Housing Market Shocks and the Persistent Decline in U.S. Fertility

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16 November 2026

Abstract

Fertility in the United States declined sharply following the Great Recession and has remained persistently low despite the subsequent economic recovery. This paper examines whether the housing bust contributed to this sustained decline. Using variation across metropolitan areas in the severity of the housing bust, I show that more exposed MSAs experienced substantially larger declines in fertility after the recession. These effects persist through 2022, are similar across several measures of housing-market exposure, and are not explained by differential deterioration in local labor markets. The fertility response also persists even as mortgage lending and residential construction recover from their recession lows. To investigate potential channels, I examine housing and household outcomes among young adults. Young adults in more exposed MSAs became more likely to live with their parents and less likely to form partnered households, own homes, and move. The persistence of the fertility effects across successive cohorts of young women suggests that the response was not confined to those directly exposed to the housing bust during young adulthood. These findings suggest that persistent disruptions to housing and household transitions following the housing bust contributed to the long-run decline in U.S. fertility.

JEL codes: J13, E32, R21

Keywords: Fertility, housing markets, Great Recession, economic shock, homeownership

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1 Introduction

U.S. fertility fell sharply at the onset of the Great Recession and has continued to trend downward despite the subsequent economic recovery. The general fertility rate fell from 71.1 per 1,000 women aged 15 to 44 in 2007, to 57.2 per 1,000 in 2022 (Figure 1). Despite the substantial declines in fertility, survey evidence suggests that intended family size has remained relatively stable across recent U.S. cohorts (Guzzo and Hayford 2023; Stone 2017). This divergence between intended and realized fertility points to a potential role for constraints in explaining the fertility decline.

While economic theory and empirical evidence show that recessions can lead to declines in fertility through income, employment, and economic uncertainty (Lindo 2010; Kearney and Wilson 2018), these explanations do not readily explain why fertility remained depressed long after the Great Recession ended. Reviewing a broad range of economic, policy, and social explanations, Kearney, Levine, and Pardue (2022) conclude that no existing explanation can fully account for either the magnitude or the persistence of the decline. The fact that fertility continued to decline throughout the economic recovery suggests that the Great Recession may have fundamentally altered an important determinant of fertility in a way that endured well beyond the recession itself.

One distinguishing feature of the Great Recession was the unprecedented collapse in housing markets (Mian and Sufi 2011, 2018). The years preceding the recession were characterized by rapid growth in mortgage lending, rising house prices, and a surge in residential construction, fueled in part by the expansion of subprime lending (Mian and Sufi 2009, 2014). When the housing bubble burst, house prices fell, mortgage credit contracted sharply, and residential construction collapsed. Importantly, the housing bust was not merely transitory. Mortgage lending and residential construction recovered from their recession lows but did not return to their pre-boom trajectories. House prices also remained below their pre-crisis

level for over a decade (Figure A.2). The persistence of these housing-market disruptions makes the housing bust a potential explanation for why fertility remained depressed even as aggregate economic conditions recovered.

Housing market conditions can affect fertility through several channels, including housing wealth, affordability, and access to homeownership. Falling house prices reduced housing wealth and home equity for existing homeowners. For prospective buyers, falling house prices made housing more affordable, but tighter mortgage credit could make home purchase more difficult even at lower prices, leaving the overall effect on residential independence, partnership formation, and fertility ambiguous. The collapse in residential construction reduced the supply of new housing, which could further reduce fertility by constraining households' ability to adjust their housing as their families expand. How the housing bust affected fertility therefore depends on which dimensions of the housing market were most consequential for household decisions.

In this paper, I examine whether housing-market disruptions contributed to the persistent decline in U.S. fertility following the Great Recession. I combine data on births from the National Center for Health Statistics Vital Statistics Natality Files with mortgage data from the Home Mortgage Disclosure Act (HMDA). I exploit variation across metropolitan areas (MSAs) in exposure to the housing bust, measured by the pre-crisis share of higher-priced mortgages, a proxy for subprime lending. This predetermined measure captures differences in local vulnerability to the housing bust, particularly through exposure to mortgage distress and declines in housing wealth. Using an event-study framework, I compare changes in fertility over time between more and less exposed MSAs. I conduct the analysis at the MSA level because metropolitan areas better approximate local housing and labor markets, which often extend across county boundaries. I also examine alternative measures of housing-bust exposure based on declines in mortgage originations, single-family building permits, and house prices between 2006 and 2011, which capture different dimensions of housing-market

disruptions.

I find that MSAs with greater pre-crisis subprime exposure experienced substantially larger declines in fertility following the Great Recession, with the differential widening over time and persisting through 2022. The preferred estimate implies that an MSA with the sample mean subprime mortgage share of 22.04% experienced a decline in fertility that was 1.91 births per 1,000 women larger than an MSA at the 10th percentile of exposure (15.45%). This differential is equivalent to approximately 51% of the observed pre-post fertility decline in the sample.

The results are similar when housing-bust exposure is measured using declines in mortgage originations and single-family building permits. Across these measures, fertility trends were relatively stable across more and less exposed MSAs in the years immediately preceding the Great Recession, followed by larger and persistent declines in more exposed MSAs. These findings suggest that the relationship between housing-market disruptions and fertility is not specific to pre-crisis subprime lending. MSAs experiencing larger house-price declines also exhibited persistent fertility declines following the recession. However, substantial differential fertility trends during the 1990s complicate attributing this relationship specifically to changes in house prices. Taken together, the results suggest that persistent fertility declines were associated with broader housing-market disruptions, rather than any single measure of exposure.

One concern is that housing-market exposure may capture broader local effects of the Great Recession, particularly labor-market deterioration. Prior work documents persistent local employment effects of the Great Recession (Yagan 2019), while labor-market and income shocks have been shown to affect fertility (Lindo 2010; Kearney and Wilson 2018). I find little evidence that more housing-exposed MSAs experienced persistently larger employment declines after accounting for baseline MSA characteristics. Moreover, the fertility estimates remain largely unchanged when I directly account for differences in the severity of local

labor-market shocks. The persistent fertility response therefore does not appear to be driven primarily by differential deterioration in local labor markets.

The fertility decline extends to both first and higher-order births, suggesting that the relationship between housing-market exposure and fertility extends to both entry into parenthood and decisions about family expansion. The effects are concentrated among women under age 35. The persistence across successive cohorts reaching these ages suggests that the response was not confined to cohorts directly exposed to the housing bust during young adulthood, but instead reflects lasting changes in the housing and household conditions faced by subsequent cohorts entering adulthood and family formation.

Homeownership among women of childbearing age declined substantially following the housing bust. Whereas fertility remained relatively stable among homeowners, fertility among non-homeowners also declined, suggesting that changes in homeownership alone cannot account for the fertility response. To examine how exposure to the housing bust affected housing and household conditions among young adults, I use the Census and American Community Survey (ACS) to study residential independence, partnered household formation, homeownership, and residential mobility. In more exposed MSAs, young adults became more likely to live with their parents and less likely to form partnered households or own homes. Moves into owner-occupied housing also declined, along with residential mobility more broadly. These patterns suggest that the housing bust disrupted housing and household transitions closely connected to family formation and expansion.

A large literature studies how economic conditions affect fertility, emphasizing the roles of unemployment, income shocks, and economic uncertainty (Lindo 2010; Sobotka, Skirbekk, and Philipov 2011; Kearney and Wilson 2018). While these mechanisms help explain the cyclical relationship between economic conditions and fertility, less is known about why fertility remained depressed long after the Great Recession. Recent work has explored additional explanations, including smartphone diffusion (Myers and Hooper 2026).

This paper also contributes to the literature on housing markets and fertility. Existing research identifies several channels through which housing conditions may influence fertility. Dettling and Kearney (2014) find that house price increases during the housing boom increased fertility among homeowners but reduced fertility among non-homeowners, consistent with opposing wealth and price effects. Japaridze and Sayour (2024) document that renters tend to delay childbearing relative to homeowners, particularly in less affordable housing markets, highlighting an association between housing affordability, homeownership, and the timing of fertility. Cumming and Dettling (2023) study the relationship between monetary policy, mortgage credit, and fertility, while Dettling and Kearney (2025) find that the introduction of federally backed mortgages increased homeownership and fertility during the baby boom. Most closely related to this paper, Kim, Kim, and Park (2024) find that counties experiencing larger negative mortgage credit-supply shocks during the Great Recession experienced persistent declines in fertility. Rather than isolating a specific credit-supply shock or housing-market channel, this paper examines the relationship between broader local housing-market disruptions and the persistent decline in fertility following the Great Recession.

Finally, this paper contributes to a growing literature examining the long-run consequences of the Great Recession. Previous work documents persistent effects of the recession on labor market outcomes (Yagan 2019; Hershbein and Kahn 2018; Rothstein 2023). This paper extends that literature by documenting persistent demographic consequences associated with local housing-market disruptions, with fertility declines continuing well beyond the initial recession.

The remainder of the paper is organized as follows. Section 2 provides background on trends in fertility and housing markets. Section 3 describes the data, and Section 4 outlines the empirical strategy. Section 5 presents the main results, Section 6 examines the role of labor-market shocks, and Section 7 examines housing and household responses. Section 8

concludes.

2 Background

2.1 Decline in Fertility

U.S. fertility has historically been procyclical, declining during economic downturns but generally recovering as economic conditions improve (Sobotka, Skirbekk, and Philipov 2011). The decline following the Great Recession, however, was markedly different (Figure 1).

The general fertility rate fell from 71.1 births per 1,000 women aged 15–44 in 2007 to 65.7 in 2010 and, rather than recovering as economic conditions improved, continued to decline to 57.0 per 1,000 by 2020. Thus, fertility remained persistently depressed throughout the following decade despite declining unemployment and sustained economic growth.

This decline was not limited to first births. Fertility fell for both first and higher-order births (Figure A.1), suggesting declines in both entry into parenthood and subsequent childbearing.

2.2 Housing Boom and Bust

The early 2000s were characterized by a rapid expansion of the U.S. housing market. Mortgage credit expanded substantially, accompanied by a sharp increase in subprime and other high-risk lending (Mian and Sufi 2009, 2014). House prices rose rapidly, residential construction expanded, and housing-market activity reached historically high levels. The expansion of mortgage credit, rising house prices, and residential construction reinforced one another, contributing to the housing market boom.

The subsequent housing bust reversed many of these trends. As house prices began to fall, mortgage delinquencies, defaults, and foreclosures increased, with distressed sales

placing further downward pressure on house prices. Falling prices substantially reduced homeowners' housing wealth and left many mortgage borrowers with negative equity. For existing homeowners, these losses could make selling or moving more difficult, particularly when the outstanding mortgage balance exceeded the value of the home. At the same time, mortgage credit contracted sharply and lending standards tightened, making entry into homeownership more difficult despite lower house prices. Residential construction also collapsed and recovered only gradually following the recession.

These disruptions to housing markets may have consequences for fertility. Housing and fertility decisions are closely linked, as home purchase and childbearing frequently occur at similar stages of the life cycle and households often adjust their housing as they start or expand families. Existing work shows that housing-market conditions can affect fertility through changes in housing wealth, housing costs, and access to mortgage credit (Lovenheim and Mumford 2013; Dettling and Kearney 2014; Cumming and Dettling 2023). The housing bust could therefore affect fertility through several distinct and potentially offsetting channels. Falling house prices reduced housing wealth and home equity for existing homeowners, potentially discouraging fertility and leaving highly leveraged homeowners locked into their current residences. Tighter mortgage credit could also make it more difficult for prospective buyers to finance a home purchase, while the collapse in residential construction reduced the supply of new housing. On the other hand, lower house prices made housing more affordable for prospective buyers and could facilitate home purchase and family formation. The net effect of the housing bust on fertility is therefore ambiguous ex ante and may differ across the different dimensions of the housing market.

The lasting effects of the housing bust are visible in aggregate housing activity. Mortgage originations and single-family building permits rose substantially during the housing boom before declining sharply as the housing bubble burst and the financial crisis unfolded (Figure A.2). Although both mortgage lending and residential construction subsequently

recovered, neither returned to its pre-boom trajectory. House prices fell less sharply during the housing bust and remained below their pre-crisis level for over a decade. Homeownership among women of childbearing age also declined substantially following the housing bust and remained below its pre-recession level throughout the subsequent decade (Appendix Figure A.4). These patterns contrast with the recovery in aggregate labor-market conditions and motivate examining whether geographic differences in exposure to the housing bust can account for persistent differences in fertility.

2.3 The Great Recession

The housing bust occurred alongside a severe deterioration in U.S. labor markets. Employment fell sharply during the Great Recession, and local areas differed substantially in the severity of the downturn. Labor-market conditions may independently affect fertility by changing household income, employment prospects, and the opportunity cost of childbearing. The broader recession therefore provides an important alternative explanation for the geographic relationship between housing-market exposure and fertility.

Employment recovered following the Great Recession, in contrast to fertility, which remained persistently depressed (Figure A.3). Employment increased steadily prior to the Great Recession, declined sharply during the recession, and recovered gradually over the subsequent decade. By the end of the sample, national employment had largely returned to its pre-recession level, while fertility continued to decline.

3 Data

3.1 Fertility Outcomes

Fertility data are obtained from the National Center for Health Statistics (NCHS) Vital Statistics Natality Files, which contain information on all live births in the United States. The primary analysis uses the restricted-use natality files from 1989 onward, which include county and metropolitan statistical area (MSA) identifiers. For descriptive national trends presented in the introduction and background, I additionally use the public-use natality files for earlier years.

Population denominators are obtained from the Surveillance, Epidemiology, and End Results (SEER) Program population estimates. Female population counts for ages 15–44 are aggregated to the metropolitan statistical area (MSA) level and used to construct the primary fertility measure.

I conduct the main analysis at the MSA level, because MSAs approximate local housing and labor markets, which often extend across county boundaries. I also construct analogous county-level fertility measures to assess the robustness of the results to the choice of geographic unit.

The primary outcome is the race-by-age-group fertility rate[1] defined as the number of live births per 1,000 women in each race-by-age-group cell:

$$BirthRate_{mgt} = \frac{Births_{mgt}}{FemPop_{mgt}} \times 1000,$$

where $Births_{mgt}$ is the number of births to women in MSA m, race-by-age-group g, and year t, and $FemPop_{mgt}$ is the corresponding female population. Using information on birth order reported in the natality files, I separately examine first and higher-order births.

