dose-Response Relationship: Fertility Effects by Magnitude of Birth Rate Change

Notes: This figure presents event study estimates for individuals moving to areas with birth rate increases of 5%, 10%, and 15%, as well as those moving to areas with equivalent birth rate decreases. All regressions include individual fixed effects, calendar year fixed effects, and five-year age group fixed effects. Standard errors are clustered at the household level. Coefficients are presented with 90% confidence intervals across years relative to the first year before the move.

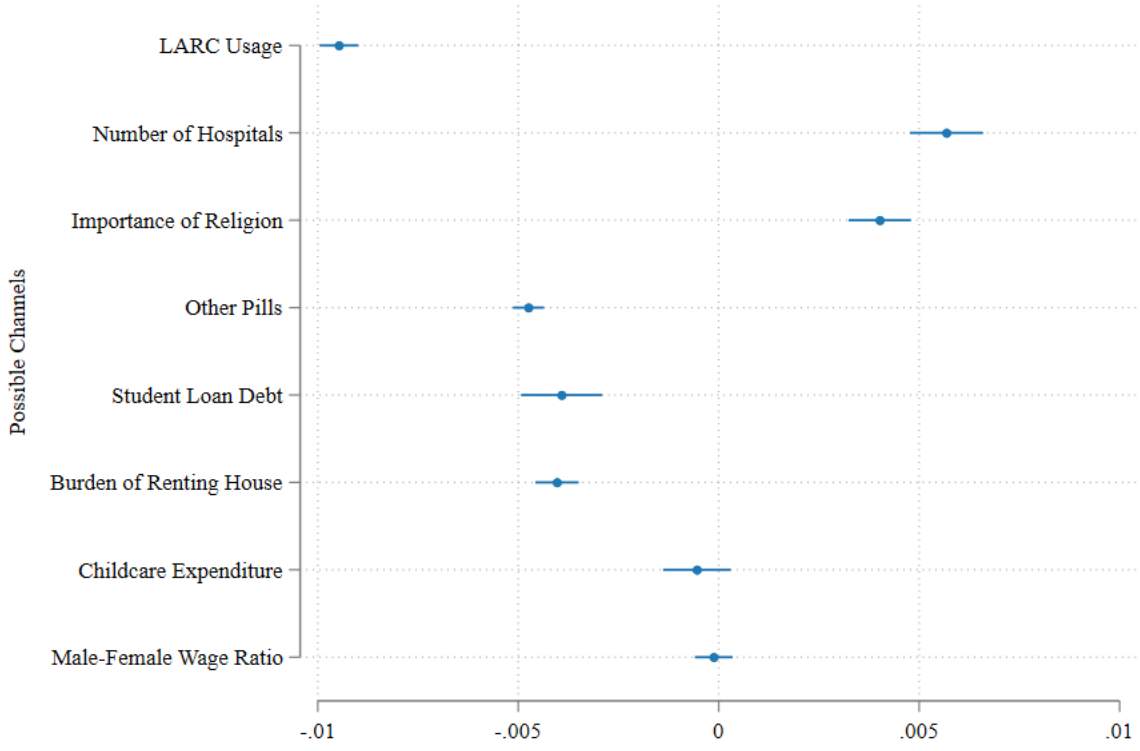


Figure 8 Correlates of Spatial Variation in Place Effects on Fertility

Notes: This figure displays the correlations between estimated place effects on fertility and various state-level characteristics. The state-level measures include long-acting reversible contraception (LARC) usage, childcare expenditure, usage of other contraceptive pills, average student loan debt, importance of religion, male-female wage ratio, and the burden of renting housing, sourced from Kearney et al. (2022). Data on the number of hospitals are derived from the American Hospital Directory (https://www.ahd.com/state_statistics.html). Horizontal lines represent 90% confidence intervals.

