When the Marriage Market Fails: How Changes in Relative Wages Shape Childbearing Decisions

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Abstract

This paper examines the impact of the narrowing US gender wage gap on fertility during 1980–2010, when women's wages increased from under 50% to over 65% of men's and fertility remained below the 2.1 replacement rate. To identify causal estimates, I use a Bartik-style shift–share measure of relative potential wages by interacting pre-1970 industry–occupation shares with current national wage growth, generating plausibly exogenous variation. Using IPUMS Census and ACS microdata for women of childbearing age across all U.S. states, I find that a 10 percentage point increase in the female-to-male potential wage ratio has the following effects: (i) lowers the motherhood rate by 4 percentage points, (ii) reduces the average number of children per woman by about 0.7, and (iii) delays first births by over three years. I also investigate several potential mechanisms and find that higher relative potential wages reduce marriage formation and, as a result, increase the likelihood of nonmarital births, raise the opportunity cost of motherhood, weaken household specialization, and increase women's bargaining power.

Keywords: fertility, relative potential wages, gender wage gap, shift-share (Bartik), marriage markets, time use, single motherhood.

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1 Introduction

Becker (1960, 1991) argued that marriage and families exist primarily to produce and raise children, with the economic gains from marriage stemming from specialization and the exchange of household and market work. In the decades since, families have remained central to social and economic life, but lifelong marriage combined with intensive childbearing is no longer the prevailing path to adulthood (Lundberg and Pollak, 2007). Over the same period, women's earnings increased relative to men's, narrowing the gender wage gap and altering incentives surrounding family formation. This paper investigates the relationship between these two transformations. Specifically, I examine the extent to which rising female-to-male relative potential wages shaped U.S. fertility outcomes from 1980 to 2010. I also examine the channels through which these changes operate.

As shown in Panel A of Figure 1, the fading of the baby boom was followed by a steady decline in the U.S. total fertility rate between 1960 and 1980. After 1980, fertility stabilized at a low level, consistently below the replacement rate of 2.1. Panel B of Figure 1 shows that over the same period the female-to-male wage ratio rose markedly–from below 50 percent in 1980 to over 65 percent by 2010. This increase holds even after adjusting for differences in education and occupation. These shifts suggest that rising labor market opportunities for women fundamentally alter fertility behavior. Women remain the primary caregivers in most households and thus face particularly sharp tradeoffs between time spent on career and family (Cai and Winters, 2024; Cortés and Pan, 2023; Iyigun and Walsh, 2007; Kleven et al., 2021).

To capture different dimensions of fertility behavior, I examine three outcomes. The first two measure the prevalence of childbearing: the share of women with at least one child and the average number of children per woman. The number of children for American women aged 39 to 41 fell sharply between 1970 and 1990 (Cai and Winters, 2024) and has since stabilized at historically low levels. At the same time, women have continued to delay childbearing. Birth rates for women over 30 have risen while rates for women under 30 have declined, as shown in Figure 2. To capture this timing dimension, my third outcome is the average age at first birth.

To identify the causal effect of relative wages on fertility, I use a measure of potential wages that serves as a plausibly exogenous proxy for the gender wage gap. Observed wages are likely endogenously related to fertility, making causal interpretation difficult (McNown and Rajbhandary, 2003; Pollak, 2005). Following Shenhav (2021), I implement a Bartik-style shift–share approach to construct a female-to-male potential wage ratio. This measure combines pre-1970 industry–occupation employment shares with subsequent national wage growth to capture long-run opportunities driven by national demand shifts. I use microdata from the 1980, 1990, and 2000 Censuses and the 2010 ACS, accessed through IPUMS USA, covering all U.S. states, focusing on women ages 22 to 44.

The main estimates show that higher relative potential wages reduce fertility and shift its timing. A 10 percent increase in the female-to-male potential wage ratio lowers the motherhood rate by about 4 percentage points; it also reduces the average number of children by roughly 0.7, and delays first births by over three years. These effects remain large and statistically significant even after controlling for the average (sex-combined) potential wage. This finding indicates that relative earnings, rather than absolute earnings, are the key driver of the fertility decline.

Beyond average effects, I also examine heterogeneity across groups defined by race, education, and age and find meaningful differences in the fertility response. By race, the negative fertility response is strongest for non-Hispanic White and Black women, while the effects for Hispanic women are small and generally imprecise. By education and age, there is a clear timing pattern. Among younger women, the decline in the likelihood of having any children is larger for high-skilled than for low-skilled women, consistent with higher opportunity costs early in the life cycle. At older ages, completed fertility declines more for low-skilled women, reflecting forgone marriages and earlier delays that translate into fewer total births by the end of the childbearing years.

Having established my empirical approach and main findings, I next consider the mechanisms through which relative wages may affect fertility. Guided by established economic theories, I focus on three main channels. The first mechanism is the marriage market. Higher female wages relative to men's reduce the financial gains from marriage and raise the threshold for acceptable partners, which fewer men can meet (Shenhav, 2021). Rising female wages also diminish the relative economic standing of men (Anelli et al., 2024), shrinking the pool of "marriageable" men (Autor et al., 2019) and contributing to delayed or foregone marriage.

Lower marriage rates can suppress childbearing altogether or increase the likelihood of nonmarital births. In either case, relative wages shape fertility outcomes by altering incentives and opportunities in the marriage market. To further explore whether these changes in marriage behavior shape fertility responses, I re-estimate the main specification separately for single and married women. The results indicate that Among single women, higher relative potential wages are associated with higher fertility. For married women, however, the effects are strongly negative.

The second mechanism is the rising opportunity cost of motherhood. The New Home Economics framework emphasizes that female wages represent the opportunity cost of childbearing (Becker, 1960; McNown and Rajbhandary, 2003; Willis, 1973). As women's relative wages increase, the cost of allocating time to childrearing rises, making children more expensive in terms of forgone market earnings. The substitution effect of higher wages outweighs the income effect, leading to lower fertility (Galor and Weil, 1993; Kimura and Yasui, 2010; Santos Silva and Klasen, 2021). This tradeoff is especially pronounced for women with higher educational attainment and stronger career incentives, for whom delaying or reducing fertility is closely tied to labor market opportunities.

To evaluate this channel, I compare fertility responses across occupations with different gender compositions (female-dominated, gender-neutral, and male-dominated) to see whether the responses vary with occupational opportunity costs. The evidence supports an opportunity cost channel: fertility responses to higher relative wages are larger in gender-neutral and male-dominated occupations than in female-dominated ones, where penalties for time out appear smaller. This pattern fits the idea that when career interruptions are more costly, higher relative wages induce stronger declines in entry into motherhood and larger delays.

The third mechanism is intra-household adjustment, particularly the breakdown of traditional specialization and shifts in bargaining power. In Becker's specialization framework, low female wages relative to male wages supported specialization in home production and made higher fertility attractive. As women's wages rise, the efficiency gains from specialization shrink, which tends to reduce optimal fertility (Becker, 1960, 1991). In addition, higher female wages increase women's bargaining power within the household. Because women continue to carry a larger share of childrearing, these shifts in bargaining power directly affect fertility choices (Iyigun and Walsh, 2007; Komura, 2013).

To analyze this channel, I use time-use data from Aguiar and Hurst (2007) to track how relative wages alter men's and women's allocation of time. To assess specialization, I examine the effects of changes in female-to-male relative wages on market work, nonmarket work, child care, and total work for both women and men. To assess bargaining power, I follow Friedberg and Webb (2005) and Datta Gupta and Stratton (2008) in using measures of leisure and other discretionary time as indicators of women's influence within couples. These measures include personal care and play with children, but exclude routine caregiving.

The evidence shows that as relative female wages rise, women increase market work and reduce nonmarket work, while men adjust less. The female-to-male ratio of total work time (market work, nonmarket work, and child care) rises, indicating that a larger share of the total work burden falls on women. This greater burden on women likely dampens their incentives to have children. Millimet (2000) provides supporting evidence, showing that women take on a disproportionate share of household work after childbearing, which reduces their wages and hinders career progression. At the same time, women's discretionary time, including leisure and play with children, increases with relative wages. Following the literature, I interpret these discretionary margins as indicators of greater bargaining power for women.

My study contributes to the literature on labor market outcomes and fertility. While a large body of research has examined how shifts in female or male absolute incomes (Amialchuk, 2013; Autor et al., 2019; Fleisher and Rhodes, 1979; Kearney and Wilson, 2018; McNown and Rajbhandary, 2003), as well as changes in observed relative incomes (Anelli et al., 2024; Day, 2018; Galor and Weil, 1993; Siegel, 2017), affect fertility, identification challenges still cast doubt on the causal interpretation of these estimates (Cai and Winters, 2024). To my knowledge, this is the first study to use relative potential wages as a plausibly exogenous proxy for economic opportunities in order to estimate the causal effect of the narrowing gender wage gap on fertility outcomes. I find clear evidence that higher female-to-male potential wages substantially reduce fertility.

These findings have important implications for understanding and addressing persistently low fertility in advanced economies. McDonald (2000) argues that fertility is shaped by how fairly opportunities and responsibilities are distributed between men and women in both the public sphere (education, labor markets, political participation) and the private sphere (household work, childrearing). When gender equity in the household fails to keep pace with equity in education and employment, fertility may remain depressed despite rising female labor market opportunities. My results support this view by showing that as women's relative potential wages increase, fertility declines unless households and institutions adapt by redistributing care responsibilities and reducing the burden that currently falls disproportionately on women.