1. Race and ethnicity groups are White, Black, Hispanic, and other. Throughout the paper, I refer to these groups as race groups for brevity. Age groups are 15–19, 20–24, 25–29, 30–34, 35–39, and 40–44.

3.2 Housing Market Measures

Mortgage lending data are obtained from the Home Mortgage Disclosure Act (HMDA) database, which contains loan-level information on mortgage applications and originations reported by covered financial institutions. I use the reported rate spreads to proxy for pre-crisis subprime lending. During 2005–2006, rate spreads were reported for first-lien mortgages with an annual percentage rate at least 3 percentage points above the yield on comparable-maturity Treasury securities. I construct the subprime mortgage share as the proportion of originated first-lien home-purchase mortgages in each MSA over 2005–2006 with a reported rate spread. I also measure local mortgage market activity using the number of originated home-purchase mortgages, aggregated to the MSA level and expressed per 1,000 residents.

Data on residential construction come from the U.S. Census Bureau's Building Permits Survey (BPS), which reports the number of privately owned housing units authorized by building permits. I use single-family housing permits reported at the metropolitan statistical area (MSA) level and express them as the number of permits per 1,000 residents.

House price data are obtained from the Federal Housing Finance Agency (FHFA) House Price Index (HPI). I use the annual all-transactions county house price index (developmental series), and aggregate county-level house price indexes to the MSA level using population weights.

3.3 Labor Market Measures

Labor market data are obtained from the Bureau of Labor Statistics' Local Area Unemployment Statistics (LAUS) program. I use annual MSA-level estimates of employment, unemployment, and the labor force. The unemployment rate is defined as the ratio of unemployed individuals to the labor force. The employment-to-population ratio is calculated

using the SEER working-age population (ages 16 to 64) as the denominator.

3.4 Homeownership and Household Formation

To examine the mechanisms underlying the relationship between housing-market shocks and fertility, I use data from the Census and the American Community Survey (ACS). The analysis uses the 2000 Census, the 2003 ACS, and annual ACS samples beginning in 2005, when MSA identifiers are available. The Census and ACS provide nationally representative information on household composition and homeownership, and the ACS additionally provides information on residential mobility, allowing me to examine mobility responses to housing-market shocks.

I also use data from the Current Population Survey (CPS) to document national trends in household and housing outcomes.

3.5 Control Variables

I use several time-varying measures of local economic, housing-market, and policy conditions as controls. MSA-level personal income is obtained from the Bureau of Economic Analysis (BEA), and the housing price index is from the Federal Housing Finance Agency (FHFA). State-level Medicaid enrollment is obtained from the Centers for Medicare & Medicaid Services (CMS), which I use to construct the Medicaid enrollment rate.

4 Empirical Method

4.1 Defining Housing Market Exposure

Local housing markets experienced different degrees of disruption during the housing bust surrounding the Great Recession. To characterize this heterogeneity, I construct measures

of each MSA's exposure to the housing bust. These measures are intended to capture the severity of local housing-market disruptions rather than isolate the causal effect of any single housing-market channel. This approach is closely related to a broader literature exploiting geographic variation in exposure to the Great Recession to study its long-run consequences (Yagan 2019; Charles, Hurst, and Notowidigdo 2018, 2019).

The primary measure of housing-market exposure is the pre-crisis subprime mortgage share, defined as the proportion of originated first-lien home-purchase mortgages classified as higher-priced loans in 2005–2006. Subprime mortgage lending played a major role in the housing boom and subsequent bust. Mian and Sufi (2009) show that areas with greater concentrations of subprime borrowers experienced disproportionate expansions in mortgage credit before the crisis and larger increases in mortgage defaults afterward. More broadly, Mian and Sufi (2010) find that pre-crisis household leverage predicts the severity of subsequent declines in house prices and residential investment. The pre-crisis subprime mortgage share therefore provides an ex ante measure of local vulnerability to the housing bust, particularly through exposure to mortgage distress and declines in housing wealth.

I also consider three alternative measures that more directly capture the realized severity of the housing bust. First, I use the decline in home-purchase mortgage originations per 1,000 residents between 2006 and 2011, which captures the contraction in local mortgage-market activity. Second, I use the decline in single-family building permits per 1,000 residents over the same period, which reflects the contraction in residential construction. Finally, I use the percentage decline in the house price index between 2006 and 2011, which captures changes in local housing values.

These alternative measures capture different dimensions of local housing-market disruptions during the Great Recession. I measure the contractions between 2006 and 2011 to capture differences across MSAs in the severity of the housing downturn, rather than subsequent recovery dynamics. Because mortgage originations, residential construction, and

house prices are equilibrium outcomes, these measures reflect both supply- and demand-side forces rather than exogenous housing-market shocks. Consistent findings across the different exposure measures would suggest that the results reflect broader housing-market disruptions rather than any single housing-market channel.

4.2 Characterizing Housing Market Exposure

The exposure measures capture overlapping but distinct dimensions of local housing-market disruption (Table A.2). The pre-crisis subprime mortgage share is positively correlated with subsequent house-price declines (0.249), but is largely uncorrelated with declines in mortgage originations (−0.046) and building permits (0.067). In contrast, the realized measures of housing-market contraction are more strongly correlated with one another. Declines in mortgage originations and single-family building permits are strongly correlated (0.769), and both are moderately correlated with house-price declines (0.466 and 0.453, respectively). These patterns suggest that pre-crisis subprime lending captures a distinct dimension of housing-market vulnerability, more closely associated with subsequent house-price declines, while the realized measures capture related contractions in housing-market activity.

Table A.1 relates the housing-market exposure measures to MSA characteristics measured in 2000. MSAs with higher pre-crisis subprime shares tended to have larger populations, higher baseline fertility rates, lower personal income, and lower single-family permit rates, but were not systematically different in baseline mortgage origination rates or house prices. The realized measures of housing-market contraction exhibit somewhat different patterns. MSAs that subsequently experienced larger declines in mortgage originations and building permits tended to have greater housing-market activity before the bust, including higher mortgage origination and single-family permit rates and larger construction employment shares. These MSAs also tended to have lower baseline personal income, while larger declines in mortgage originations were additionally associated with larger MSA populations.

MSAs that subsequently experienced larger house-price declines had higher baseline house prices and mortgage origination rates and lower personal income, but were not systematically different in baseline fertility, employment, population, or residential construction. Baseline employment rates are not significantly associated with any of the exposure measures. Overall, these patterns suggest that pre-crisis subprime exposure and the realized measures of housing-market contraction capture distinct dimensions of pre-existing local housing-market conditions.

Finally, I examine how housing-market conditions evolved following the housing bust and whether differences across localities persisted. Figure 2 reports trends in mortgage originations, single-family building permits, and house prices separately for MSAs with above- and below-median pre-crisis subprime mortgage shares. Panel (a) shows that mortgage origination rates evolved similarly across the two groups during the 1990s, before rising more rapidly in MSAs with greater subprime exposure during the housing boom. Mortgage originations subsequently declined sharply in both groups, with a larger contraction in more exposed MSAs. By around 2008, mortgage origination rates had converged, and subsequently fell slightly below those in less exposed MSAs. Mortgage originations remained substantially below their pre-recession peaks in both groups through the end of the sample. Panel (b) shows a similar pattern for residential construction. More exposed MSAs experienced a larger expansion in single-family building permits before the recession, followed by a sharper contraction. By around 2008, construction rates had converged, and subsequently fell below those in less exposed MSAs. Although construction recovered in both groups after 2011, it remained well below its pre-recession peak through 2017. Panel (c) shows that more exposed MSAs also experienced a more pronounced house-price cycle. House prices were initially lower in more exposed MSAs but rose more rapidly during the housing boom, reaching similar levels across the two groups by 2006. During the bust, house prices declined more sharply in more exposed MSAs, falling below those in less exposed MSAs. Although house

prices subsequently recovered in both groups, those in more exposed MSAs remained below their pre-recession peak in 2017, while those in less exposed MSAs had surpassed it.

4.3 Event-Study Specification

To estimate how fertility evolved in MSAs with greater exposure to the housing bust, I use an event-study specification that interacts each exposure measure with year indicators. The primary outcome is the fertility rate, measured as births per 1,000 women for each race-by-age-group cell. I also estimate analogous specifications for age- and parity-specific fertility rates.

I estimate regressions of the form:

$$Y_{mgt} = \sum_{k \neq -1} \beta_k \mathbb{1}\{k = t - 2007\} \, Exposure_m + X_{m,2000} \times \gamma_t + \delta_m + \delta_t + \delta_g + \varepsilon_{mgt}, \qquad (1)$$

where Y_{mgt} denotes the fertility rate for race-by-age-group cell g in MSA m in year t; $Exposure_m$ is a measure of MSA m's exposure to the housing bust; $X_{m,2000}$ is a vector of baseline MSA characteristics measured in 2000, including the mortgage origination rate, single-family permit rate, housing price index, personal income, employment rate, and construction employment share; and δ_m, δ_t, and δ_g are MSA, year, and race-by-age-group FEs. The omitted year is 2006, immediately prior to the onset of the housing collapse, so all coefficients are interpreted relative to the pre-crisis period.

The coefficients of interest are the β_ks, which measure how outcomes evolved over time in MSAs with greater exposure to housing-market shocks relative to those with less exposure.

To summarize the average differential change in fertility following the housing bust, I also estimate the following pooled specification:

$$Y_{mgt} = \beta Post_t \times Exposure_m + X_{m,2000} \times \gamma_t + \delta_m + \delta_t + \delta_g + \varepsilon_{mgt}, \qquad (2)$$

where $Post_t$ is an indicator variable for the post period, defined as 2007 and later.

The estimation sample consists of 203 MSAs with both fertility outcomes and the pre-crisis subprime mortgage share, my primary measure of housing-market exposure. All specifications include metropolitan area, year, and race-by-age-group fixed effects. The preferred specification additionally includes baseline mortgage originations, single-family building permits, the housing price index, personal income, the employment rate, and the construction share of employment, all measured in 2000 and interacted with year fixed effects. As a robustness check, I additionally control for lagged employment rate, personal income, and housing price index at the MSA level, and lagged Medicaid enrollment rate at the state level. Regressions are weighted by race-by-age-group female population, and standard errors are clustered at the metropolitan area level.

The identifying assumption is that, conditional on baseline MSA characteristics, fertility in MSAs with different levels of housing-market exposure would have followed parallel trends in the absence of the housing bust. The event-study specification allows me to examine whether fertility trends differed systematically across MSAs before the Great Recession, providing evidence on the plausibility of this assumption. However, the absence of differential pre-trends does not rule out contemporaneous shocks that are correlated with housing-market exposure and independently affect fertility. In particular, areas with greater exposure to the housing bust may also have experienced more severe labor-market disruptions. I address this concern by examining differential labor-market outcomes and controlling for local labor-market shocks in subsequent analyses. Moreover, while the pre-crisis subprime share is predetermined relative to the housing bust, it is not randomly assigned and may be correlated with other MSA characteristics that influence fertility trends.

Because housing-market exposure is continuous, the specification estimates how differential changes in fertility vary with exposure intensity, imposing a linear relationship between the two. As discussed by Callaway, Goodman-Bacon, and Sant'Anna (2026), the standard

parallel-trends assumption does not, by itself, identify a causal dose-response relationship when treatment effects are heterogeneous across exposure levels. The coefficients are therefore interpreted as differences in fertility trajectories associated with greater housing-market exposure, rather than the causal effect of marginally increasing exposure for a given MSA.

5 Results

MSAs with higher pre-crisis subprime mortgage shares experienced substantially larger declines in fertility following the housing bust (Figure 3). The event-study estimates are relatively stable and close to zero in the years immediately preceding the Great Recession, although estimates from the early 1990s suggest some differential pre-trends over the longer pre-period. Beginning in 2007, fertility declined in more exposed MSAs relative to less exposed ones, consistent with the timing of the housing-market collapse. The effect widened over the following several years, with the estimated coefficient reaching -0.23 by 2011 and continuing to increase gradually through the end of the sample, suggesting that the fertility declines associated with greater subprime exposure persisted well beyond the immediate aftermath of the housing bust.

Table 1 reports the corresponding pooled estimates from Equation 2. In the preferred specification in column (2), the estimated coefficient is -0.290, indicating that a one-percentage-point higher pre-crisis subprime mortgage share is associated with a 0.290 larger decline in births per 1,000 women following the housing bust. To illustrate the magnitude, an MSA with the sample mean subprime share of 22.04% is estimated to experience a decline in fertility that is 1.91 births per 1,000 women larger than an MSA at the 10th percentile of exposure (15.45%). This differential is equivalent to approximately 51% of the observed pre-post decline in the sample fertility rate, from 66.01 to 62.26 births per 1,000 women.

The negative relationship between pre-crisis subprime exposure and subsequent fertility

persists across alternative specifications, although the estimated magnitude varies. Table 1 examines the sensitivity of the results to different sets of controls. The estimated association is larger both without baseline MSA controls and when additional time-varying economic characteristics are included. However, these time-varying characteristics may themselves respond to the housing bust, so conditioning on them could absorb part of the fertility response to housing-market disruptions. I therefore use the specification with baseline MSA controls as my preferred specification. The corresponding event-study estimates (Figure A.5) show a similar pattern of persistent fertility declines following 2007 across specifications.

Figure 4 shows that the main results are robust to alternative measures of housing-market exposure. The results are broadly consistent with the main findings when exposure is measured using the decline in mortgage originations or single-family building permits between 2006 and 2011. For both measures, the estimated coefficients are close to zero in the years immediately preceding the Great Recession, although there is some evidence of differential trends over the longer pre-period. Beginning in 2007, fertility declined more sharply in MSAs experiencing larger contractions in mortgage lending and residential construction. The estimated differentials widened over the following several years and remained negative through the end of the sample. These results suggest that the relationship between housing-market disruption and fertility is not specific to pre-crisis subprime lending, but is also evident when exposure is measured using realized contractions in housing-market activity.

MSAs experiencing larger house-price declines following the Great Recession also experienced larger and persistent fertility declines. However, Figure 4c shows substantial differential fertility trends before the Great Recession. MSAs that subsequently experienced larger house-price declines exhibited a pronounced relative decline in fertility during the 1990s, followed by relatively stable differential trends in the years immediately preceding the housing bust. Fertility declined again in these MSAs following the Great Recession, with the differential persisting through 2022. These patterns illustrate the close relationship

between house prices and fertility more generally, consistent with the findings of Dettling and Kearney (2014). However, the differential pre-trends make it difficult to attribute the post-2007 divergence specifically to changes in house prices.