Appendix

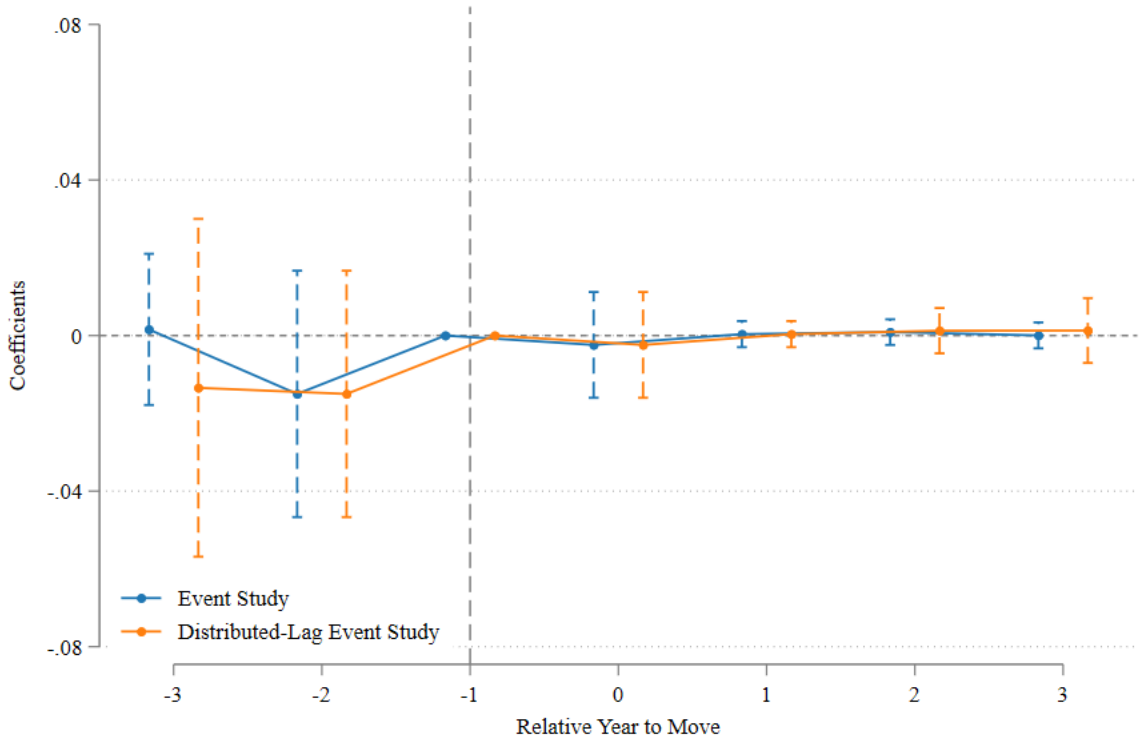
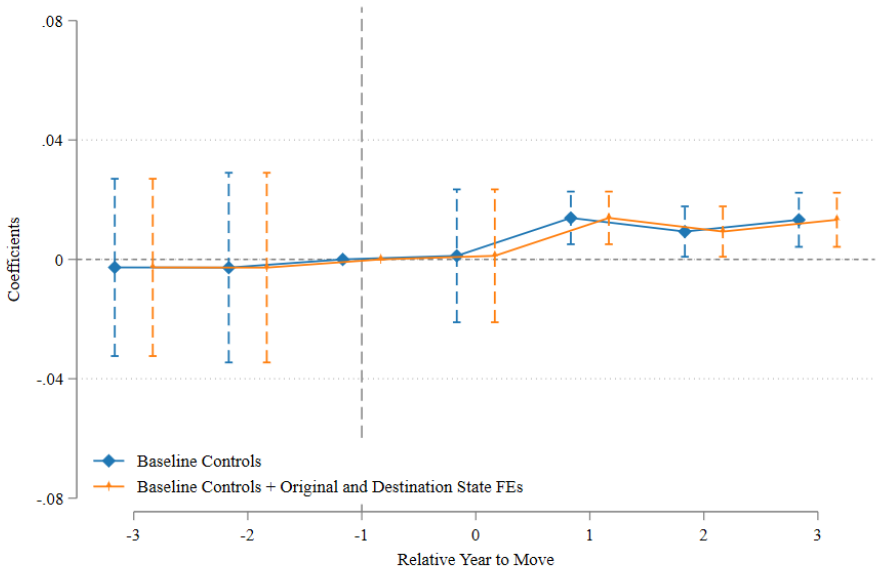
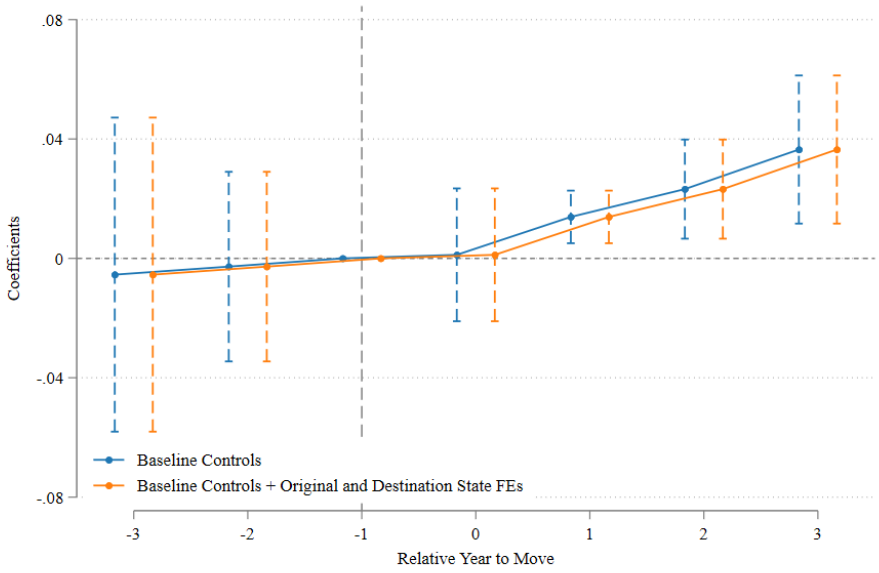


Figure A1 Place Effects on Marriage Formation

Notes: This figure examines the treatment effects of place on marriage formation decisions, presenting coefficients with 90% confidence intervals across years relative to the year before moving Event study estimates are presented using two complementary approaches: a dynamic specification based on Equation (1) that traces year-by-year effects (blue line), and a distributed-lag model following Equation (2) that captures cumulative impacts (orange line). The dependent variable indicates marriage formation within the previous 12 months, with coefficients plotted relative to the year before migration (t-1). All regression specifications include individual, calendar year, relative year fixed effects, and five-year age group fixed effects. Standard errors are clustered at the household level.



Panel A. Event Study Approach



Panel B. Distributed-Lag Event Study Approach

Figure A2 Place Effects on Fertility, Mover Sample

Notes: This figure presents event study estimates of place effects on fertility using only the mover subsample, presenting coefficients with 90% confidence intervals across different specifications. Panel A illustrates the dynamic effects of place on fertility using two specifications based on Equation (1): a baseline model with individual, calendar year, relative year, and five-year age group fixed effects, and an extended model that additionally incorporates origin and destination state fixed effects. Panel B examines cumulative place effects over time using the two same specifications, based on Equation (2). Standard errors are clustered at the household level.