At the same time, prior research suggests that low fertility is not inevitable. A fertility rebound can occur at higher stages of economic development, when rising female wages make external child care relatively cheaper than women's time spent at home (Day, 2018; Yakita, 2018). This substitution enables parents to maintain both market participation and family formation, provided that affordable and high-quality child care is widely available. From a policy perspective, this highlights the central role of child care provision, workplace flexibility, and broader support for gender equity within households. Without such measures, narrowing the gender wage gap may reduce fertility by amplifying the opportunity costs of motherhood. By contrast, with strong work–family policies in place, a higher level of gender equality can coexist with higher fertility rates.

The remainder of the paper is organized as follows. Section 2 reviews the related literature on fertility, wages, and household dynamics, situating this study within existing empirical work. Section 3 outlines the conceptual framework and describes the mediating forces. Section 4 details the empirical strategy, including the construction of the relative potential wage measure. Section 5 presents the main results on how female-to-male relative wages affect fertility outcomes, followed by heterogeneity analyses across race, education, and age. Section 6 investigates the underlying mechanisms, drawing on evidence from marriage patterns, occupational heterogeneity, and time-use data. Finally, Section 7 concludes by discussing the implications of the findings for understanding persistent low fertility and for designing policies that reconcile gender equity with family formation.

2 Review of Related Literature

A large body of work in economics has examined how wages shape fertility, marriage, and household dynamics. This section reviews the main strands of theory and evidence relevant to my study, organized around three themes: (i) foundational theories of fertility and household behavior, (ii) empirical evidence on absolute and relative wages, and (iii) mediating mechanisms linking wage shifts to fertility, including marriage markets, opportunity costs, and intra-household dynamics.

The economic analysis of fertility begins with the New Home Economics of Becker (1960) and Willis (1973), which emphasizes the role of female wages as a measure of the opportunity cost of childbearing. Female wages are thought to generate both (positive) income effects and (negative) substitution effects on fertility, with corresponding but opposite effects on women's labor supply. In this framework, children are modeled as durable goods, and specialization within marriage, where childcare is primarily the wife's responsibility, plays a central role. Consequently, the cost of children is independent of the husband's wage, so that men's earnings exert only (positive) income effects on the demand for children. Later research extended this perspective by incorporating bargaining and collective decision-making within households, showing that partners' outside options, particularly their potential wages, shape not only fertility but also the allocation of labor within families (Pollak, 2005).

Empirical research initially focused on absolute male and female wages. Fleisher and Rhodes (1979) was among the first to estimate fertility and labor supply jointly using micro data, showing that higher women's wages reduce fertility and increase lifetime labor supply. The study provided early evidence that fertility choices and women's economic opportunities are closely connected, and that declining family size may be an even stronger driver of male–female wage equality than "equal opportunity" labor market legislation. Along similar lines, McNown and Rajbhandary (2003) demonstrate that fertility and women's labor market behavior are deeply interconnected in the long run. Using cointegration methods, they show that fertility is negatively related to women's wages, education, and male relative cohort size, consistent with the predictions of both the New Home Economics and Easterlin hypotheses.

Despite these insights, the use of observed wages raises important concerns about endogeneity, since fertility itself shapes women's labor supply and earnings. More recent studies employ strategies designed to overcome this issue. Amialchuk (2013) exploit variation from energy prices, international competition, and technology, combined with grouping and error-in-variables corrections, to study age-specific fertility rates. Their results indicate that higher male earnings raise fertility among younger married women, while higher female earnings reduce fertility at younger ages but increase it at older ages.

Similarly, Kearney and Wilson (2018) use local fracking booms as plausibly exogenous shocks to men's earnings and find that higher male earnings raise both marital and nonmarital birth rates, though they do not affect marriage rates. Evidence from the earlier coal boom shows a different pattern, with marriage and marital births rising and nonmarital births falling, suggesting that the social and institutional context mediates how income gains translate into family formation. Employing the imperfect instrumental variables method with instruments based on industry- and major-specific earnings, Cai and Winters (2024) provide clear evidence that while higher female income reduces fertility for college graduates, the magnitude is modest, suggesting that recent fertility slowdowns cannot be explained primarily by rising female incomes.

In related work, Autor et al. (2019) examine gender-specific components of large labor demand shocks from rising international manufacturing competition. They find that adverse shocks to men's relative earnings reduce marriage and fertility and increase unwed motherhood, while shocks concentrated in female-intensive industries have smaller effects of the opposite sign. Taken together, these studies show that absolute wages play a central role in shaping fertility decisions, but their effects vary by gender, age, and context. They also highlight the limitations of focusing solely on absolute wages, since fertility and family outcomes depend not just on women's or men's earnings in isolation but also on their relative position in the labor market. This motivates a growing body of work that shifts attention from absolute to relative wages as a key determinant of fertility and household dynamics.

A growing literature has instead emphasized the importance of relative wages. Galor and Weil (1993) develop a theoretical model in which fertility depends on women's wages relative to men's. Higher relative female wages increase the opportunity cost of childbearing more than household income, thereby lowering fertility. The resulting decline in fertility raises capital per worker, which in turn increases women's relative wages, generating a feedback loop between gender wage convergence and fertility decline. Building on this insight, Siegel (2017) argues that the common driving force behind long-run trends in both fertility and female employment is the narrowing of the gender wage gap, rather than the absolute level of women's wages. Similarly, Day (2018) show that growth which raises women's wages relative to men's can initially reduce fertility but may later attenuate or reverse these effects once supportive policies such as child care subsidies and maternity pay are in place and gender wage gaps narrow further.

More recent empirical work highlights the role of technological change. Anelli et al. (2024) use U.S. regional exposure to automation as a source of variation in gender-specific labor demand. They find that robot adoption narrowed gender gaps in income and labor force participation, reducing men's relative economic standing. While overall fertility did not change, the composition of births shifted: marital fertility declined while nonmarital fertility increased. Together, these studies underscore that the division of economic opportunities between men and women, rather than the level of women's wages alone, is a central determinant of fertility. My paper builds directly on this insight by constructing an exogenous measure of relative potential wages to identify causal effects on fertility outcomes.

Later studies in the literature emphasize that fertility is shaped not only by wages but also by levels of household specialization, availability of child care and the distribution of bargaining power between couples. McDonald (2000) argues that fertility depends on how gender equity evolves across both the public and private spheres: when household roles fail to keep pace with women's labor market opportunities, fertility may remain persistently depressed.

Building on this insight, Siegel (2017) develops a quantitative model with imperfect household specialization to show that the narrowing gender wage gap is a central driver of long-run fertility trends. As women's wages converge toward men's, women increase their participation in market work and the opportunity cost of childbearing rises, producing an initial decline in fertility. At the same time, home production and child care are increasingly reallocated from women to men and to the market, dampening the decline. The calibrated model successfully replicates U.S. twentieth-century patterns, including the long-run decline in fertility, the mid-century baby boom, and the recent stabilization.

Related empirical work also highlights the role of marketization. Bar et al. (2018) show that the post-1980 flattening of U.S. fertility is driven less by income effects alone than by the outsourcing of parental time: as higher-income households increasingly purchase child care and market substitutes for home production, the time cost of children falls relative to income. This raises fertility at the top of the income distribution and flattens the income–fertility gradient. Doepke and Kindermann (2019) formalize these dynamics in a quantitative household bargaining model, showing that the allocation of child care responsibilities between mothers and fathers is a critical determinant of fertility. Their results imply that fertility is highly responsive to policies that reduce the child care burden specifically for mothers.

Other theoretical contributions also stress the role of bargaining. Iyigun and Walsh (2007) argue that fertility decline is not only a response to rising wages and industrialization but also to changes in intra-household bargaining power that reshape how families allocate time between work and childrearing. Similarly, Komura (2013) develops a model in which fertility decisions are both influenced by and feed back into bargaining power through social norms and labor market participation. My paper extends this literature by analyzing specialization and bargaining power not only as outcomes, but as mediating mechanisms through which relative wages influence fertility.

While prior research has documented the importance of absolute and relative wages, as well as the role of household specialization, marketization, and bargaining power in shaping fertility, these factors have rarely been measured in a way that addresses endogeneity concerns. My paper fills this gap by constructing an exogenous measure of relative potential wages, using a Bartik-style shift–share design, to estimate the causal effect of the narrowing gender wage gap on fertility. To my knowledge, this is the first study to use relative potential wages, rather than observed wages, to identify how changes in the female-to-male wage ratio shape fertility outcomes. In doing so, we move beyond treating marriage, specialization, and bargaining power as mere outcomes, and instead examine them as central mechanisms through which relative wages influence childbearing decisions. This approach allows us to capture both the direct effects of relative wages on fertility and the channels through which these effects operate. By integrating these strands of the literature, my study provides new evidence on how labor market convergence between men and women reshapes family formation in the United States.