The decline in fertility associated with greater pre-crisis subprime exposure is observed for both first and higher-order births (Figure 5). First-birth rates began to decline following the housing bust, with the estimated differential widening through approximately 2010 and remaining relatively stable thereafter. Higher-order birth rates also declined following the bust, but the estimated coefficients are larger in magnitude and continued to become more negative over the post-recession period. These patterns suggest that the fertility response was not limited to delayed entry into parenthood, but also involved changes in childbearing among women who had already become mothers. Although the annual fertility rates do not distinguish between postponed and permanently forgone births, the persistence of the declines in higher-order births suggests that the housing bust may have had implications for family size as well as the timing of childbearing.

The effects are concentrated among younger women (Figure 6). Fertility among women aged 20–34 declined sharply following the housing bust, with the estimated differential widening over the following several years and remaining substantial through 2022. In contrast, the estimated effects for women aged 35–44 are considerably smaller and less precisely estimated. Although the coefficients become moderately negative during the years following the bust, they subsequently move back toward zero, providing little evidence of a persistent fertility decline among older women. Figure A.6 further disaggregates the results by 5-year age group. The persistence of the decline among women aged 20–34 is particularly notable because many women in this age range toward the end of the sample were children or teenagers when the housing bust began. This pattern suggests that the fertility response was not confined to women who were already making childbearing decisions during the Great Recession, but may also reflect persistent changes in local economic and housing-market con-

ditions affecting subsequent cohorts. Table A.4 reports the corresponding pooled post-period estimates by birth order and age group.

6 Labor Market Conditions

6.1 Housing Market Exposure and Employment

The Great Recession combined a severe housing-market contraction with a sharp deterioration in local labor markets. Prior work shows that local exposure to the Great Recession had persistent effects on employment (Yagan 2019), and labor-market conditions are a known determinant of fertility (Lindo 2010; Kearney and Wilson 2018). An important concern is therefore that the relationship between pre-crisis subprime exposure and fertility may reflect broader local labor-market disruptions rather than housing-market conditions specifically.

Figure 7 examines how employment evolved in MSAs with different levels of pre-crisis subprime exposure. I estimate an analogous event-study specification to Equation 1 at the MSA level, using the employment rate as the outcome. Conditional on baseline MSA characteristics, there is little evidence of a sharp or persistent deterioration in employment rates in more exposed MSAs following the Great Recession. Although employment falls modestly in more exposed areas around the recession, the estimated differential is small and not statistically significant. These results provide limited evidence of persistent differences in employment rates associated with pre-crisis subprime exposure.

Nevertheless, housing-market exposure and labor-market disruptions are not independent. MSAs with higher pre-crisis subprime mortgage shares also tended to experience larger increases in unemployment between 2006 and 2011, although there is considerable variation in unemployment changes across MSAs with similar levels of subprime exposure. This relationship motivates examining whether the fertility results are sensitive to differences in the severity of local labor-market shocks.

6.2 Labor Market Shocks and Fertility

Next, I examine the relationship between labor-market exposure to the Great Recession and fertility. I construct a measure of labor-market exposure defined as the increase in the MSA unemployment rate between 2006 and 2011, analogous to the realized measures of housing-market contraction. I first estimate Equation 1 using this measure of labor-market exposure.

Figure A.7 shows that MSAs experiencing larger increases in unemployment during the Great Recession also experienced larger subsequent declines in fertility. However, the estimates exhibit substantial differential trends well before the recession. Fertility in MSAs that subsequently experienced larger unemployment shocks was already declining relative to other MSAs throughout the 1990s, with the differential stabilizing around zero during the early 2000s. Following the Great Recession, the estimated coefficients became increasingly negative, with the differential persisting through the end of the sample. These substantial pre-existing trends make it difficult to attribute the post-recession divergence specifically to the increase in unemployment during the Great Recession.

I then examine whether the main results are sensitive to accounting for differences in labor-market exposure. Figure A.8 reports results from the preferred specification additionally including the 2006–2011 increase in unemployment interacted with year indicators, allowing fertility trends to vary flexibly with the severity of the local labor-market shock. The estimated relationship between subprime exposure and fertility remains negative following the housing bust, with the differential widening over time and persisting through 2022. Table 2 reports the corresponding pooled estimates. Controlling for labor-market exposure attenuates the estimated coefficient from -0.290 in the preferred specification (Table 1) to -0.228 (Table 2), a reduction of approximately 21%. Thus, the relationship between pre-crisis subprime exposure and fertility remains substantial even after accounting for differences in the severity of local unemployment shocks.

However, this comparison should be interpreted with caution because the increase in unemployment between 2006 and 2011 may itself be a consequence of the housing bust. To the extent that housing-market disruptions affected fertility through employment and income, conditioning on subsequent unemployment changes could absorb part of the effect of housing-market exposure. The attenuation therefore cannot be interpreted as the share of the fertility response attributable to labor-market conditions, and the augmented specification serves as a sensitivity check rather than an estimate of the direct effect of housing-market disruptions.

Taken together, these results suggest that differences in labor-market conditions may explain part of the relationship between pre-crisis subprime exposure and subsequent fertility declines, but are unlikely to account for the entire pattern. While MSAs experiencing larger unemployment shocks also experienced larger declines in fertility, this relationship is complicated by substantial differential pre-trends. Moreover, the persistent negative relationship between subprime exposure and fertility remains after accounting for local unemployment shocks. These findings are consistent with housing-market disruptions affecting fertility through channels beyond local labor-market conditions, although they do not separately identify the contributions of housing- and labor-market mechanisms.

7 Housing and Household Responses

7.1 Household Formation, Homeownership, and Residential Mobility

One potential channel through which housing-market disruptions may affect fertility is by delaying young adults' residential independence. The share of young adults living with their parents has increased in recent decades (U.S. Census Bureau 2024), raising the possibility

that disruptions to housing markets made it more difficult to leave the parental home and establish an independent household, with potential consequences for family formation.

To examine this possibility, I use the 2000 Census and the American Community Survey (ACS) to study whether exposure to the housing bust altered residential independence, partnered household formation, homeownership, and residential mobility among young adults. First, I measure residential independence using an indicator for whether an individual lives with at least one parent. Second, I measure partnered household formation using an indicator for whether the individual is a householder living with a spouse or unmarried partner, or is the spouse or unmarried partner of the householder. Third, I define homeownership as being a householder or spouse living in an owner-occupied residence. Finally, the ACS reports whether respondents lived in the same residence one year earlier, allowing me to measure residential mobility and whether a move ended in an owner-occupied residence. Because the ACS is a repeated cross-section and does not report tenure at the respondent's previous residence, I cannot distinguish first-time transitions into homeownership from moves by existing homeowners. All household formation and residential mobility outcomes are binary indicators multiplied by 100, so the estimated coefficients are expressed in percentage points.

The estimation sample is restricted to 60 MSAs for which the relevant geographic identifiers and household outcomes are available. The 2003 ACS predates the survey's full implementation in 2005 and has more limited geographic coverage and a smaller sample. These limitations, together with the relatively small number of MSAs, reduce statistical precision and warrant caution when interpreting the event-study estimates, particularly in the pre-recession period.

I estimate individual-level event study specifications analogous to Equation 1:

$$Y_{imt} = \sum_{k \neq -1} \beta_k \mathbb{1}\{k = t - 2007\} Exposure_m + X_{m,2000} \times \gamma_t + W_{imt}\lambda + \delta_m + \delta_t + \epsilon_{imt}, \quad (3)$$

where Y_{imt} denotes the outcome for individual i in MSA m in year t, and W_{imt} are demographic controls including sex and race-by-age indicators. Regressions are weighted using ACS survey weights, and standard errors are clustered at the MSA level. I focus on men and women ages 20–34, for whom these household transitions are most relevant, and show that the patterns are robust to women ages 15–44.

I again estimate the following pooled specification to summarize the post-period effects:

$$Y_{imt} = \beta Post_t \times Exposure_m + X_{m,2000} \times \gamma_t + W_{imt}\lambda + \delta_m + \delta_t + \epsilon_{imt}, \tag{4}$$

where $Post_t$ is defined as in Equation 2. The pooled specification includes the same controls, fixed effects, and weights as the event-study specification in Equation 3.

Table 3 reports the estimated relationship between pre-crisis subprime exposure and household formation and residential mobility. A 10-percentage-point increase in the pre-crisis subprime mortgage share is associated with a 1.47-percentage-point increase in the probability of living with a parent and a 1.59-percentage-point decline in the probability of living in a partnered household. Homeownership also declines by 1.05 percentage points, while the probabilities of moving into owner-occupied housing and moving more generally decline by 0.42 and 0.71 percentage points, respectively. The estimates are statistically significant at conventional levels, although the estimate for overall residential mobility is significant only at the 10% level. The results are robust to restricting the sample to women aged 15–44 (Table A.5).

The corresponding event-study estimates, reported in Figures A.10 and A.11, are generally imprecise and provide limited evidence on the timing of these changes. The relatively small sample of 60 MSAs and the limitations of the early ACS data warrant caution in interpreting these results.

Taken together, these findings are consistent with housing-market disruptions constraining

residential independence, partnered household formation, and housing transitions. These patterns provide suggestive evidence of mechanisms through which the housing bust may have contributed to the persistent decline in fertility.

7.2 Housing and Fertility

The decline in fertility following the Great Recession coincided with substantial changes in homeownership and household formation. However, changes in homeownership alone are unlikely to explain the full fertility decline. Figure A.9 plots trends in recent childbearing between 1990 and 2025 separately by homeownership status, using the presence of an own child under age one in the Current Population Survey (CPS) as a proxy for births. Fertility among homeowners remained relatively stable in the decades following the Great Recession, while fertility among non-homeowners declined substantially. These patterns suggest that the aggregate fertility decline cannot be understood solely as a compositional shift toward non-homeownership. However, because homeownership status is itself endogenous to housing-market conditions and fertility decisions, these comparisons do not identify the causal effect of homeownership on fertility.

The housing bust involved simultaneous disruptions to several dimensions of local housing markets, which may have affected fertility through distinct and potentially offsetting channels. Declines in house prices reduced housing wealth for existing homeowners while lowering housing costs for prospective buyers. Contractions in mortgage lending could make home purchases more difficult even as prices fell. Negative equity and tighter financing conditions could constrain residential mobility, while declines in residential construction may have reduced the availability of new housing. More broadly, uncertainty about future homeownership, access to suitable housing, and the ability to establish an independent household may influence decisions about marriage, partnership, and childbearing.

The empirical evidence is consistent with disruptions to housing access and household

formation playing a role in the fertility decline, although the individual channels cannot be separately identified. The main results show that MSAs with higher pre-crisis subprime mortgage shares experienced larger and persistent fertility declines, with similar patterns observed using subsequent contractions in mortgage originations and residential construction. The house-price exposure measure, however, exhibits substantial differential pre-trends, limiting its causal interpretation.

The household formation results provide further suggestive evidence of these mechanisms. Young adults in more exposed MSAs were more likely to live with their parents and less likely to form partnered households, own homes, or move residences. Although the household event studies are imprecise, the pooled estimates are consistent with persistent constraints on residential independence and housing transitions. Moreover, fertility declined for both first and higher-order births, suggesting that housing-market disruptions may have affected not only entry into parenthood but also decisions about expanding existing families. Taken together, these patterns point to broader disruptions in housing access and household formation as potential channels linking the housing bust to the persistent decline in fertility.

8 Discussion

This paper examines whether housing-market disruptions contributed to the persistent decline in U.S. fertility following the Great Recession. Using variation across MSAs in pre-crisis subprime mortgage exposure, I find that more exposed areas experienced substantially larger declines in fertility. These effects persist through 2022 and are robust to alternative measures of housing-market exposure. Although controlling for local labor-market shocks attenuates the estimates, the relationship between housing-market exposure and fertility remains substantial, suggesting that labor-market conditions alone are unlikely to explain the observed decline. The results also provide suggestive evidence that housing-market exposure affected

residential independence, partnered household formation, homeownership, and residential mobility among young adults, pointing to disruptions in housing and household transitions as potential mechanisms linking the housing bust to fertility.

The fertility response persisted even as housing-market conditions began to recover. Mortgage lending and residential construction increased from their recession lows, although neither returned to its pre-boom trajectory. The persistence of the fertility effects across successive cohorts of young women suggests that the response was not confined to women who were directly exposed to the housing bust during young adulthood. Instead, the bust may have altered housing and household conditions faced by subsequent cohorts entering adulthood and family formation.

The housing bust involved simultaneous changes in several dimensions of local housing markets and household housing outcomes, including mortgage credit, residential construction, house prices, homeownership, and residential mobility. The exposure measures used in this paper therefore capture broader housing-market disruptions rather than the effect of any single housing-market margin. Consistent with this interpretation, the estimates provide little evidence that the expansion in mortgage originations during the housing boom generated a corresponding increase in fertility, suggesting that the subsequent fertility decline cannot be understood simply as the reversal of an earlier mortgage-market expansion. Moreover, the fertility decline persisted as house prices recovered, suggesting that house-price changes alone are unlikely to explain the observed pattern. While the results cannot separately identify the contributions of individual housing-market mechanisms, the consistency of the fertility results across multiple exposure measures, together with the incomplete recovery in mortgage lending and residential construction, suggests that housing markets played an important role in the sustained fertility decline.

Fertility in the United States continues to decline, with successive cohorts reaching each age having fewer children than previous generations. While some of this decline may reflect

delayed childbearing, existing evidence suggests that delayed births have not been fully offset at older ages. The results of this paper suggest that persistent changes in housing markets following the Great Recession may have contributed to this long-run demographic shift. More broadly, they highlight that housing-market shocks can have consequences extending beyond housing markets themselves, influencing family formation and long-run fertility.

References

Callaway, Brantly, Andrew Goodman-Bacon, and Pedro H. C. Sant'Anna. 2026. "Difference-in-Differences with a Continuous Treatment." Forthcoming, *American Economic Review.*

Charles, Kerwin Kofi, Erik Hurst, and Matthew J. Notowidigdo. 2018. "Housing Booms and Busts, Labor Market Opportunities, and College Attendance." *American Economic Review* 108 (10): 2947–94.