3 Conceptual Framework

4 Mediating Forces: Marriage, Opportunity Cost, And Intra-Household Adjustments

Lundberg and Pollak (2007) start their insightful paper by stating that "The American family has not been destroyed, but it has been radically altered. Long-term marriage combined with childrearing is no longer a near-universal adult experience, and the intense gender specialization that characterized the traditional nuclear family of the 1950s now seems archaic." I share this view and argue that shifts in both marriage and household dynamics are central to understanding how changes in female-to-male relative wages shape fertility behavior. In particular, I focus on three main mediating forces emphasized in the literature: changes in marriage market behavior, the rising opportunity cost of motherhood, and shifts in intra-household dynamics.

The first mechanism through which relative wages may affect fertility is the marriage market. As women's wages rise relative to men's, marriage rates tend to decline. Rising female wages reduce marriage rates for two key reasons: they diminish the financial incentives for marriage and raise the threshold for acceptable partners, resulting in fewer men meeting these criteria (Shenhav (2021)). Autor et al. (2019) findings support the hypothesis that adverse shocks to male earnings capacity reduce the marriage market value of young men, leading to lower marriage rates and more nonmarital fertility. Lower marriage rates, in turn, influence fertility behavior by either suppressing childbearing altogether or increasing the likelihood of nonmarital births. In either case, relative wages shape fertility outcomes through their impact on the institution of marriage. Shenhav (2021) provides direct evidence of this mechanism, showing that a 10% increase in the relative wage leads to a 3.1 percentage point rise in the share of never-married women.

The second mechanism is the rising opportunity cost of childbearing. As capital accumulation raises the returns to mental over physical labor, women's relative wages increase, making childrearing more costly; the resulting substitution effect outweighs the income effect, leading to lower fertility (Santos Silva and Klasen (2021)). This economic tradeoff discourages fertility, particularly among women with higher earnings potential. Galor and Weil (1993) states that the household's fertility decision depends on the relative wages of women and men. When female wages rise, the cost of having children increases more than household income does, leading couples to choose fewer children. Lundberg and Pollak (2007) argue that education, labor force participation, and fertility are jointly determined: women who anticipate having fewer children and sustained careers are more likely to invest in market skills. For these women, higher educational attainment and better employment prospects increase the opportunity cost of childbearing.

The third mechanism through which relative wages influence fertility is intra-household adjustment, particularly the breakdown of traditional specialization and shifts in bargaining power. Rising relative wages of women reduce the returns to specialization and exchange within marriage at all levels of education (Lundberg et al. (2016)). This breakdown in specialization may reduce the appeal of childbearing, especially if women perceive that they will bear a disproportionate share of domestic responsibilities despite contributing equally or more to household income. Between 1965 and 1995, total housework hours in married couples declined by over 20 percent, but despite a substantial increase in husbands' contributions, wives continued to perform the majority of domestic labor (Lundberg and Pollak (2007)).

Additionally, higher relative female earnings can increase women's bargaining power within the household, enabling them to exert greater control over fertility decisions. When women contribute more to household income, they may gain more influence over major life choices, including whether and when to have children. Following the collective household model, Pollak (2005) argues that bargaining power is shaped by each partner's economic options, particularly their potential wage rates rather than earnings. This supports my use of relative potential wages as a key indicator of shifts in intra-household bargaining power.

5 Estimation Strategy

Conceptually, I aim to estimate how a woman's fertility outcomes change as the log of the ratio between her potential wage and the potential wage of men in her matching market increases. Potential wages are considered better than actual wages for analyzing marriage and fertility decisions (Pollak (2005)) for several reasons. First, actual wages may be endogenous to family outcomes. Women often adjust their labor supply in response to marriage or caregiving responsibilities, making observed earnings a poor measure of labor market potential (Amialchuk (2013); Pollak (2005)). Second, decisions around fertility and marriage are forward-looking. When deciding whether to marry or have children, people consider their long-term earning potential, not just current income.

Third, actual wages may reflect life choices rather than labor market opportunities. A lower observed wage may arise because a woman prefers to work part-time or take a flexible job. That lower wage does not reflect what she could earn if she worked full-time. In contrast, potential wages, predicted from characteristics like education, age, and experience, capture what someone could earn given their skills, regardless of current hours worked or job preferences. Finally, potential wages better reflect a person's value in the marriage market. Individuals assess both their own and others' attractiveness as partners based on long-term economic prospects, which shape bargaining power and relationship dynamics. For example, an educated woman may earn little while in school, but her expected earnings make her a more desirable match and give her greater leverage in partnership decisions.

For this reason, I follow Shenhav (2021) to construct a proxy for potential wages using a Bartik-style shift-share approach. This method combines pre-1970 industry-occupation employment shares with national wage trends in those industries and occupations, excluding the individual's own state. This proxy is plausibly exogenous, because it reflects national wage shocks interacted with pre-determined shares, which aren't influenced by local fertility or marriage decisions.

To construct the relative potential wage proxy and estimate its effects on fertility outcomes, I define a matching market, μ, as a group of individuals who live in the same state s and share the same education level e and race r. Education is grouped into two categories: high school or less, and some college or more. Race is divided into three mutually exclusive categories: White non-Hispanic, Black non-Hispanic, and Hispanic. This definition follows common practice in the literature[1] and captures the social and geographic boundaries within which most individuals form unions and make fertility decisions.

5.1 Data

To measure relative potential wages, I use data constructed by Shenhav (2021), based on the 1970 (1%) Census and the 1980–2011 March Current Population Surveys. The sample is restricted to working-age individuals between ages 18 and 64 who report positive earnings and are not self-employed. The variable reflects national wage shocks from the CPS interacted with pre-1970 industry-occupation employment shares for each matching market. This data provides a suitable measure for my analysis, and my effort focuses on extending it to examine fertility outcomes rather than marriage outcomes.

For fertility outcomes, I use individual-level data from the IPUMS 1980–2000 decennial Censuses and the 2010 American Community Survey (ACS). I restrict the sample to women ages 22 to 44, who are most likely to be on the margin of fertility and have completed their education. I categorize individuals by race and education, using three mutually exclusive racial and ethnic groups (White non-Hispanic, Black non-Hispanic, and Hispanic) and two education groups (high school or less, and some college or more). Appendix Table A1 presents descriptive statistics for the analytic sample.

I examine three fertility outcomes. First, I construct an indicator for whether a woman has at least one child, defined as a binary variable equal to one if the number of own children is greater than or equal to one, and zero otherwise. Second, I calculate the average number of children per woman, including all women in the sample regardless of parental status. Third, I estimate the average age at first birth by subtracting the age of the eldest co-resident own child from the woman's age. This measure is only defined for mothers and is missing for childless women.

[1] I replicate Shenhav (2021) relative potential wage measure using the same matching market definition, referred to as a marriage market in her paper, which allows for greater comparability across estimates. This definition is also consistent with Bertrand et al. (2015), who use the same combination of education, race, and geographic cells in their analysis.

5.2 Construction of Relative Potential Wage

The relative potential wage measure is constructed following Shenhav (2021), using a Bartik-style shift-share approach. The idea is to estimate the wage a woman (or man) could potentially earn based on her demographic group's historical industry-occupation mix and national wage trends, excluding her own state.

Formally, the potential wage for gender g in matching market μ and year t is given by:

$$\widehat{w}_{\mu gt} = \sum_{j} \left(\frac{E_{j\mu g,1970}}{E_{\mu g,1970}} \right) \times \sum_{o} \left(\frac{E_{oj\mu g,1970}}{E_{j\mu g,1970}} \cdot \pi^{W*}_{ojt,-s} \right) \times w_{ojt,-s}$$

This formula aggregates national log wages $w_{ojt,-s}$ for each occupation o and industry j, weighted by two components:

- **Between-industry exposure:** The share of individuals in group (μ, g) working in each industry j in 1970, denoted $\frac{E_{j\mu g,1970}}{E_{\mu g,1970}}$.
- **Within-industry occupation exposure:** The share of individuals in occupation o within each industry j, adjusted by the updating term $\pi^{W*}_{ojt,-s}$, which reflects changes in the national occupational composition within industries over time.

This approach allows the potential wage to evolve as national demand for different occupation-industry pairs changes. It also ensures exogeneity by excluding wages from the individual's own state, avoiding bias from local labor market shocks. Additional details on relative potential wage construction are provided in Appendix A.2.

The final step computes the relative potential wage as the log ratio of female to male potential wages in each matching market-year cell:

$$\log \left(\frac{\widehat{w}_{\mu female,t}}{\widehat{w}_{\mu male,t}} \right)$$

This relative measure captures how a woman's potential earnings compare to those of her likely partners in the same education-race-state group and year.

5.3 Estimating Equation

To estimate the effect of relative potential wages on fertility, I follow Shenhav (2021), who builds on the approach of Aizer (2010) and Bertrand et al. (2015), and estimate reduced-form regressions of outcomes on a proxy for potential wages, rather than using the proxy as an instrument for observed wages. This allows potential wages to influence outcomes through multiple channels, including both increased bargaining power and higher expected earnings.

I collapse the data to the level of matching market μ, cohort c, and census year t, and estimate the following regression:

$$Y_{\mu ct} = \beta \log\left(\frac{\widehat{w}_{\mu female,t}}{\widehat{w}_{\mu male,t}}\right) + \alpha_\mu + \delta_{rt} + \chi_{et} + \gamma_{st} + \xi_{ct} + \rho_{rs} \cdot t + X_{\mu t}\Phi + \nu_{\mu ct} \tag{1}$$

where $Y_{\mu ct}$ is one of the fertility outcomes: (i) whether a woman has at least one child, (ii) average number of children per woman, or (iii) average age at first birth. The key explanatory variable is the log of the female-to-male potential wage ratio in matching market μ at time t, which proxies the relative economic position of women compared to their likely partners.

I include matching market fixed effects α_μ to absorb time-invariant differences in preferences, demographics, and labor market structures across markets. To account for secular trends in fertility by demographic group and geography, I include time-varying fixed effects by race δ_{rt}, education χ_{et}, and state γ_{st}, as well as cohort-by-year fixed effects ξ_{ct}. In addition, I include state-by-race linear time trends $\rho_{rs} \cdot t$ to allow for smooth differential evolution of fertility patterns across regions and groups.

The vector $X_{\mu t}$ includes controls for the average educational attainment of men and women and the sex ratio in each matching market-year. These variables could influence fertility both directly and indirectly through changes in relationship dynamics and childbearing expectations. All regressions are weighted by population and standard errors are clustered at the state level. To aid interpretation, I rescale the coefficients to represent the effect of a 10 percent increase in the relative potential wage.

6 Results

6.1 Fertility Responses to Relative Wages

In this section, I present the main empirical findings on how changes in female-to-male relative wages affect fertility outcomes. Using reduced-form regressions based on the specification outlined earlier, I examine a range of fertility measures, including the likelihood of having a child, the average number of children per woman, and age at first birth. Panel A of Table 1 presents the estimated effect of the relative wage on fertility outcomes before controlling for the average potential wage. Column 1 shows that a 10% increase in the relative wage leads to a 4.4 percentage point decline in the likelihood of having any children. It also results in a 0.73 decrease in the average number of children, as shown in column 2. My estimates are consistent with early evidence from Fleisher and Rhodes (1979), who find that higher female wages substantially reduce fertility, with an elasticity of -0.43.

The average age at first birth, with a mean of about 23.5 years, increases by more than three years (column 3), indicating substantial postponement of childbearing. Some studies explain the decline in total fertility rates as a response to rising female wages. Others, such as Siegel (2017), argue that the narrowing of the gender wage gap is the common force behind fertility trends, rather than the absolute level of female wages. Galor and Weil (1993) supports my results by showing that increases in women's relative wages reduce fertility by raising the opportunity cost of children more than they increase household income.

Panel B introduces controls for the average (sex-combined) potential wage in the matching market. Including this variable allows for a clearer separation between absolute income effects and relative wage effects. Consistent with economic theory, higher average wages are positively associated with fertility. As shown in column 1, a 10% increase in the average potential wage raises the likelihood of having any children by 5.1 percentage points. This suggests that when both men and women earn more, total household resources increase, encouraging childbearing through standard income effects. This line of analysis, which connects fertility to men's and women's average wages, goes back to Becker (1960) and Willis (1973). In their framework, children are treated as durable goods in the parents' utility function: an increase in household income, holding the cost of children constant, leads to higher demand for children. Similar findings have been reported in several studies, including Schaller (2016), Kearney and Wilson (2018), and Autor et al. (2019).

In contrast, the negative and significant effects of the relative wage persist even after controlling for the average wage. For example, a 10% increase in the relative wage continues to reduce the likelihood of having children by 4.3 percentage points and lowers the average number of children by 0.71, while also increasing the age at first birth. These findings suggest that relative wage dynamics, rather than absolute income levels, are central to understanding the fertility decline. This distinction highlights the importance of not just how much individuals earn, but how their earnings compare within the matching market, offering new insight into the demographic consequences of wage convergence.

6.2 Heterogeneous Responses

In this section, I examine whether the effects of relative wages on fertility outcomes vary across key demographic groups. Tables 2–4 present results by education, race, and age. The analysis begins with differences by education level, followed by racial heterogeneity, and then by age groups, before combining age and education to capture more nuanced patterns. Table 2 shows that both low- and high-skilled women experience declines in the likelihood of having children, but delays in childbearing are more pronounced among low-skilled women.

Racial differences are also substantial: white and Black women experience the largest reductions in fertility, while Black women also show the greatest delays in childbearing. Table 3 reveals that younger women primarily postpone childbearing, whereas older women show larger reductions in completed fertility. Finally, Table 4 highlights that education further shapes these age patterns, with high-skilled women more likely to delay and low-skilled women more likely to forgo childbearing altogether. Across specifications, the findings reveal that while the negative effects of rising relative wages on fertility are widespread, their magnitude and timing differ substantially across subgroups.

6.2.1 Education Heterogeneity

College graduates are generally more career oriented than those without a degree and therefore face sharper tradeoffs between career and family (Goldin, 2006). Panel A of Table 2 examines how the effects of relative wages on fertility differ between low- and high-skilled women. A 10% increase in the female-to-male potential wage ratio significantly reduces the likelihood of having at least one child for both groups, with declines of 3.9 percentage points for low-skilled women and 5.0 percentage points for high-skilled women. This pattern is consistent with Cai and Winters (2024), who show that women with a bachelor's degree consistently have the lowest fertility, measured by both the total fertility rate and the number of children, compared to other educational groups.

In my results, however, the effect on the average number of children is statistically significant only for low-skilled women, who experience a reduction of 0.82 children on average. For high-skilled women, the effect is negative but not statistically significant. Cai and Winters (2024) also find that, for college graduate women, the effect of female earnings on fertility is clearly negative but relatively small: a 10% increase in female income reduces the mean number of children from about 1.93 to 1.91 among college-educated women aged 39 to 41 between 1970 and 2019. The timing of fertility also responds differently: low-skilled women see a substantial and significant increase in the average age at first birth (5.07 years), while for high-skilled women the effect is smaller and not statistically significant.

6.2.2 Racial Heterogeneity

Panel B of Table 2 interacts the relative wage with race indicators. The negative fertility response to rising relative wages is most pronounced among white and Black women. A 10% increase in the relative wage reduces the probability of having at least one child by 4.6 percentage points for white women and 3.4 percentage points for Black women, while the effect for Hispanic women is small and not statistically significant. The number of children per woman falls sharply for Black women (–1.10) and more modestly for white women (–0.58), with no significant change for Hispanic women.

Fertility timing responses also differ substantially across racial groups. The average age at first birth increases for all groups, but the effect is largest for Black women (6.44 years), compared to 2.20 years for white women and 2.30 years for Hispanic women. The equality tests reject the null of equal effects across racial groups for the probability of having at least one child, and age at first birth, confirming that race mediates the link between wage changes and fertility behavior.

6.2.3 Age Heterogeneity

Table 3 examines whether the effects of relative wages differ between younger women (ages 22–35) and older women (ages 36–44). The split at age 35 is chosen because fertility is generally high and biologically safer before the mid-30s, while fertility rates drop sharply afterward, making delays more likely to result in permanent reductions in childbearing. For women aged 22–35, a 10% increase in the relative wage reduces the likelihood of having at least one child by 3.1 percentage points and significantly delays childbearing, with the average age at first birth increasing by 1.7 years.

The effect on the number of children is negative but not statistically significant, which is consistent with a postponement pattern at younger ages rather than a clear reduction in completed fertility. For women aged 36–44, the effects are larger and more permanent. A 10% increase in the relative wage reduces the likelihood of having at least one child by 5.3 percentage points and the number of children by nearly one. The average age at first birth rises by more than six years, suggesting substantial delays earlier in life that translate into fewer total births by the end of the reproductive years.

6.2.4 Interactions of Age and Education

Table 4 shows how the effects of relative wages on fertility outcomes vary jointly by age and education. For younger women (ages 22–35), the effect of higher relative wages on the likelihood of having any children is larger for high-skill women than for low-skill women: a 10% increase in the relative wage reduces the likelihood by 4.2 percentage points for high-skill women compared to 2.5 percentage points for low-skill women. This is consistent with the higher opportunity cost of childbearing at younger ages for high-skill women, who may be more likely to delay childbearing in favor of investing in education and career.

In older ages (36–44), the pattern reverses: the effect on having any children is larger for low-skill women (5.6 percentage points) than for high-skill women (4.5 percentage points). This fits with Shenhav's finding that higher relative wages lead to "opting out" of marriage for low-skill women but primarily to delayed marriage for high-skill women. While relative wages delay marriage for both groups, high-skill women often enter marriage later, preserving some opportunity to have children, whereas for low-skill women delayed marriage more often translates into permanent nonmarriage and thus lower fertility.

The decline in the number of children is significant only for older low-skill women, who have 1.08 fewer children on average. This also aligns with the marriage patterns above, as this group's marriage rates are most negatively affected by higher relative wages, leaving less time and opportunity for childbearing. For age at first birth, the effects are large and positive for low-skill women in both age groups, suggesting substantial delays in childbearing when relative wages rise. The lack of a significant positive effect for younger high-skill women could reflect that their delay in fertility is already built into their longer educational and career trajectories, as I can see that their mean age at first birth is already about 2.5 years higher than that of low-skill women. So an increase in relative wages does not shift their timing much further.