———. 2019. "Housing Booms, Manufacturing Decline and Labour Market Outcomes." *The Economic Journal* 129 (617): 209–248.

Cumming, Fergus, and Lisa Dettling. 2023. "Monetary Policy and Birth Rates: The Effect of Mortgage Rate Pass-Through on Fertility." *The Review of Economic Studies* 91 (1): 229–258.

Dettling, Lisa J., and Melissa S. Kearney. 2014. "House prices and birth rates: The impact of the real estate market on the decision to have a baby." *Journal of Public Economics* 110:82–100.

Dettling, Lisa J., and Melissa S. Kearney. 2025. *Did the Modern Mortgage Set the Stage for the U.S. Baby Boom?* Working Paper, Working Paper Series 33446. National Bureau of Economic Research.

Guzzo, Karen Benjamin, and Sarah R. Hayford. 2023. "Evolving Fertility Goals and Behaviors in Current U.S. Childbearing Cohorts." *Population and Development Review* 49 (1): 7–42.

Hershbein, Brad, and Lisa B. Kahn. 2018. "Do Recessions Accelerate Routine-Biased Technological Change? Evidence from Vacancy Postings." *American Economic Review* 108 (7): 1737–72.

Japaridze, I., and N. Sayour. 2024. "Housing Affordability Crisis and Delayed Fertility: Evidence from the USA." *Population Research and Policy Review* 43 (23).

Kearney, Melissa S., Phillip B. Levine, and Luke Pardue. 2022. "The Puzzle of Falling US Birth Rates since the Great Recession." *Journal of Economic Perspectives* 36 (1): 151–76.

Kearney, Melissa S., and Riley Wilson. 2018. "Male Earnings, Marriageable Men, and Nonmarital Fertility: Evidence from the Fracking Boom." *The Review of Economics and Statistics* 100 (4): 678–690.

Kim, Bokyung, Minseog Kim, and Narae Park. 2024. "Credit Supply Shocks and Fertility: Long-Term Consequences." Working paper, March.

Lindo, Jason M. 2010. "Are Children Really Inferior Goods?" *Journal of Human Resources* 45 (2): 301–327.

Lovenheim, Michael F., and Kevin J. Mumford. 2013. "Do Family Wealth Shocks Affect Fertility Choices? Evidence from the Housing Market." *The Review of Economics and Statistics* 95 (2): 464–475.

Mian, Atif, and Amir Sufi. 2009. "The Consequences of Mortgage Credit Expansion: Evidence from the U.S. Mortgage Default Crisis*." *The Quarterly Journal of Economics* 124 (4): 1449–1496.

———. 2010. "Household Leverage and the Recession of 2007–09." *IMF Economic Review* 58 (1): 74–117.

———. 2011. "House Prices, Home Equity-Based Borrowing, and the US Household Leverage Crisis." *American Economic Review* 101 (5): 2132–56.

———. 2014. "What Explains the 2007–2009 Drop in Employment?" *Econometrica* 82 (6): 2197–2223.

———. 2018. "Finance and Business Cycles: The Credit-Driven Household Demand Channel." *Journal of Economic Perspectives* 32 (3): 31–58.

Myers, Caitlin K, and Ezekiel Hooper. 2026. *Is the iPhone Birth Control? Causal Evidence from AT&T's 2007–2011 Carrier Monopoly.* Working Paper, Working Paper Series 35310. National Bureau of Economic Research, June.

Rothstein, Jesse. 2023. "The Lost Generation?" *Journal of Human Resources* 58 (5): 1452–1479.

Sobotka, Tomáš, Vegard Skirbekk, and Dimiter Philipov. 2011. "Economic Recession and Fertility in the Developed World." *Population and Development Review* 37 (2): 267–306.

Stone, Lyman. 2017. *How Big Is the Fertility Gap in America? In a State of Migration*, October.

U.S. Census Bureau. 2024. *America's Families and Living Arrangements: 2022.* Technical report. U.S. Census Bureau.

Yagan, Danny. 2019. "Employment Hysteresis from the Great Recession." *Journal of Political Economy* 127 (5): 2505–2558.

9 Tables and Figures

Table 1: Effect of the Housing Bust on Fertility Rate

VARIABLES	(1) No controls	(2) + Baseline controls	(3) + Time-varying controls
Post × Pre-Crisis Subprime Share	-0.438***	-0.290***	-0.380***
	(0.0898)	(0.0609)	(0.130)
Observations	185,703	160,647	155,779
Mean dep var	69.78	69.77	69.77
Mean exposure	22.49	22.04	22.04
MSA FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Race × Age-Group FE	Yes	Yes	Yes
Baseline controls × Year FE	No	Yes	Yes
Time-varying controls	No	No	Yes
# MSAs	235	203	203

Notes: The table reports pooled estimates from Equation 2. The outcome variable is fertility rate at the MSA-by-race-by-age-group level, defined as the number of births per 1,000 women in that group. Housing-market exposure is measured by the pre-crisis subprime mortgage share. The post indicator equals one in 2007 and subsequent years. Column (1) includes MSA, year, and race-by-age-group fixed effects. Column (2), the preferred specification, additionally interacts baseline MSA characteristics measured in 2000 with year fixed effects. Column (3) further controls for lagged MSA-level employment, personal income, and the housing price index, as well as the lagged state-level Medicaid enrollment rate. Regressions are weighted by the MSA race-by-age-group female population. Standard errors are clustered at the MSA level and reported in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 2: Housing-Market Shocks, Labor-Market Shocks, and Fertility

VARIABLES	(1) Employment Rate	(2) Fertility Rate	(3) Fertility Rate
Post × Pre-Crisis Subprime Share	-0.0542		-0.228***
	(0.0332)		(0.0704)
Post × Unemployment Rate Increase		-0.905***	-0.581**
		(0.223)	(0.247)
Observations	6,695	160,647	160,647
Mean dep var	73.90	69.77	69.77
MSA FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Race × Age-Group FE	No	Yes	Yes
Baseline controls × Year FE	Yes	Yes	Yes
Time-varying controls	No	No	No
# MSAs	203	203	203

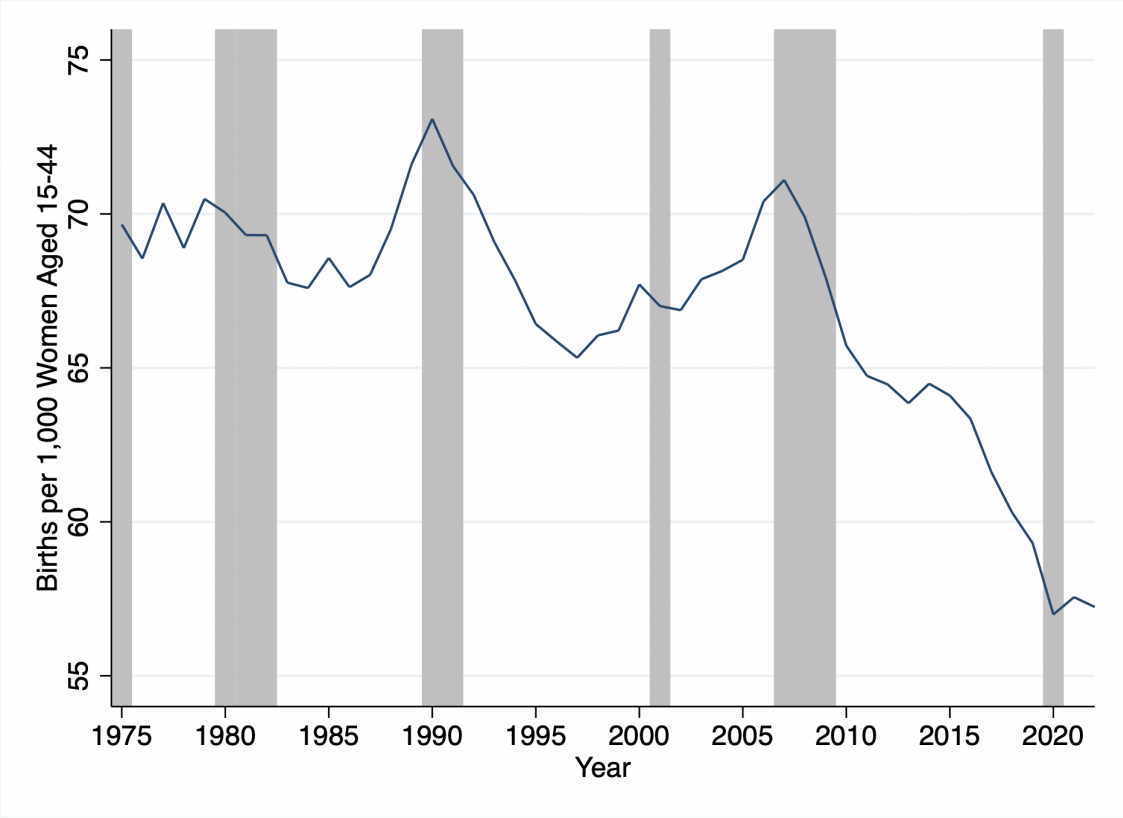
Notes: The table reports pooled estimates from Equation 2 and its MSA-level analogue, examining the relationships between housing-market shocks, labor-market conditions, and fertility. Column (1) reports the effect of housing-market exposure, measured as the pre-crisis subprime mortgage share, on the employment rate, defined as the share of employed persons ages 16–64. Column (2) reports the effect of labor-market exposure, measured as the increase in the unemployment rate between 2006 and 2011, on fertility. Column (3) includes both exposure measures in the fertility regression. All specifications include MSA and year fixed effects and interact baseline MSA characteristics measured in 2000 with year fixed effects. Columns (2) and (3) additionally include race-by-age-group fixed effects. Regressions are weighted by MSA population in column (1) and the corresponding MSA female population in columns (2) and (3). Standard errors are clustered at the MSA level and reported in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 3: Effects of the Housing Bust on Household Formation and Residential Mobility

VARIABLES	(1) Parent in Household	(2) Partnered Household	(3) Owns Home	(4) Moved & Owns Home	(5) Moved
Post × Pre-Crisis Subprime Share	0.147***	-0.159***	-0.105***	-0.0418**	-0.0713*
	(0.0470)	(0.0560)	(0.0370)	(0.0164)	(0.0406)
Observations	2,521,511	2,521,511	2,521,511	2,421,225	2,421,225
Mean dep var	22.91	43.84	28.98	5.46	32.19
Mean exposure	22.91	22.91	22.91	22.91	22.91
MSA FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Race × Age-Group FE	Yes	Yes	Yes	Yes	Yes
Baseline controls × Year FE	Yes	Yes	Yes	Yes	Yes
Time-varying controls	No	No	No	No	No
# MSAs	60	60	60	60	60

Notes: The table reports pooled estimates from Equation 4. Housing-market exposure is measured by the pre-crisis subprime mortgage share. The outcome variables are indicators for living with at least one parent, being a householder or the spouse or unmarried partner of a householder, being a householder or partner in an owner-occupied residence, having moved within the past year into an owner-occupied residence, and having moved within the past year. The post indicator equals one in 2007 and subsequent years. All specifications include MSA, year, sex, and race-by-age-group fixed effects and interact baseline MSA characteristics measured in 2000 with year fixed effects. The sample includes respondents ages 20–34. Regressions are weighted by ACS survey weights. Standard errors are clustered at the MSA level and reported in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

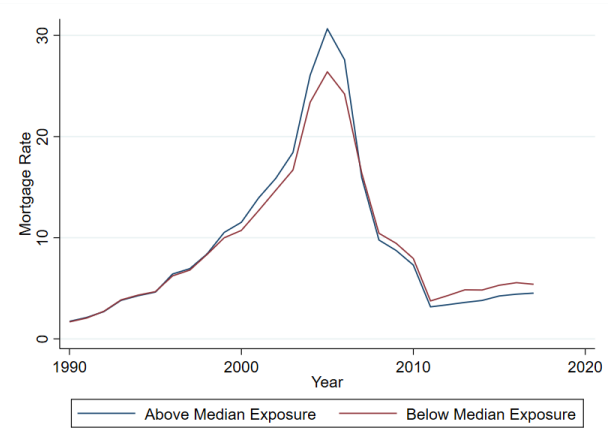
Figure 1: Births per 1,000 Women Aged 15–44



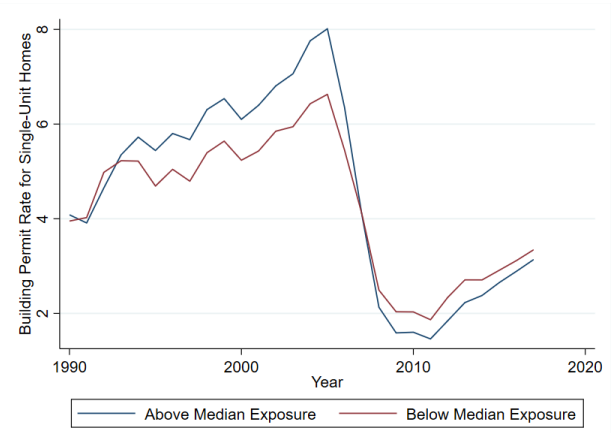
Notes: The figure reports the national fertility rate, measured as births per 1,000 women ages 15–44. Births are from the National Vital Statistics System (NVSS), and population denominators are from the Surveillance, Epidemiology, and End Results (SEER) Program. Shaded areas indicate NBER recession years.