7 Mechanisms

In this section, I examine four channels through which changes in female-to-male relative potential wages can influence fertility decisions. These channels build on the framework outlined earlier and reflect mechanisms emphasized in the literature. The first channel focuses on marriage market dynamics, where shifts in relative wages can alter the incentives and opportunities to marry and shape childbearing patterns. The second channel considers the opportunity cost of motherhood, highlighting how higher potential wages raise the economic tradeoffs of time spent out of the labor market. The final two channels, specialization breakdown and bargaining power, both capture changes in how time and decision-making are allocated within households. Given their shared reliance on intra-household dynamics, I combine them into a single subsection on intra-household adjustments, examining how the erosion of traditional gender specialization and shifts in bargaining power jointly affect fertility behavior.

7.1 Marriage Market Dynamics

As women's wages rise relative to men's, marriage rates tend to decline (Autor et al., 2019; Shenhav, 2021). Lower marriage rates, in turn, influence fertility behavior by either suppressing childbearing altogether or increasing the likelihood of nonmarital births. To further explore whether these changes in marriage behavior shape fertility responses, I re-estimate the main specification separately for single and married women. [2] If higher female relative wages reduce the economic gains from marriage and increase women's financial independence, the negative effects on marriage should appear as greater childbearing outside marriage. Figure 3 shows that the share of children born outside marriage in the United States increased from 5 percent in 1960 to more than 40 percent today, motivating the decomposition of results by marital status.

Table 5 presents the results, which reveal a clear divergence by marital status. Among single women, higher relative potential wages are associated with higher fertility: a 10 percent increase in the female-to-male potential wage ratio raises the likelihood of motherhood by about 8 percentage points and increases the average number of children per woman by 1.5. These effects are consistent with the idea that rising relative wages make single motherhood more feasible by reducing women's dependence on marriage for economic security.

For married women, however, the effects are strongly negative. A 10 percent increase in the relative potential wage lowers the probability of motherhood by about 9 percentage points and reduces the average number of children by nearly three, with results remaining negative and statistically significant even after controlling for average wages. For single women, once I control for the average potential wage in the market (Panel B), the coefficients become small and statistically insignificant, while the average wage itself enters strongly negative.

This pattern suggests that the initial positive association reflects differences in overall income conditions rather than relative wage gains alone. In other words, higher relative wages may allow some single women to afford motherhood independently, but higher absolute income levels tend to reduce fertility by increasing the opportunity cost of childbearing. Together, these results support the marriage-market channel: as women's relative wages rise, fewer women marry, and those who remain married have fewer children and delay fertility, shifting births from within marriage to outside it.

7.2 Rising Opportunity Cost of Motherhood

The opportunity cost of motherhood refers to the economic tradeoff women face when time spent on childbearing and childrearing reduces their ability to engage in market work and advance their careers. When the female wage is low, the time cost of childrearing is small, so the couple optimally chooses high fertility. Higher female wages raise the cost of time spent on childrearing, lowering optimal fertility and, at sufficiently high wages, making childlessness optimal (Baudin et al. (2015)). These opportunity costs vary by education and occupation:

[2] Women are classified as single if they have never been married and as married if they have ever been married, including those who are divorced, widowed, or separated. Cohabiting unions are not identified in the data and are therefore excluded from this classification.

delaying the first birth raises career earnings by about 9% per year of delay, wages by 3%, and hours by 6%, with the largest gains for college-educated women and those in professional or managerial jobs (Miller (2011)). To assess whether the opportunity cost of motherhood is a channel linking relative wages to fertility, I use heterogeneity by occupation and examine whether the fertility response varies systematically with occupational opportunity costs.

To examine how fertility responses vary with occupational opportunity costs, I classify occupations into three groups based on their gender dominance in 1980: *female-dominated occupations* (at least 60% women), *male-dominated occupations* (at most 40% women), and *gender-neutral occupations* (40–60% women). I then estimate the main specification (Equation 1) separately within each category. This pre-period classification treats gender dominance as predetermined, reducing concerns that later fertility or wage changes drive the grouping.

Results in Table 6 show that across all three occupation groups, increases in women's relative potential wages are associated with declines in fertility and later childbearing. The responses are largest in gender-neutral and male-dominated occupations, consistent with higher opportunity costs in less traditionally feminized work environments. This pattern supports the opportunity-cost channel: where institutional norms, promotion structures, and skill depreciation make career breaks more costly, fertility declines and postponement are more pronounced. Where competition is largely with male coworkers, motherhood penalties, including reduced access to training and promotion opportunities and assignment to a 'mommy track' (Miller (2011)), are especially damaging, increasing incentives to defer or forgo childbearing.

As shown in Table 6, a 10% increase in the female-to-male relative potential wage significantly reduces the probability of having at least one child by about 7 p.p. in male-dominated occupations and 6.9 p.p. in gender-neutral occupations, compared with 3 p.p. in female-dominated jobs. The number of children per woman also falls significantly, by 1.69 in gender-neutral, 1.10 in male-dominated, and 0.80 in female-dominated occupations. Timing effects align with the opportunity-cost interpretation: age at first birth rises significantly in all groups, by about 6.0 years in gender-neutral, 4.4 years in male-dominated, and 3.9 years in female-dominated occupations.

Why are the effects largest in gender-neutral occupations? In heavily male-dominated jobs, few women enter or compete for advancement, so the scope for response is small. In gender-neutral occupations, women compete directly with men for promotions and training, which raises competitive pressure and the cost of time out for childbearing, so effects are larger. In female-dominated occupations, direct competition with men is limited and the penalties tend to be smaller. In female-dominated occupations, direct competition with men is limited, so competitive pressure and penalties are lower. As shown in Figure A1, gender dominance shifts meaningfully over time: Managerial and Science/Professional occupations see steady increases in the female share, Health moves from roughly balanced in 1980 to clearly female-dominated by 2010, and Teachers/Technicians trend upward. Clerical remains highly female with a slight decline, Sales and Service change little, and Craft/Operators/Labor stays strongly male. These shifts raise the concern that a fixed 1980 classification may misstate later-period conditions.

As a robustness check, I reclassified occupational gender dominance using pooled data from 1980 to 2020 and re-estimated the heterogeneity by occupation within these pooled-year groups. The results match the main findings: higher female-to-male relative potential wages reduce entry into motherhood and the number of children and increase age at first birth in all groups, with the largest effects in gender-neutral and male-dominated occupations. Appendix Figures A2 visualize these estimates with 95% confidence intervals. This suggests that the opportunity-cost interpretation is not sensitive to how occupational gender dominance is defined.

Taken together, these findings suggest that occupational context mediates the effect of relative wage growth on fertility through the opportunity cost channel. When women's wages rise in jobs where time away from the labor force is most penalized, fertility declines are sharper and postponement more pronounced. In contrast, the smaller fertility response in female-dominated occupations may reflect greater schedule flexibility, weaker career penalties for breaks, or workplace norms more accommodating to motherhood.

7.3 Intra-Household Adjustments: Specialization Breakdown and Bargaining Power

This subsection examines two distinct but related mechanisms through which increases in female-to-male relative wages may influence fertility decisions: the breakdown of household specialization and shifts in intra-household bargaining power. While these channels operate differently in theory, they both involve changes in how time is allocated within households. Since I use time use data to explore both mechanisms, I group them together under a broader framework of intra-household adjustment. By analyzing how the time use patterns of men and women evolve in response to rising relative wages, I aim to provide empirical evidence that connects these adjustments to changes in fertility behavior.

Standard household surveys like the Current Population Survey (CPS) and the Panel Study of Income Dynamics (PSID) consistently collect information on market work hours but offer little insight into nonmarket activities. As a result, studying mechanisms such as household specialization or bargaining power, which rely on understanding how time is allocated across different activities, requires more detailed data. To address this, I use the time use dataset compiled by Aguiar and Hurst (2007), which harmonizes five major surveys: the 1965 to 1966 America's Use of Time, the 1975 to 1976 Time Use in Economics and Social Accounts, the 1985 Americans' Use of Time, the 1992 to 1994 National Human Activity Pattern Survey, and the 2003 American Time Use Survey. These data allow me to track changes in men's and women's time spent on market work, nonmarket work, child care, and leisure over nearly four decades.

7.3.1 Specialization Breakdown

The first mechanism, specialization breakdown, captures how the traditional division of labor, in which men focus on market work and women on home production, becomes unstable as women's earnings rise. In classical household models, such as those developed by Becker, this kind of specialization is efficient because it maximizes household output and supports larger families. However, as the gender wage gap narrows, the gains from strict specialization diminish. Siegel (2017) models this transition explicitly, showing that rising female relative wages lead to a state of imperfect specialization in which men increase their contributions to home production and women reduce their time at home. While this shift may slow the decline in fertility in the short run, it also reduces the economic rationale for having more children, especially when both partners face growing demands on their time.

As shown in Table A2, the traditional gender division of labor has eroded over this period. Average weekly market work hours declined substantially for men (from 51.6 to 39.5 hours), while increasing modestly for women (from 22.5 to 24.9 hours). In contrast, nonmarket work hours rose for men (from 9.7 to 13.4) and fell sharply for women (from 32.9 to 22.6). These patterns are consistent with a breakdown in perfect specialization within households, aligning with the mechanism proposed by Siegel (2017), in which rising relative female wages lead to a redistribution of time across genders.