Figure 2: Trends in Housing Market Variables by Exposure to the Housing Bust

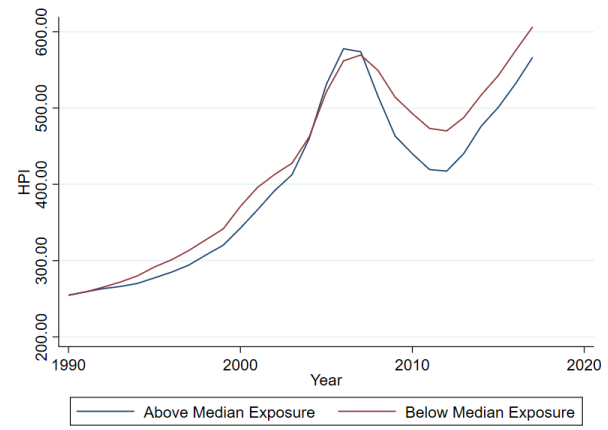
(a) Mortgage Originations



(b) Single-Family Building Permits

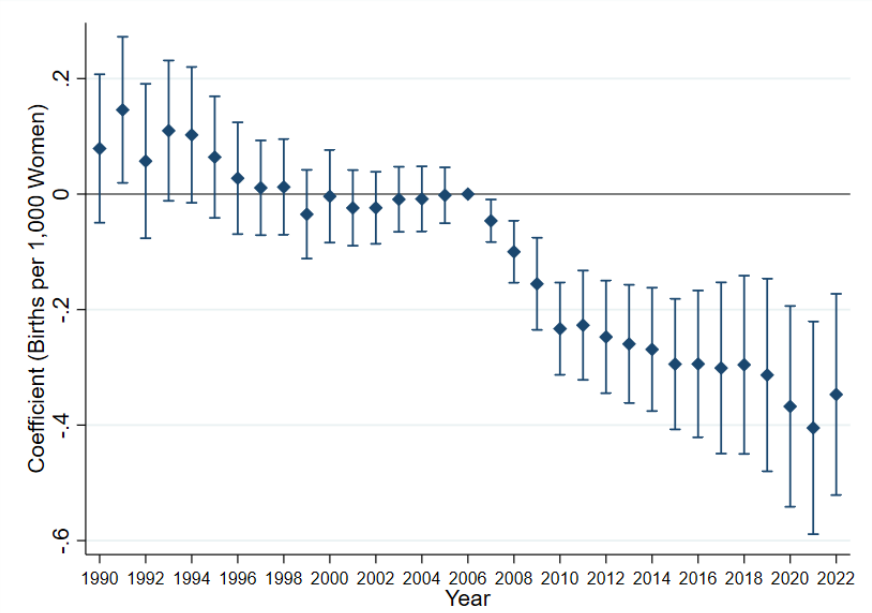


(c) Housing Price Index



Notes: The figure reports unweighted average housing-market outcomes separately for MSAs with above- and below-median pre-crisis subprime share of mortgages. Panel (a) reports mortgage originations per 1,000 residents, Panel (b) reports single-family building permits per 1,000 residents, and Panel (c) reports the housing price index.

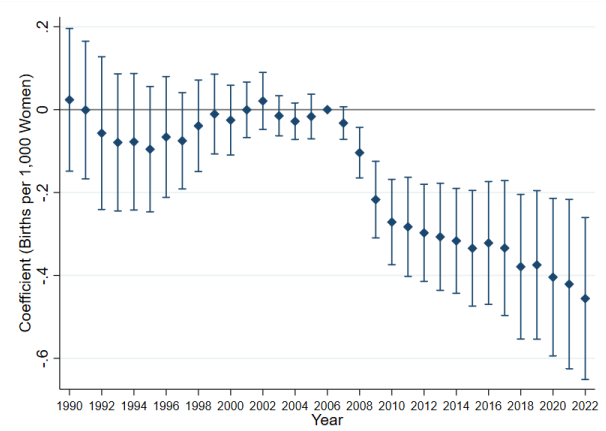
Figure 3: Effect of the Housing Bust on Fertility Rate



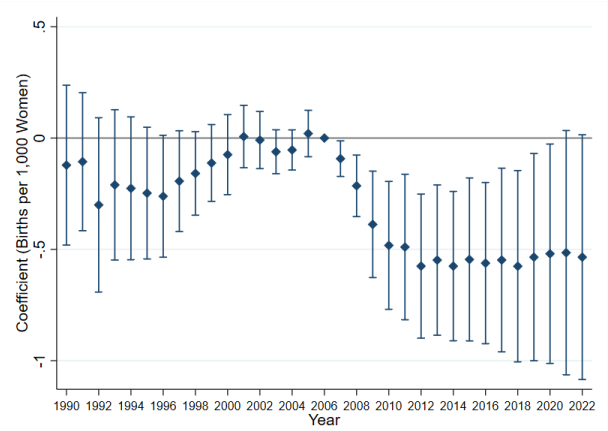
Notes: The figure reports event-study coefficients from Equation 1. The outcome variable is fertility rate at the MSA-by-race-by-age-group level, defined as the number of births per 1,000 women in that group. Housing-market exposure is measured by the pre-crisis subprime mortgage share. The omitted year is 2006. The specification includes MSA, year, and race-by-age-group fixed effects, and allows the outcome variable to vary with baseline MSA characteristics by interacting mortgage originations, the single-family permit rate, the housing price index, personal income, the employment rate, and the construction share of employment, measured in 2000, with year fixed effects. Regressions are weighted by the MSA race-by-age-group female population, and standard errors are clustered at the MSA level. Vertical bars indicate 95% confidence intervals.

Figure 4: Effect of Alternative Housing-Market Exposures on Fertility Rate

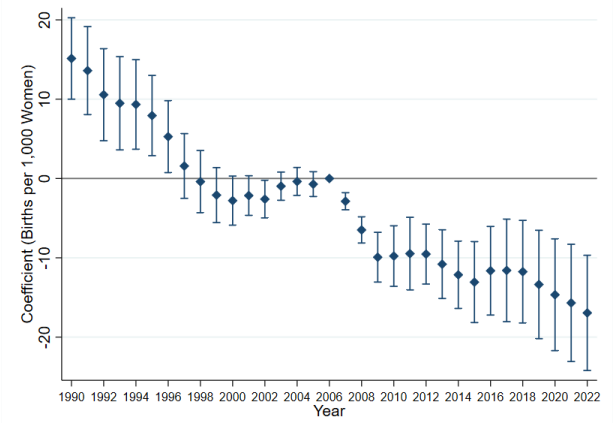
(a) Decline in Mortgage Originations 2006–2011



(b) Decline in Building Permits 2006–2011



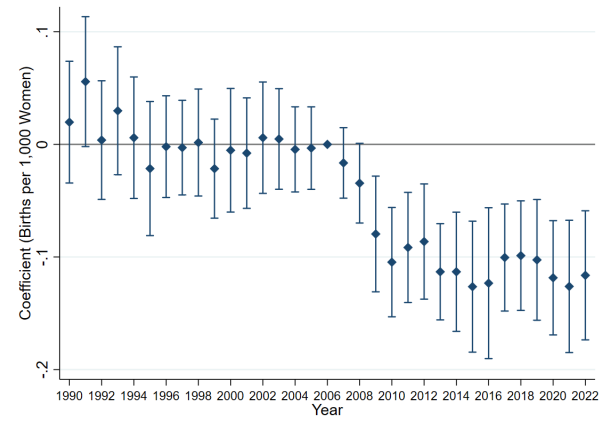
(c) Decline in HPI 2006–2011



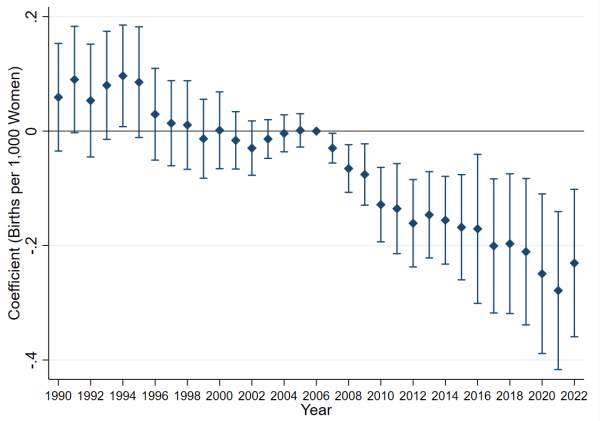
Notes: The figure reports event-study coefficients from Equation 1 using alternative measures of housing-market exposure. The outcome variable is fertility rate at the MSA-by-race-by-age-group level, defined as the number of births per 1,000 women in that group. Panel (a) measures exposure using the decline in home-purchase mortgage originations per 1,000 residents between 2006 and 2011; panel (b) uses the decline in single-family building permits per 1,000 residents between 2006 and 2011; panel (c) uses the decline in the housing price index between 2006 and 2011. The omitted year is 2006. The specification includes MSA, year, and race-by-age-group fixed effects, and allows the outcome variable to vary with baseline MSA characteristics by interacting mortgage originations, the single-family permit rate, the housing price index, personal income, the employment rate, and the construction share of employment, measured in 2000, with year fixed effects. Regressions are weighted by the MSA race-by-age-group female population, and standard errors are clustered at the MSA level. Vertical bars indicate 95% confidence intervals.

Figure 5: Effect of the Housing Bust on Fertility Rate, By Parity

(a) First births



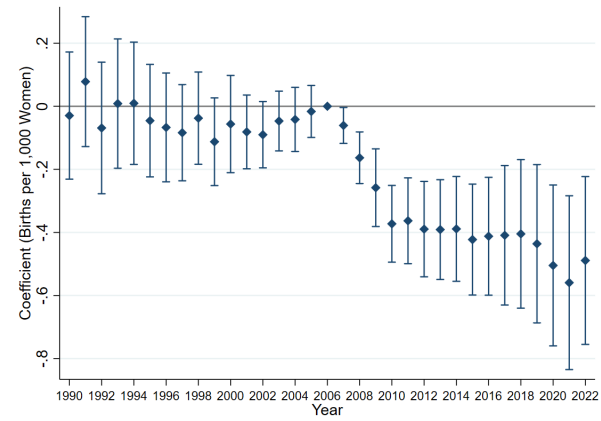
(b) Higher-order births



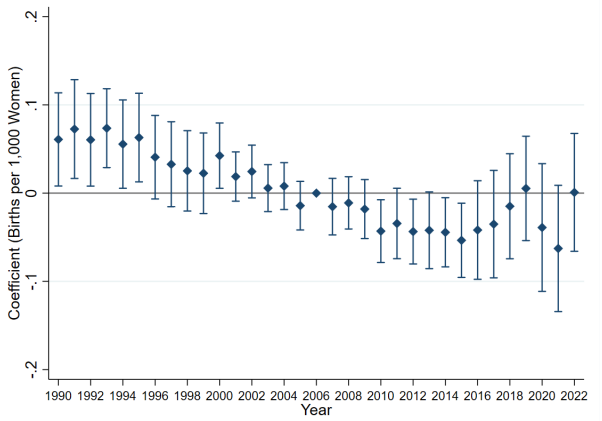
Notes: The figure reports event-study coefficients from Equation 1 separately by birth parity. The outcome variable is fertility rate at the MSA-by-race-by-age-group level, defined as the number of births per 1,000 women in that group. Panel (a) reports results for first births, and Panel (b) reports results for higher-order births. Housing-market exposure is measured by the pre-crisis subprime mortgage share. The omitted year is 2006. The specification includes MSA, year, and race-by-age-group fixed effects, and allows the outcome variable to vary with baseline MSA characteristics by interacting mortgage originations, the single-family permit rate, the housing price index, personal income, the employment rate, and the construction share of employment, measured in 2000, with year fixed effects. Regressions are weighted by the MSA race-by-age-group female population, and standard errors are clustered at the MSA level. Vertical bars indicate 95% confidence intervals.

Figure 6: Effect of the Housing Bust on Fertility Rate, By Age

(a) Ages 20–34

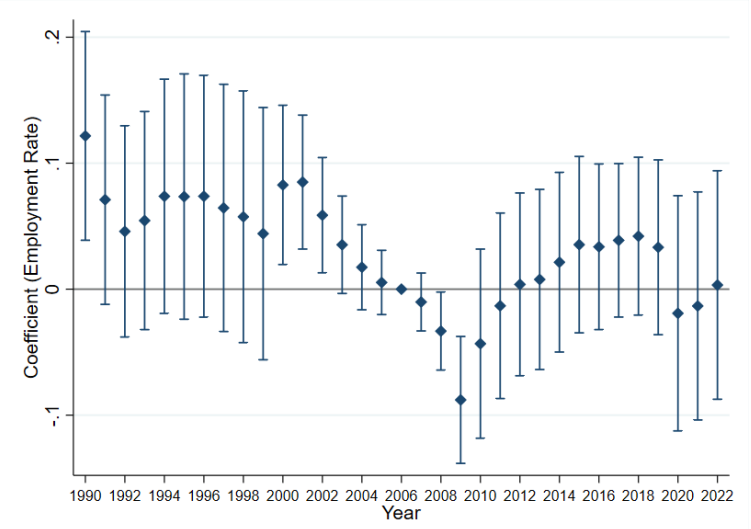


(b) Ages 35–44



Notes: The figure reports event-study coefficients from Equation 1 separately by age group. The outcome variable is fertility rate at the MSA-by-race-by-age-group level, defined as the number of births per 1,000 women in that group. Panel (a) reports results for women ages 20–34, and Panel (b) reports results for women ages 35–44. Housing-market exposure is measured by the pre-crisis subprime mortgage share. The omitted year is 2006. The specification includes MSA, year, and race-by-age-group fixed effects, and allows the outcome variable to vary with baseline MSA characteristics by interacting mortgage originations, the single-family permit rate, the housing price index, personal income, the employment rate, and the construction share of employment, measured in 2000, with year fixed effects. Regressions are weighted by the MSA race-by-age-group female population, and standard errors are clustered at the MSA level. Vertical bars indicate 95% confidence intervals.

Figure 7: Effect of the Housing Bust on Employment Rate



Notes: The figure reports event-study coefficients from a specification analogous to Equation 1. Housing-market exposure is measured by the pre-crisis subprime mortgage share. The outcome variable is employment rate at the MSA level, defined as the share of employed persons ages 16–64. The omitted year is 2006. The specification includes MSA and year fixed effects, and allows the outcome variable to vary with baseline MSA characteristics by interacting mortgage originations, the single-family permit rate, the housing price index, personal income, the employment rate, and the construction share of employment, measured in 2000, with year fixed effects. Regressions are weighted by MSA population, and standard errors are clustered at the MSA level. Vertical bars indicate 95% confidence intervals.

A Supplementary Tables and Figures

Table A.1: Baseline MSA characteristics by Housing Market Exposure

	(1)	(2)	(3)	(4)
VARIABLES	Subprime Share	Mortgage Decline	Permits Decline	House Price Decline
Employment Rate	-0.000337	0.0107	0.0293	-0.000759
	(0.0534)	(0.0477)	(0.0258)	(0.00141)
Construction Share of Employment	82.87	182.4***	80.85***	0.255
	(56.49)	(50.48)	(27.13)	(1.489)
Personal Income	-0.112***	-0.0507**	-0.0556***	-0.00164**
	(0.0268)	(0.0240)	(0.0129)	(0.000707)
HPI	0.000977	0.000752	0.00174	0.000705***
	(0.00436)	(0.00390)	(0.00210)	(0.000115)
Fertility Rate	0.222***	0.0536	0.00679	0.000595
	(0.0399)	(0.0356)	(0.0192)	(0.00105)
ln(MSA Population)	1.737***	2.344***	0.322	0.0133
	(0.616)	(0.550)	(0.296)	(0.0162)
Mortgage Rate	-0.0517	1.499***	0.601***	0.0192***
	(0.144)	(0.129)	(0.0714)	(0.00380)
Single-Family Permit Rate	-0.297***	0.324***	0.0995*	0.00332
	(0.105)	(0.0940)	(0.0507)	(0.00277)
N	203	203	202	203

Notes: Each column reports coefficients from an MSA-level regression of the indicated housing-market exposure measure on MSA characteristics measured in 2000. The employment rate is the number of employed persons per 100 residents ages 16–64. The mortgage rate is mortgage originations per 1,000 residents. Single-family permit rate is the number of single-family building permits per 1,000 residents, and subprime rate is the share of mortgage originations that are subprime between 2005–2006. The fertility rate is the number of births per 1,000 women ages 15–44. Regressions are unweighted. Standard errors are reported in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table A.2: Correlations Across Housing-Market Exposure Measures

	Subprime Share	Mortgage Decline	Permits Decline
Mortgage Decline	−0.0460		
Permits Decline	0.0665	0.7688	
House Price Decline	0.2494	0.4663	0.4530

Notes: The table reports pairwise correlations across MSA-level housing-market exposure measures. Subprime Share is the proportion of first-lien home-purchase mortgage originations classified as higher-priced loans in 2005–2006. Mortgage Decline is the decline in home-purchase mortgage originations per 1,000 residents between 2006 and 2011. Permit Decline is the decline in single-family building permits per 1,000 residents over the same period. House Price Decline is the percentage decline in the house price index between 2006 and 2011. Higher values indicate greater pre-crisis subprime exposure or larger subsequent declines in housing-market activity and prices.

Table A.3: Effect of Alternative Housing-Market Exposures on Fertility Rate

	(1)	(2)	(3)	(4)
VARIABLES	Subprime Share	Mortgage Origination Decline	Permit Decline	HPI Decline
Post × Exposure	-0.290***	-0.276***	-0.365**	-14.51***
	(0.0609)	(0.0735)	(0.164)	(2.361)
Observations	160,647	160,647	159,855	160,647
Mean dep var	69.77	69.77	69.76	69.77
Mean exposure	22.04	22.86	4.60	0.15
MSA FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Race × Age-Group FE	Yes	Yes	Yes	Yes
Baseline controls × Year FE	Yes	Yes	Yes	Yes
Time-varying controls	No	No	No	No
# MSAs	203	203	202	203

Notes: The table reports pooled estimates from Equation 2, using alternative measures of MSA exposure to the housing bust. The outcome variable is fertility rate at the MSA-by-race-by-age-group level, defined as the number of births per 1,000 women in that group. Column (1) uses the pre-crisis subprime mortgage share; column (2) measures exposure as the decline in home-purchase mortgage originations per 1,000 residents between 2006 and 2011; column (3) uses the decline in single-family building permits per 1,000 residents between 2006 and 2011; column (4) uses the decline in the housing price index between 2006 and 2011. The post indicator equals one in 2007 and subsequent years. All specifications include MSA, year, and race-by-age-group fixed effects and interact baseline MSA characteristics measured in 2000 with year fixed effects. Regressions are weighted by the MSA race-by-age-group female population. Standard errors are clustered at the MSA level and reported in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table A.4: Effect of the Housing Bust on Fertility Rate, By Parity and Age

VARIABLES	(1) First Births	(2) Higher-order Births	(3) Ages 15–19	(4) Ages 20–24	(5) Ages 25–29	(6) Ages 30–34	(7) Ages 35–39	(8) Ages 40–44
Post × Pre-Crisis Subprime Share	-0.101***	-0.189***	-0.688***	-0.915***	-0.226	-0.221***	-0.109***	-0.0152*
	(0.0277)	(0.0416)	(0.0959)	(0.154)	(0.137)	(0.0779)	(0.0303)	(0.00820)
Observations	160,647	160,647	26,777	26,770	26,780	26,780	26,780	26,760
Mean dep var	27.57	42.20	44.07	107.50	122.67	97.38	44.18	8.20
Mean exposure	22.04	22.04	22.11	21.70	22.15	22.17	22.12	22.02
MSA FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Race × Age-Group FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Baseline controls × Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time-varying controls	No	No	No	No	No	No	No	No
# MSAs	203	203	203	203	203	203	203	203

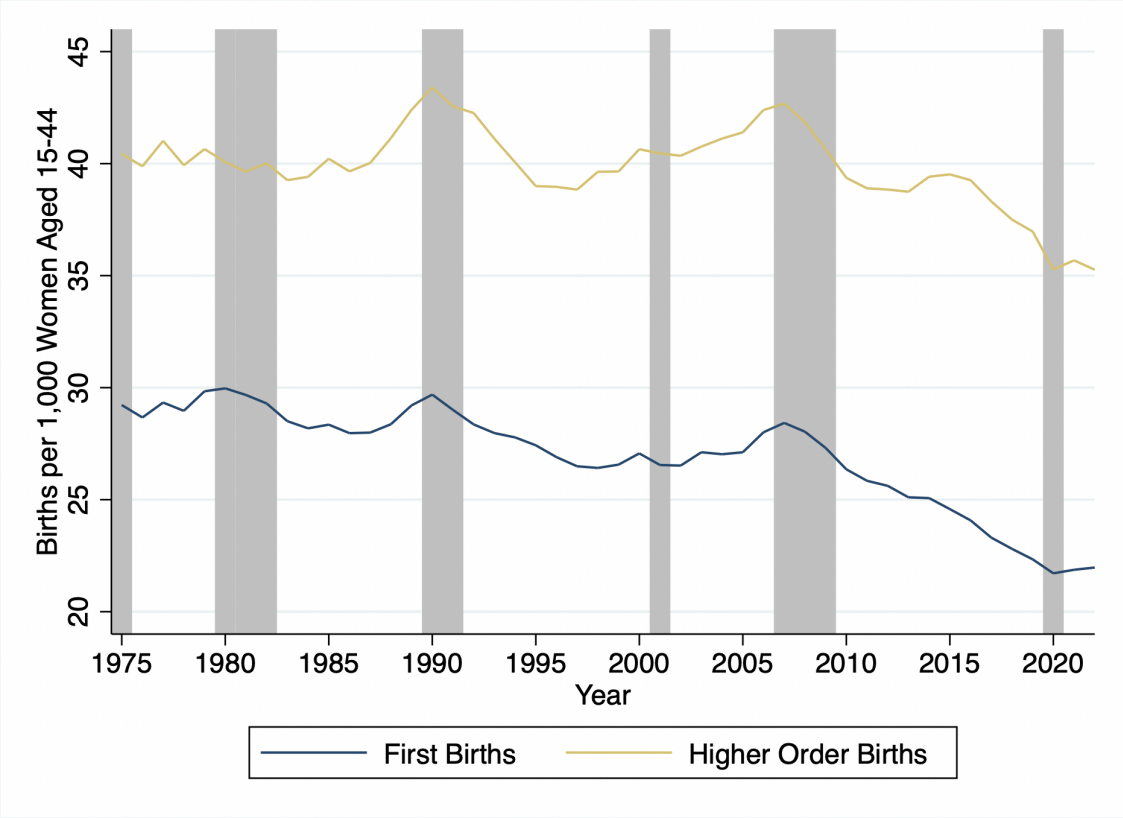
Notes: The table reports pooled estimates from Equation 2. The outcome variable is fertility rate at the MSA-by-race-by-age-group level, defined as the number of births per 1,000 women in that group. Housing-market exposure is measured by the pre-crisis subprime mortgage share. The post indicator equals one in 2007 and subsequent years. Columns (1) and (2) report results separately for first births and higher-order births. Columns (3)–(8) report results separately for women in each 5-year age group. The post indicator equals one in 2007 and subsequent years. All specifications include MSA, year, and group fixed effects and interact baseline MSA characteristics measured in 2000 with year fixed effects. Regressions are weighted by the corresponding MSA female population. Standard errors are clustered at the MSA level and reported in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table A.5: Effects of the Housing Bust on Household Formation and Residential Mobility, Alternative Sample

VARIABLES	(1) Parent in Household	(2) Partnered Household	(3) Owns Home	(4) Moved & Owns Home	(5) Moved
Post × Pre-Crisis Subprime Share	0.114***	-0.0887**	-0.0654**	-0.0244	-0.0555*
	(0.0286)	(0.0382)	(0.0282)	(0.0147)	(0.0311)
Observations	2,651,213	2,651,213	2,651,213	2,543,538	2,543,538
Mean dep var	25.63	47.04	38.46	4.76	24.37
Mean exposure	22.86	22.86	22.86	22.86	22.86
MSA FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Race × Age-Group FE	Yes	Yes	Yes	Yes	Yes
Baseline controls × Year FE	Yes	Yes	Yes	Yes	Yes
Time-varying controls	No	No	No	No	No
# MSAs	60	60	60	60	60

Notes: The table reports pooled estimates from Equation 4. Housing-market exposure is measured by the pre-crisis subprime mortgage share. The outcome variables are indicators for living with at least one parent, being a householder or the spouse or unmarried partner of a householder, being a householder or partner in an owner-occupied residence, having moved within the past year into an owner-occupied residence, and having moved within the past year. The post indicator equals one in 2007 and subsequent years. All specifications include MSA, year, sex, and race-by-age-group fixed effects and interact baseline MSA characteristics measured in 2000 with year fixed effects. The sample includes female respondents ages 15–44. Regressions are weighted by ACS survey weights. Standard errors are clustered at the MSA level and reported in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

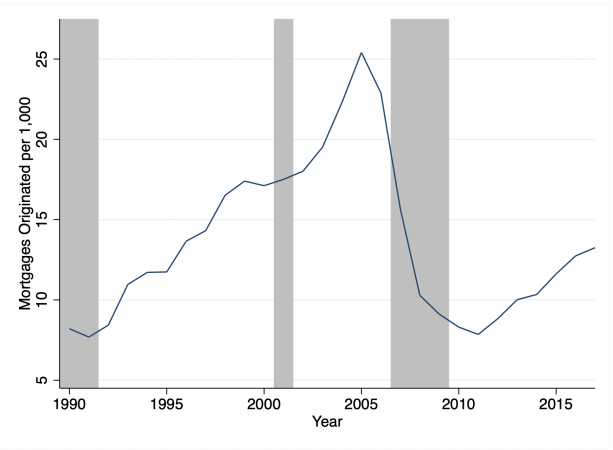
Figure A.1: Births per 1,000 Women Aged 15–44



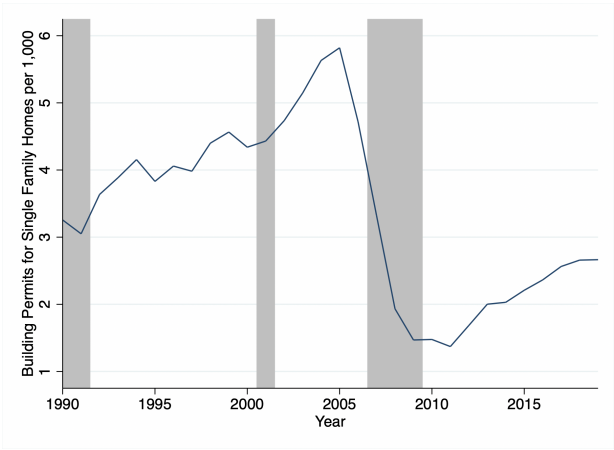
Notes: The figure reports the national fertility rate for first and higher-order births, measured as births per 1,000 women ages 15–44. Births are from the National Vital Statistics System (NVSS), and population denominators are from the Surveillance, Epidemiology, and End Results (SEER) Program. Shaded areas indicate NBER recession years.