To assess whether changes in relative wages affect fertility through shifts in intra-household specialization, I estimate a two-stage mediation model.

First Stage: Effect of Relative Wages on Specialization

The first stage of the specialization model investigates how rising female-to-male relative wages alter household time allocation, reflecting a shift away from traditional patterns of specialization. In classical models, women tend to allocate more time to nonmarket work and child care, while men specialize in market work. As women's relative earnings increase, this division is expected to weaken, leading to a breakdown in household specialization. To capture this shift, I estimate the effect of relative wages on time spent in market work, nonmarket work, child care, total work, and leisure, separately for men and women.

$$TimeUse_{i,gmt} = \alpha + \beta \cdot \log\left(\frac{Wage_f}{Wage_m}\right)_{mt} + \delta_e + \lambda_a + \gamma_t + \varepsilon_{gmt} \tag{2}$$

The variable $TimeUse_{i,gmt}$ denotes the average number of hours spent per week on activity i (market work, nonmarket work, child care, total work, or leisure) by gender g, in marriage market m, and year t, where marriage markets are defined as education group $\times$ age group. The key independent variable is the log of the female-to-male relative wage in that market and year. The regression includes fixed effects for education group (δ_e), age group (λ_a), and year (γ_t).

To examine the relationship between relative wages and time use, I merged the Aguiar and Hurst (2007) time-use dataset with wage data constructed from IPUMS. Because the time-use data lacks geographic and racial identifiers, both datasets were aggregated to the education $\times$ age group $\times$ year level. Specifically, each time-use survey year (1965, 1975, 1985, 1993, and 2003) was matched with relative wage data constructed from the corresponding decennial Census years (1960, 1970, 1980, 1990, and 2000), using five education groups and five age groups between ages 18 and 65.

Table 7 provides evidence of a breakdown in traditional household specialization in response to rising female-to-male relative wages. As shown in Panel A, higher relative wages are associated with a significant increase in market work hours for women and a significant decrease for men, suggesting a reallocation of labor supply across genders. At the same time, women substantially reduce their nonmarket work and child care, indicating that they are no longer specializing in home production.

Panel B summarizes these patterns using relative time use measures. A one-unit increase in the log female-to-male relative wage is associated with a 0.33 log-point increase in women's total work time (market work + nonmarket work + child care) relative to men's. Meanwhile, relative leisure time declines significantly for women. This imbalance suggests that women are not only increasing their participation in market work but are also not fully compensated by men taking on more nonmarket responsibilities. Together, these findings support the notion that rising female wages have disrupted traditional intra-household specialization, potentially increasing the total work burden for women and lowering their incentives for childbearing.

McDonald (2000) argues that fertility depends on how gender equity evolves in both the public and private spheres; when household roles fail to keep pace with labor market opportunities, fertility may remain depressed. Galor and Weil (1993) emphasize the trade-off between market work and childrearing to explain fertility dynamics. Kimura and Yasui (2010) extend this framework by incorporating non-market production as a third dimension of household time. Building on these insights, I argue that total work, including market, non-market, and child care, provides a more comprehensive measure of the constraints shaping fertility decisions.

Siegel (2017) highlights that imperfect household specialization, with men gradually increasing their home hours, can ease women's home responsibilities and support fertility, and Greenwood et al. (2005) argue that productivity growth in the household sector, spurred by innovations such as electricity and home appliances, can lead to fertility increases. My results are consistent with the idea that both imperfect specialization and improvements in household-sector productivity can relieve some constraints, but I show that women's total work relative to men's has nonetheless risen. This imbalance suggests that rising female wages, even as they reduce specialization and increase marketization, still leave women bearing a greater total work burden, thereby lowering their incentives for childbearing.

Stage 2: Effect of Specialization Breakdown on Fertility

The second stage of the specialization model investigates whether changes in time allocation across market work, nonmarket work, and child care are associated with fertility outcomes. Specifically, I estimate the effect of relative time use, measured as the log ratio of female to male time use in a given activity, on three fertility outcomes: whether a woman has at least one child, the number of children, and age at first birth:

$$FertilityOutcome_{met} = \alpha + \beta \log(RelTimeUse_{i,mt}) + \delta_e + \lambda_a + \gamma_t + \varepsilon_{met} \tag{3}$$

where $FertilityOutcome_{met}$ denotes the fertility outcome for women in marriage market m, and year t. $\log(RelTimeUse_{i,mt})$ is the log of the female-to-male time use ratio in activity i. The specification includes fixed effects for education group (δ_e), age group (λ_a), and year (γ_t).

I aggregate both the time use data (from Aguiar and Hurst (2007)) and the IPUMS USA fertility outcomes to the education × age group × year level, aligning five survey years (1965, 1975, 1985, 1993, and 2003) with corresponding census years (1970, 1980, 1990, 2000, and 2005). To ensure consistency with the age range relevant for fertility decisions, I estimate the second-stage regressions using both the full age sample and a restricted version that includes only the first three age groups (ages 18 to 49). This restriction aligns more closely with the paper's fertility sample of women aged 22 to 44 and excludes older respondents in the time use data whose behavior is less relevant for reproductive outcomes.

Results in Table 8 show that higher relative market work by women is significantly associated with lower fertility and delayed childbearing: a 1-unit increase in the log female-to-male market work ratio reduces the likelihood of having a child and the number of children, while increasing age at first birth. In contrast, greater relative non-market work by women, reflecting more traditional specialization, is positively associated with having children while reduces age at first birth. Since the first-stage results show that higher female relative wages reduce women's non-market work relative to men's, this implies that rising wages lead to a decline in fertility through the erosion of traditional household specialization. Finally, when women's total workload (market + nonmarket + child care) exceeds men's, they are significantly less likely to have children and delay fertility. This aligns directly with the specialization breakdown channel: without a compensating shift in men's contributions, the burden of "doing it all" falls disproportionately on women, discouraging childbearing.

7.3.2 Shifts in Bargaining Power of Women

To examine the second mechanism, which involves shifts in women's intra-household bargaining power, I use leisure time as a proxy. This approach follows Datta Gupta and Stratton (2008) and Friedberg and Webb (2005), who argue that leisure is a sensitive indicator of relative power within couples. The idea is that partners with greater bargaining power are better able to protect their leisure time, which is the most discretionary use of time after meeting market and household responsibilities. Table 9 shows that as female-to-male relative wages increase, women spend significantly more time on eating, sleeping, and personal care (ESP), as well as on leisure activities. [3] These results suggest that rising relative wages allow women to retain more control over how their non-work time is used, consistent with an increase in their bargaining position within the household.

sleeping, eating, and in personal activities (excluding own medical care). Leisure Measure 3 includes Leisure Measure 2 plus time spent in child care. Leisure Measure 4 is defined as any time not allocated to market or nonmarket work. See Table IX and text for additional detail.

Friedberg and Webb (2005) also note that wives with higher bargaining power tend to spend more time with family members. This is plausible given that they spend less time on home production and routine child care tasks, allowing them to reallocate time toward more relational and interactive activities with children. Table 9 supports this interpretation: while total child care time declines with rising relative wages, the time women spend playing with their children increases significantly. This pattern reflects a shift away from obligatory

[3] In line with Aguiar and Hurst (2007), I examine two definitions of leisure. The narrower measure, Leisure2, refers to the time individuals spent socializing, in passive leisure, in active leisure, volunteering, in pet care, and gardening, time spent sleeping, eating, and in personal activities. Leisure 3 includes Leisure Measure 2 plus time spent with children. See Aguiar and Hurst (2007, Table 1) for full classification.

care work toward more engaged, voluntary parenting time, consistent with greater autonomy in time allocation. These results are also consistent with Becker's concept of the 'quantity–quality' tradeoff in which the decline in the instrumental value of children led parents to reduce family size and increase investment per child.

8 Conclusion

I study how changes in female-to-male relative potential wages shape childbearing in the United States from 1980 to 2010. Using a Bartik-style shift-share measure of potential wages at the marriage-market level, I link plausibly exogenous movements in women's economic position to both the timing and level of fertility. My approach moves beyond observed earnings to capture long-run opportunities and to reduce concerns about simultaneity with family choices.

Three main results emerge. First, higher relative potential wages for women reduce entry into motherhood, lower completed fertility, and delay first births. A 10 percent increase in the female-to-male potential wage ratio lowers the probability of having any children by about 4 p.p., reduces the average number of children by roughly 0.7, and shifts first births later by a little over three years. These effects remain large and significant after controlling for average potential wages, which points to relative rather than absolute earnings as the primary driver.

Second, the mechanisms align with economic theory. Higher relative potential wages reduce marriage formation and, as a result, increase the likelihood of nonmarital births. Opportunity cost matters as well. Responses are larger in gender-neutral and male-dominated occupations, where time out of the labor market is more costly. Time-use evidence shows a breakdown of household specialization as relative wages rise: women increase market work and reduce nonmarket work, the female-to-male ratio of total work time rises, and discretionary time margins such as leisure and play with children move in ways that suggest greater bargaining power for women.

Third, the effects vary across groups. The negative fertility response is strongest for non-Hispanic White and Black women. By age and education, younger high-skill women show larger declines in entry into motherhood, consistent with higher early-life opportunity costs, while older low-skill women experience larger reductions in completed fertility, consistent with earlier delays translating into fewer total births. Together, the heterogeneity patterns reinforce the role of both marriage markets and opportunity costs.

My study has limits. The shift-share design strengthens identification, but mediation through marriage is only partly identified, so the decomposition should be read as descriptive.

Policy-wise, when women's potential wages rise relative to men's, fertility falls and shifts later, especially where career interruptions are costly and marriage is more responsive. Policies that lower the time cost of childbearing, such as affordable child care, paid leave, flexible scheduling, and re-entry support, may temper these effects without undoing gains in women's labor market opportunities. McDonald (2000) shows that countries that better support work–family balance (e.g., childcare, parental leave, shared domestic roles) tend to maintain higher fertility compared to those where women bear a disproportionate household burden.

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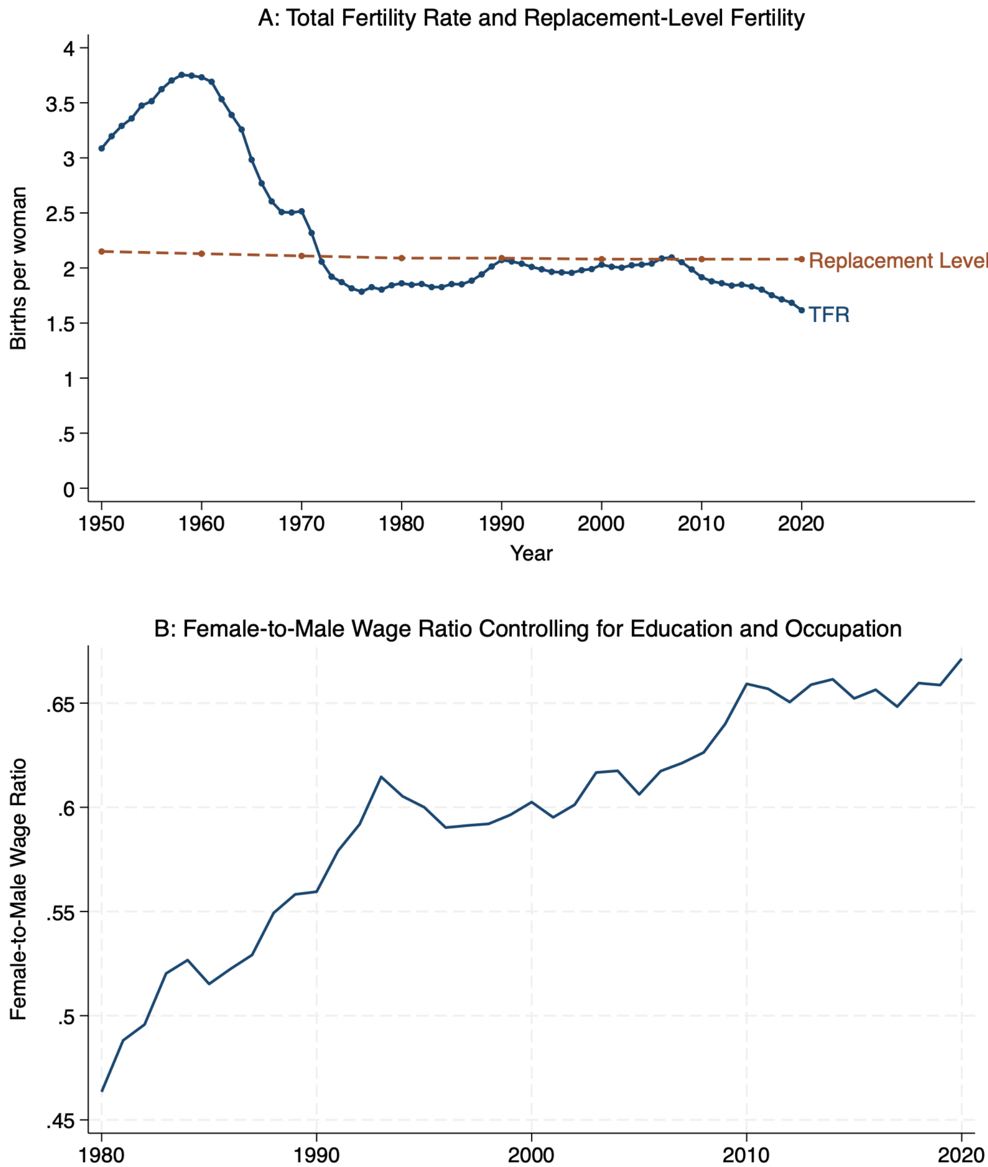
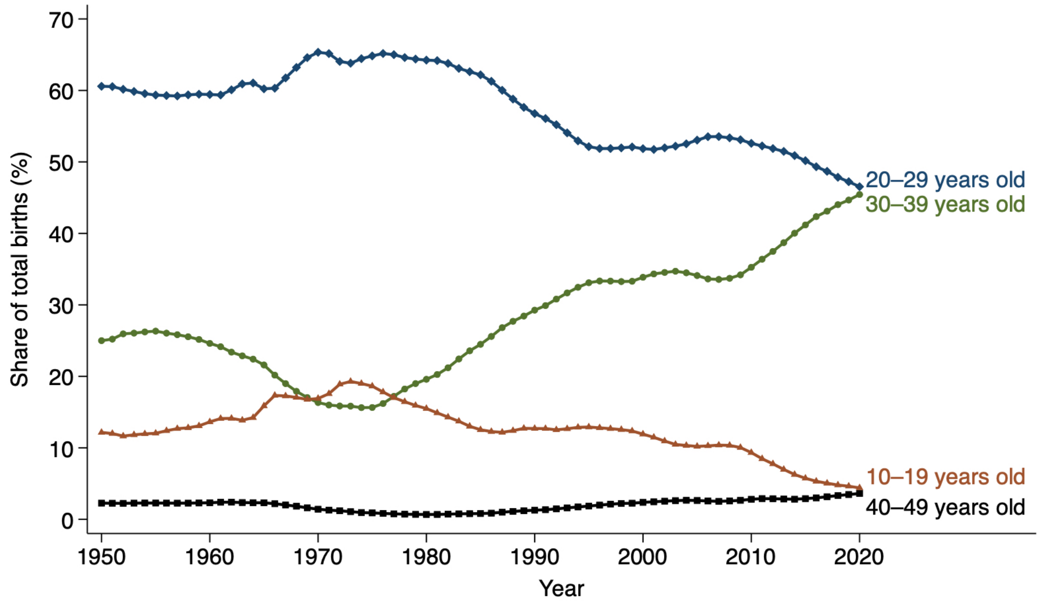
Figure 1: Total Fertility Rate and Female to Male Wage Ratio, United States



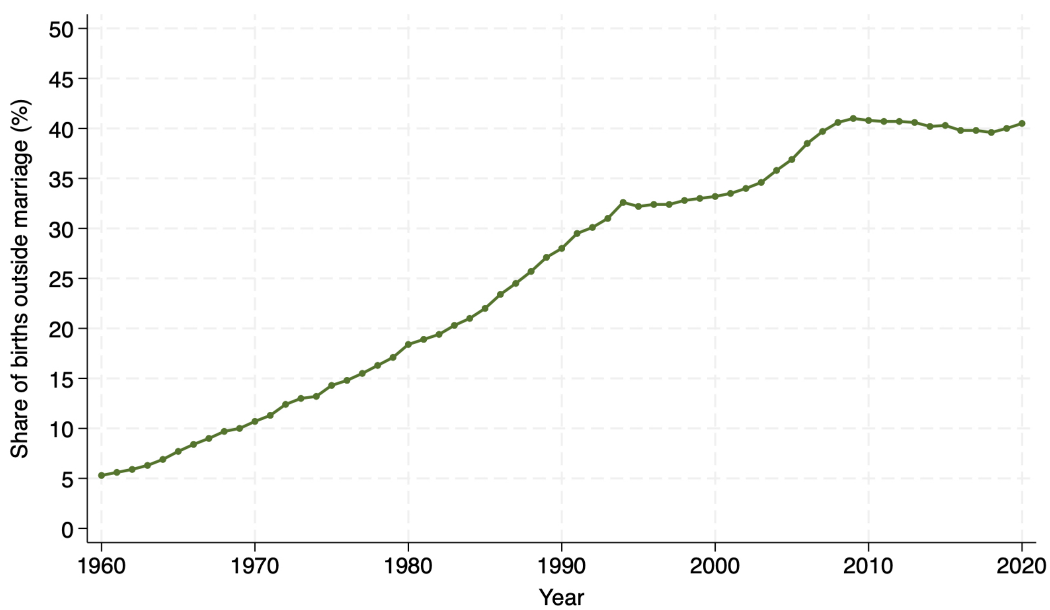
Note: Panel A shows the total fertility rate (TFR) vs the replacement-level fertility rate from 1950–2020. The total fertility rate summarizes the total number of births a woman would have, if she experienced the birth rates seen in women of each age group in one particular year across her childbearing years. The replacement-level fertility rate (the total fertility rate needed to keep the population size stable over time, without migration) is commonly stated to be 2.1. But the level can vary based on the sex ratio, child mortality rates, and other factors. Data Source: Human Fertility Database (2024), Organisation for Economic Co-operation and Development (OECD), Gietel-Basten and Scherbov (2020); processed by Dattani et al. (2025).
Panel B shows the Estimates from year-by-year regressions of log wage on a female dummy, controlling for EDUC and OCC FEs. Sample includes individuals age 18 to 64 with positive hours worked and positive earned income. Data Source: IPUMS 1970–2020 March Current Population Surveys.