Figure A.2: Trends in Housing Market Variables

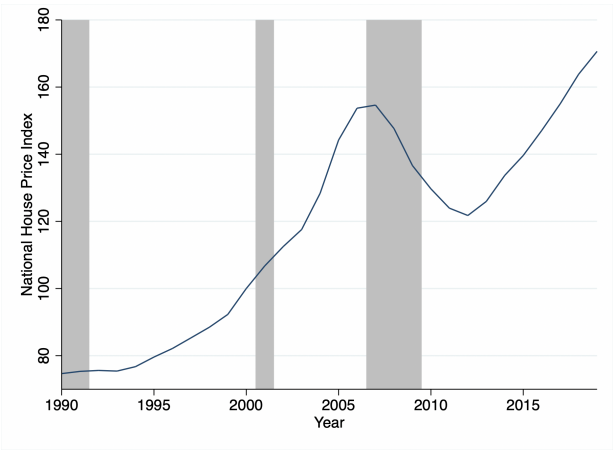
(a) Mortgage Originations



(b) Single-Family Building Permit

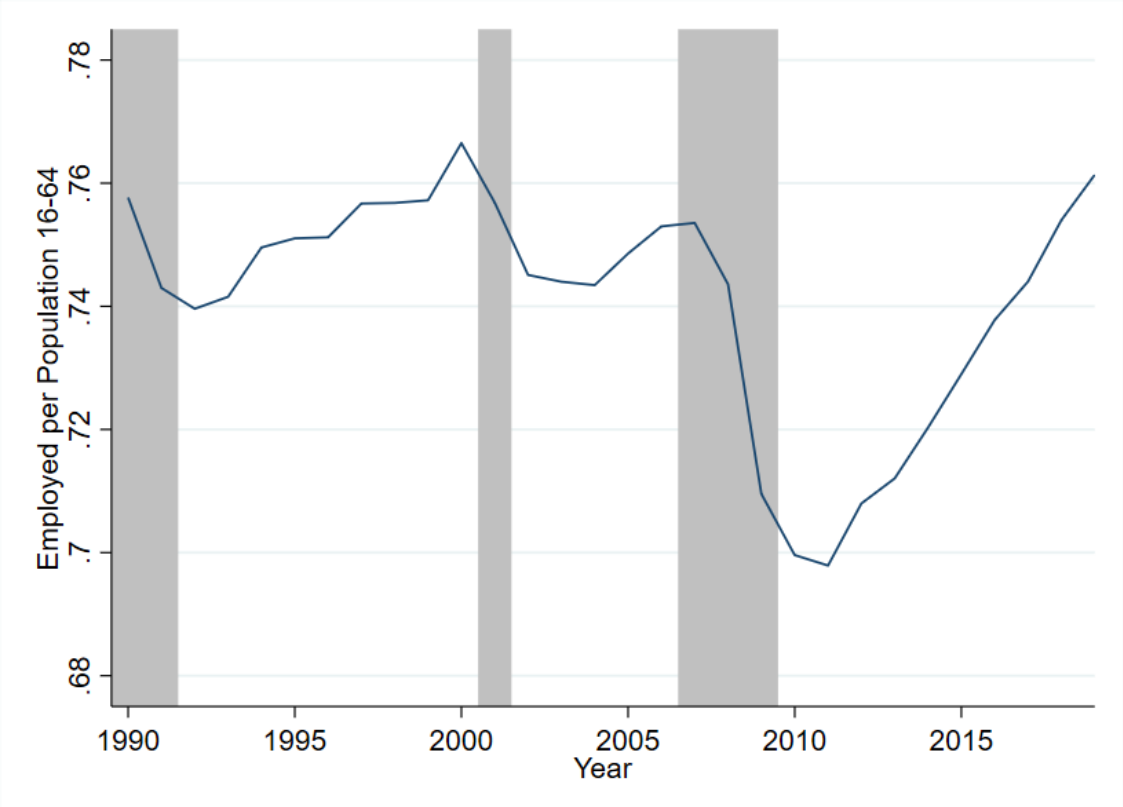


(c) House Price Index



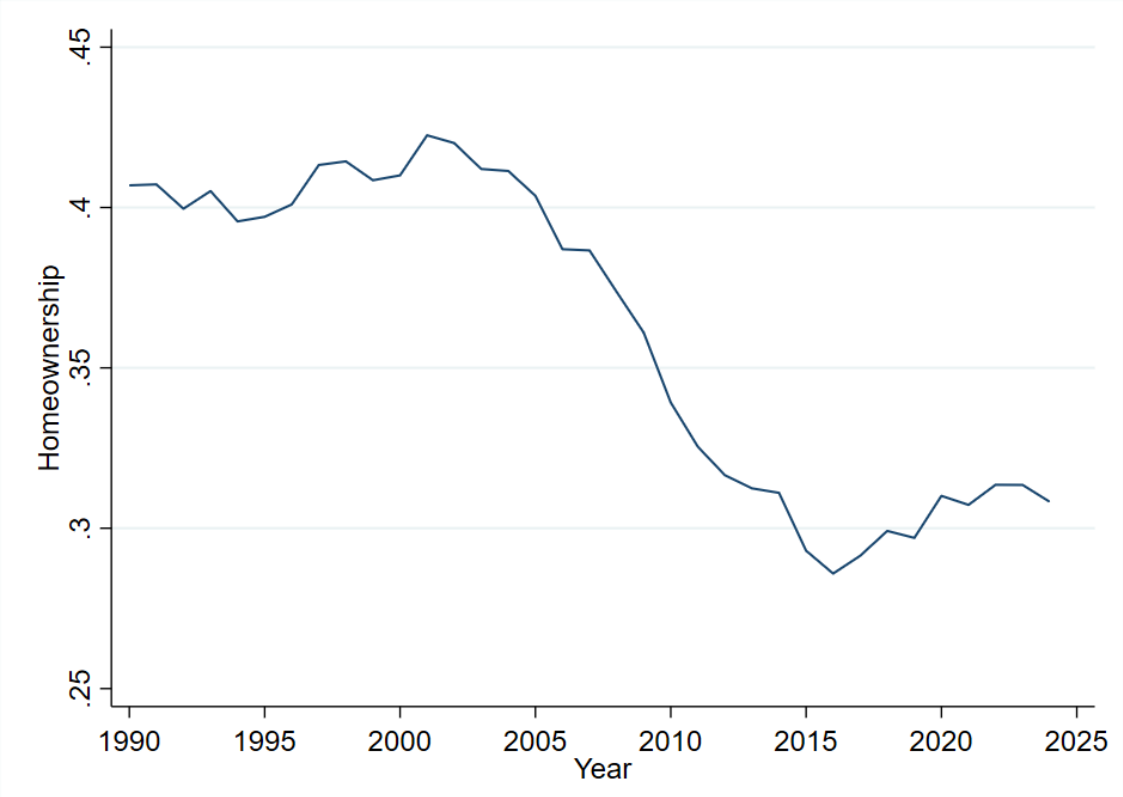
Notes: Panel (a) reports national mortgage originations per 1,000 residents, Panel (b) reports single-family building permits per 1,000 residents, and Panel (c) reports national House Price Index (HPI). Mortgage originations are from the Home Mortgage Disclosure Act (HMDA), building permits are from the Census Building Permits Survey, HPI from the Federal Housing Finance Agency (FHFA). Population denominators are from the Surveillance, Epidemiology, and End Results (SEER) Program. Shaded areas indicate NBER recession years.

Figure A.3: Trends in Employment



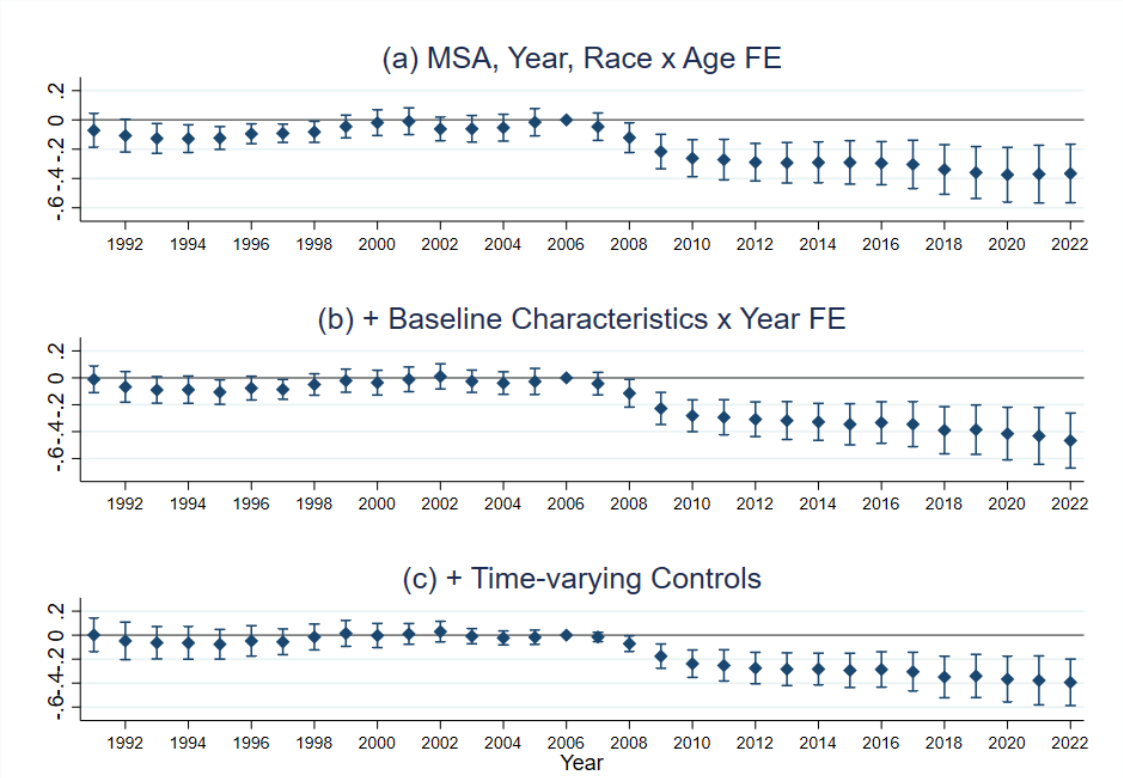
Notes: The figure reports the national employment rate, measured as the number of employed individuals divided by the population over age 16. Employment data are from the Bureau of Labor Statistics (BLS) Local Area Unemployment Statistics (LAUS), and population denominators are from the Surveillance, Epidemiology, and End Results (SEER) Program. Shaded areas indicate NBER recession years.

Figure A.4: Trend in Homeownership



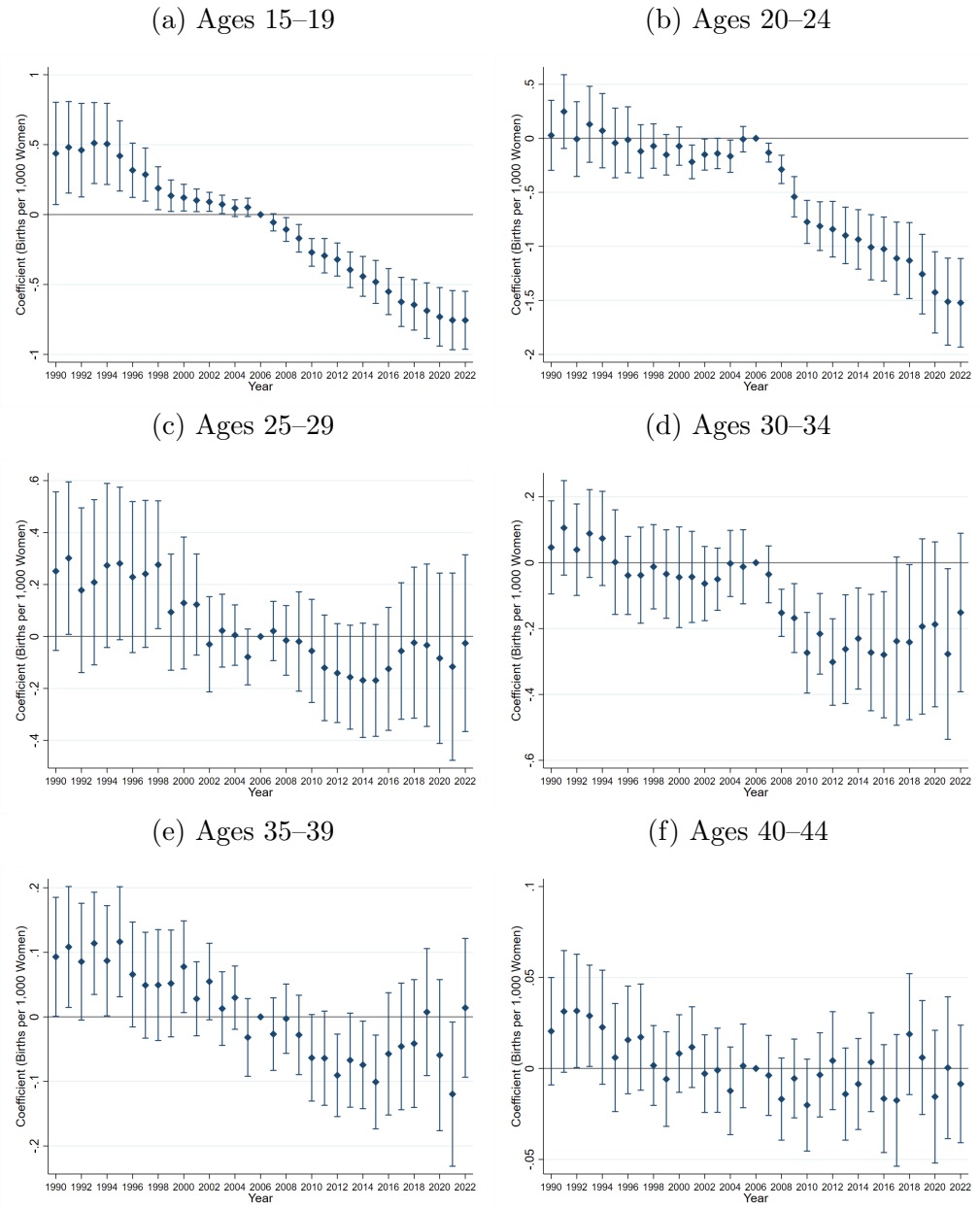
Notes: The figure reports the homeownership rate among women ages 15–44 in the Current Population Survey (CPS), where homeownership is defined as a householder or partner living in an owner-occupied residence. Estimates are weighted using CPS survey weights.

Figure A.5: Effect of the Housing Bust on Fertility Rate, Alternative Specifications



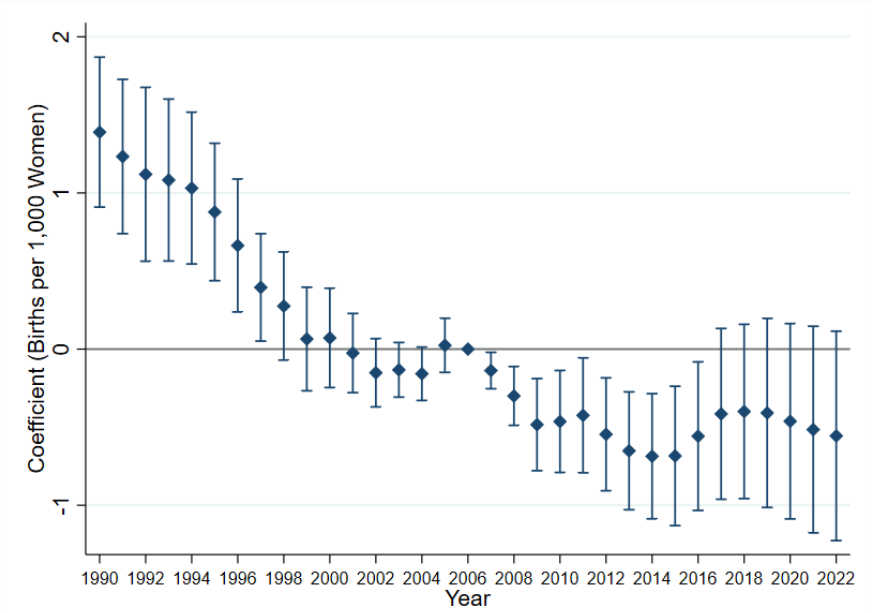
Notes: The figure reports event-study coefficients from Equation 1 under alternative sets of controls. The outcome variable is fertility rate at the MSA-by-race-by-age-group level, defined as the number of births per 1,000 women in that group. Housing-market exposure is measured by the pre-crisis subprime mortgage share. Panel (a) includes only MSA, year, and race-by-age-group fixed effects. Panel (b) is the preferred specification which allows the outcome variable to vary with baseline MSA characteristics by interacting mortgage originations, the single-family permit rate, the housing price index, personal income, the employment rate, and the construction share of employment, measured in 2000, with year fixed effects. Panel (c) additionally controls for lagged MSA-level employment, personal income, and the housing price index, as well as the lagged state-level Medicaid enrollment rate. The omitted year is 2006. Regressions are weighted by the MSA race-by-age-group female population, and standard errors are clustered at the MSA level. Vertical bars indicate 95% confidence intervals.

Figure A.6: Effect of the Housing Bust on Fertility Rate, By Age Group



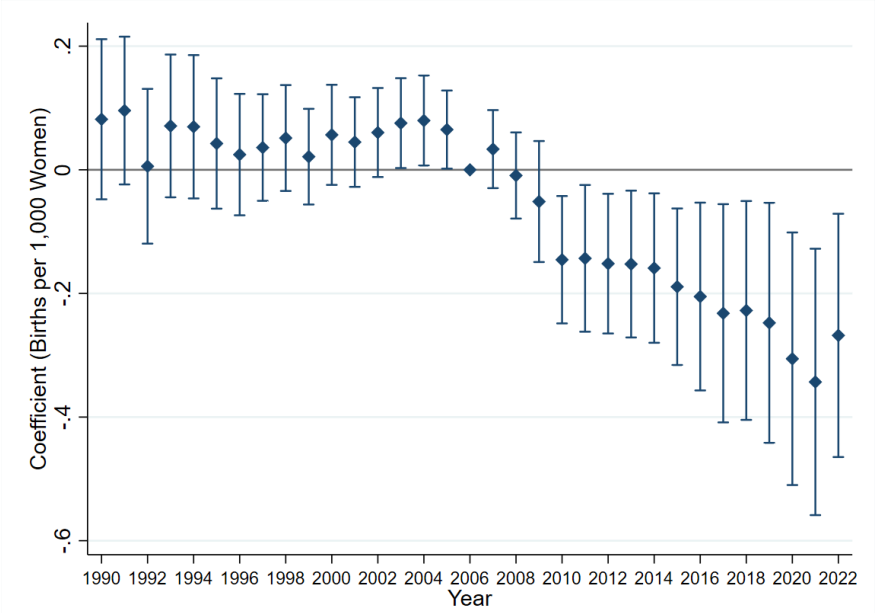
Notes: The figure reports event-study coefficients from Equation 1 separately by age group. The outcome variable is fertility rate at the MSA-by-race-by-age-group level, defined as the number of births per 1,000 women in that group. Housing-market exposure is measured by the pre-crisis subprime mortgage share. Panels (a)–(f) report results for women in each 5–year age bin respectively. The omitted year is 2006. The specification includes MSA, year, and race-by-age-group fixed effects, and allows the outcome variable to vary with baseline MSA characteristics by interacting mortgage originations, the single-family permit rate, the housing price index, personal income, the employment rate, and the construction share of employment, measured in 2000, with year fixed effects. Regressions are weighted by the MSA race-by-age-group female population, and standard errors are clustered at the MSA level. Vertical bars indicate 95% confidence intervals.

Figure A.7: Effect of Unemployment Rates Increase on Fertility Rates



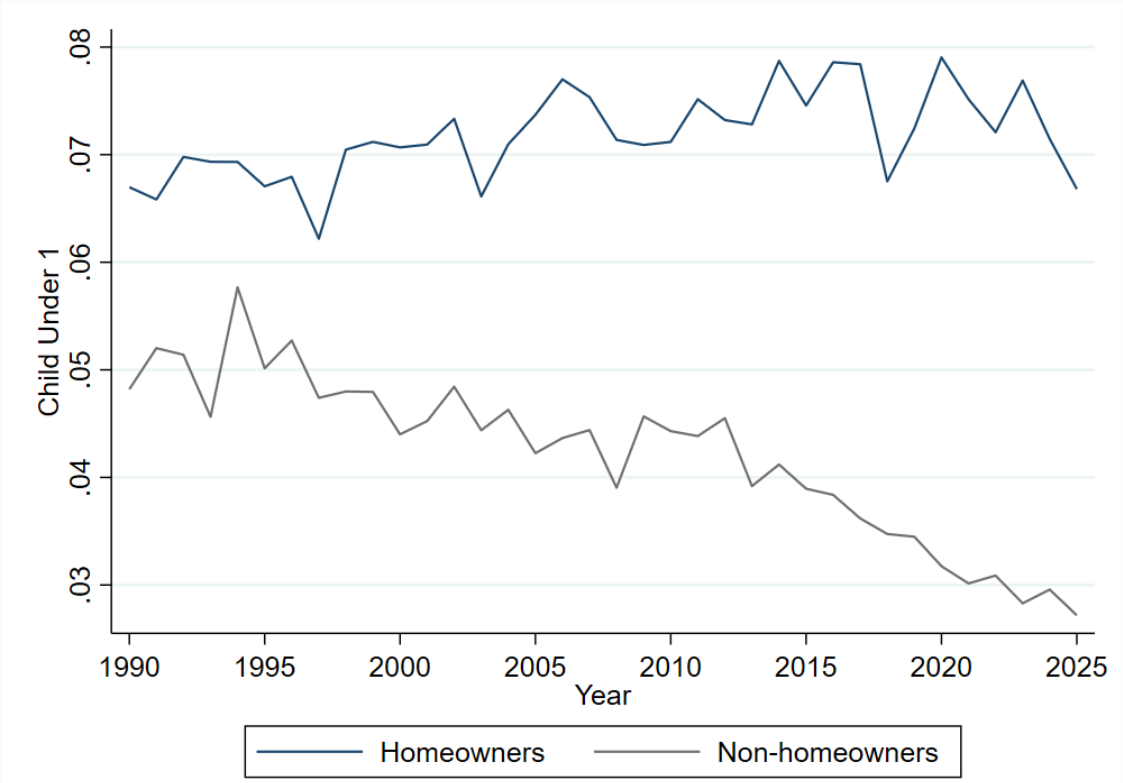
Notes: The figure reports event-study coefficients from Equation 1, using the increase in unemployment rate between 2006 and 2011 as the measure of exposure. The omitted year is 2006. The specification includes MSA, year, and race-by-age-group fixed effects, and allows fertility trends to vary with baseline MSA characteristics by interacting mortgage originations, the single-family permit rate, the housing price index, personal income, the employment rate, and the construction share of employment, measured in 2000, with year fixed effects. Regressions are weighted by the MSA female population ages 15–44, and standard errors are clustered at the MSA level. Vertical bars indicate 95% confidence intervals.

Figure A.8: Effect of the Housing Bust on Fertility Rate, Controlling for Labor Market Exposure



Notes: The figure reports event-study coefficients from Equation 1. The outcome variable is fertility rate at the MSA-by-race-by-age-group level, defined as the number of births per 1,000 women in that group. Housing-market exposure is measured by the pre-crisis subprime mortgage share. The omitted year is 2006. The specification includes MSA, year, and race-by-age-group fixed effects, the interactions between the increase in unemployment rate between 2006 and 2011 interacted with year fixed effects, and allows the outcome variable to vary with baseline MSA characteristics by interacting mortgage originations, the single-family permit rate, the housing price index, personal income, the employment rate, and the construction share of employment, measured in 2000, with year fixed effects. Regressions are weighted by the MSA race-by-age-group female population, and standard errors are clustered at the MSA level. Vertical bars indicate 95% confidence intervals.

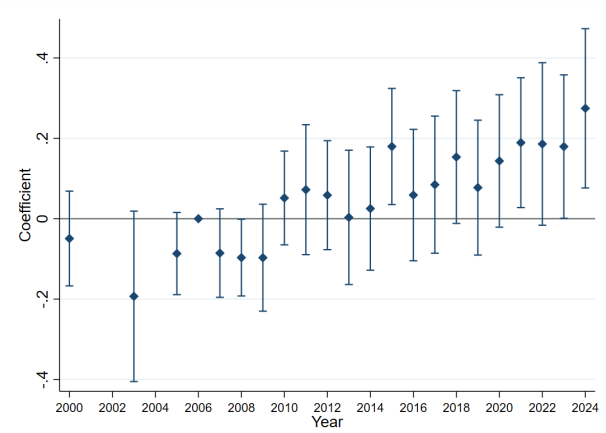
Figure A.9: Trends in Fertility, by Homeownership



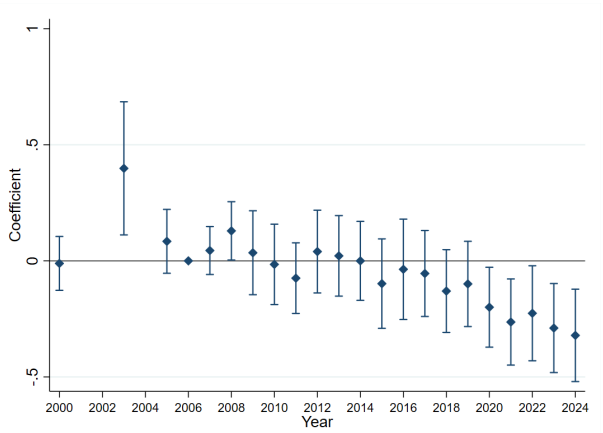
Notes: The figure reports the rate of births among women ages 15–44 in the Current Population Survey (CPS), by homeownership status. Births are identified by the respondent having an own child under age 1 in the household, and homeownership is defined as a householder or partner living in an owner-occupied residence. Estimates are weighted using CPS survey weights.

Figure A.10: Effect of the Housing Bust on Household Formation and Homeownership

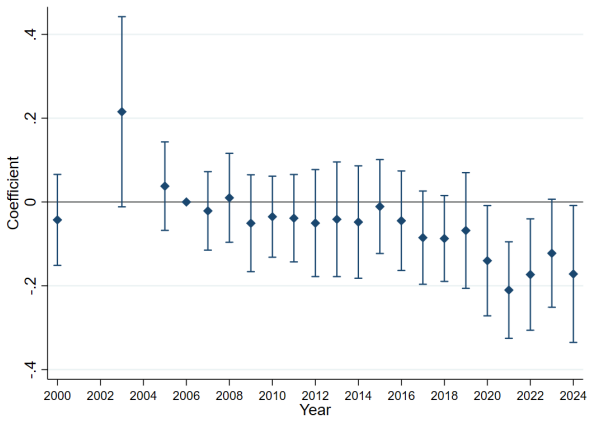
(a) Parent in Household



(b) Partnered Household



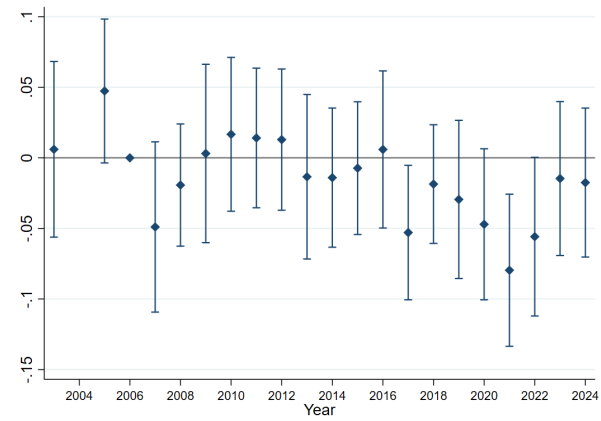
(c) Owns home



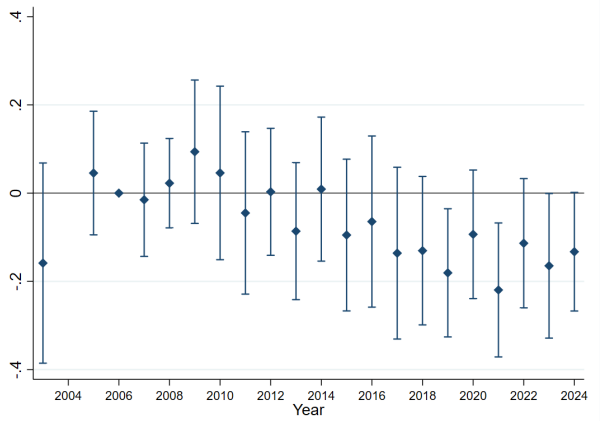
Notes: The figure reports event-study coefficients from Equation 3. Housing-market exposure is measured by the pre-crisis subprime mortgage share. The outcome variable for Panel (a) is an indicator variable for living in the same household with at least one parent; for Panel (b) an indicator variable for the respondent being a householder with a spouse or unmarried partner, or the spouse or unmarried partner of the householder; for Panel (c) an indicator variable for being a householder or partner living in an owner-occupied residence. The omitted year is 2006. The specification includes MSA, year, sex, and race-by-age-group fixed effects, and allows the outcome variable to vary with baseline MSA characteristics by interacting mortgage originations, the single-family permit rate, the housing price index, personal income, the employment rate, and the construction share of employment, measured in 2000, with year fixed effects. The sample includes all respondents ages 20–34. Regressions are weighted by the ACS survey weights, and standard errors are clustered at the MSA level. Vertical bars indicate 95% confidence intervals.

Figure A.11: Effect of the Housing Bust on Residential Mobility

(a) Moved Within 1 Year & Owns Residence



(b) Moved Within 1 Year



Notes: The figure reports event-study coefficients from Equation 3. Housing-market exposure is measured by the pre-crisis subprime mortgage share. The outcome variable for Panel (a) is an indicator variable for the respondent living in an owner-occupied residence and having moved within one year; for Panel (b) an indicator variable for the respondent having moved within one year. The omitted year is 2006. The specification includes MSA, year, sex, and race-by-age-group fixed effects, and allows the outcome variable to vary with baseline MSA characteristics by interacting mortgage originations, the single-family permit rate, the housing price index, personal income, the employment rate, and the construction share of employment, measured in 2000, with year fixed effects. The sample includes all respondents ages 20–34. Regressions are weighted by the ACS survey weights, and standard errors are clustered at the MSA level. Vertical bars indicate 95% confidence intervals.