Figure 2: Share of births by age of mother, United States



Note: The figure shows Estimated share of total births by the age of the mother in the United Stated from 1950-2020. Data Source: United Nations, Department of Economic and Social Affairs, Population Division (2024); processed by Dattani et al. (2025).

Figure 3: Share of children who were born outside of marriage, United States



Note: The figure shows the share of all children born to mothers who were not married at the time of birth in the United Stated from 1960-2020. Data Source: Organisation for Economic Co-operation and Development (OECD), processed by Dattani et al. (2025).

Table 1: Effects of Relative Potential Wages (F/M) on Fertility Outcomes

	(1) Has At least One Child	(2) Avg No of Child Per Woman	(3) Avg Age at First Birth
A: Relative only			
Effect of 10% Increase in Rel. Wage	-0.044***	-0.731**	3.414***
	(0.012)	(0.308)	(0.908)
Obs	23,716	23,716	23,356
B: Relative controlling for Average			
Effect of 10% Increase in Rel. Wage	-0.042***	-0.719**	3.470***
	(0.009)	(0.282)	(0.996)
Effect of 10% Increase in Avg. Wage	0.051***	0.372	1.813*
	(0.011)	(0.400)	(1.038)
Mean Y	0.648	1.341	23.642
Obs	23,716	23,716	23,356

Notes: This table reports coefficients from equation (1), scaled to represent the effect of a 10% increase in the female-to-male relative (potential) wage (Panel A). Panel B adds controls for the average (sex-combined) potential wage to allow for a clearer separation between absolute income effects and relative wage effects. Each column presents a different fertility outcome. Standard errors are clustered at the state level, and regressions are weighted by the female population in each cell. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Data sources: IPUMS 1980–2000 decennial Censuses and the 2010 ACS.

Table 2: Heterogeneous Responses to the Relative Wage Across Subgroups

	(1) Has At least One Child	(2) Avg No of Child Per Woman	(3) Avg Age at First Birth
Panel A: Interaction with Education			
Effect of 10% Increase in Rel. Wage x Low Skill	-0.039***	-0.819**	5.069***
	(0.009)	(0.328)	(1.156)
Effect of 10% Increase in Rel. Wage x High Skill	-0.050***	-0.491	-0.674
	(0.014)	(0.427)	(1.458)
Equality P-value	0.446	0.499	0.002
Panel B: Interaction with Race			
Effect of 10% Increase in Rel. Wage x Black	-0.034***	-1.103***	6.442***
	(0.009)	(0.364)	(1.253)
Effect of 10% Increase in Rel. Wage x Hispanic	-0.005	-0.207	2.304*
	(0.013)	(0.482)	(1.301)
Effect of 10% Increase in Rel. Wage x White	-0.046***	-0.577*	2.201***
	(0.009)	(0.310)	(0.774)
Obs	23,716	23,716	23,356
Equality P-value	0.022	0.059	0.002

Notes: This table reports coefficients from equation (1) interacted with indicators for education (Panel A) or race (Panel B), scaled to represent the effect of a 10% increase in the female-to-male relative (potential) wage. Each column presents a different fertility outcome. Standard errors are clustered at the state level, and regressions are weighted by the female population in each cell. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Data sources: IPUMS 1980–2000 decennial Censuses and the 2010 ACS.

Table 3: Heterogeneous Responses to the Relative Wage by Age

	(1) Has At least One Child	(2) Avg No of Child Per Woman	(3) Avg Age at First Birth
Panel A: Ages 22–35			
Effect of 10% Increase in Rel. Wage	-0.031***	-0.166	1.703**
	(0.010)	(0.264)	(0.720)
Mean Y	0.576	1.145	22.413
Obs	14,500	14,500	14,215
Panel B: Ages 36–44			
Effect of 10% Increase in Rel. Wage	-0.053***	-0.929***	6.242***
	(0.016)	(0.318)	(1.665)
Mean Y	0.763	1.660	25.629
Obs	9,216	9,216	9,141

Notes: This table reports coefficients from equation (1) estimated separately for younger women (Panel A: ages 22–35) and older women (Panel B: ages 36–44), scaled to represent the effect of a 10% increase in the female-to-male relative (potential) wage. Each column presents a different fertility outcome. Standard errors are clustered at the state level, and regressions are weighted by the female population in each cell. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Sources: IPUMS 1980–2000 decennial Censuses and the 2010 ACS.

Table 4: Heterogeneous Responses by Age and Education

	Ages 22–35	Ages 36–44
Panel A: Any Children		
Effect of 10% Increase in Rel. Wage x Low Skill	-0.025**	-0.056***
	(0.011)	(0.011)
Effect of 10% Increase in Rel. Wage x High Skill	-0.042***	-0.045**
	(0.013)	(0.018)
Obs	14,500	9,216
Mean Y - Low-Skill	0.695	0.778
Mean Y - High-Skill	0.469	0.749
Panel B: Number of Children		
Effect of 10% Increase in Rel. Wage x Low Skill	-0.265	-1.084***
	(0.322)	(0.360)
Effect of 10% Increase in Rel. Wage x High Skill	0.034	-0.609
	(0.374)	(0.583)
Obs	14,500	9,216
Mean Y - Low-Skill	1.463	1.747
Mean Y - High-Skill	0.858	1.573
Panel C: Age at First Birth		
Effect of 10% Increase in Rel. Wage x Low Skill	2.914***	8.490***
	(0.988)	(1.857)
Effect of 10% Increase in Rel. Wage x High Skill	-1.212	0.664
	(1.471)	(2.659)
Obs	14,215	9,141
Mean Y - Low-Skill	21.200	24.210
Mean Y - High-Skill	23.508	27.036

Notes: This table reports coefficients from equation (1) interacted with indicators for education and age, scaled to represent the effect of a 10% increase in the female-to-male relative (potential) wage. Outcomes include: (A) any children, (B) number of children, and (C) age at first birth. Each column presents estimates separately for women ages 22–35 and 36–44. Standard errors are clustered at the state level, and regressions are weighted by the female population in each cell. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Data sources: IPUMS 1980–2000 decennial Censuses and the 2010 ACS.

Table 5: Effects of Relative Potential Wages (F/M) on Fertility by Marital Status

	(1) Has At least One Child	(2) Avg No of Child Per Woman
A: Relative only, Singles		
Effect of 10% Increase in Rel. Wage	0.077***	1.508***
	(0.007)	(0.183)
B: Relative + Average, Singles		
Effect of 10% Increase in Rel. Wage	0.012	0.069
	(0.011)	(0.297)
Effect of 10% Increase in Avg. Wage	-0.129***	-2.852***
	(0.015)	(0.371)
Mean Y	0.270	0.493
Obs	21,675	21,675
C: Relative only, Married		
Effect of 10% Increase in Rel. Wage	-0.093***	-2.784***
	(0.003)	(0.141)
D: Relative + Average, Married		
Effect of 10% Increase in Rel. Wage	-0.048***	-1.260***
	(0.005)	(0.221)
Effect of 10% Increase in Avg. Wage	0.069***	2.323***
	(0.004)	(0.196)
Mean Y	0.772	1.620
Obs	23,348	23,348

Notes: This table reports coefficients from equation (1) estimated separately for single and married women to examine how the effects of relative potential wages vary by marital status. Coefficients are scaled to represent the effect of a 10% increase in the female-to-male relative (potential) wage. Each column presents a different fertility outcome. Standard errors are clustered at the state level, and regressions are weighted by the female population in each cell. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Data sources: IPUMS 1980–2000 decennial Censuses and the 2010 ACS.

Table 6: Heterogeneous Responses by Occupational Gender Dominance

	(1) Has At least One Child	(2) Avg No of Child Per Woman	(3) Avg Age at First Birth
Panel A: Female-Dominated Occupations			
Effect of 10% Increase in Rel. Wage	-0.030*	-0.795**	3.858***
	(0.016)	(0.357)	(0.901)
Mean Y	0.655	1.319	23.595
Obs	23,233	23,233	22,721
Panel B: Male-Dominated Occupations			
Effect of 10% Increase in Rel. Wage	-0.070***	-1.103***	4.399**
	(0.012)	(0.342)	(1.898)
Mean Y	0.582	1.151	23.774
Obs	21,599	21,599	20,303
Panel C: Gender-Neutral Occupations			
Effect of 10% Increase in Rel. Wage	-0.069***	-1.691***	6.031***
	(0.020)	(0.505)	(1.755)
Mean Y	0.600	1.175	23.917
Obs	21,036	21,036	19,690

Notes: This table reports coefficients from equation (1) estimated separately by occupational gender dominance, defined using 1980 occupational gender composition (Panel A: female-dominated, Panel B: male-dominated, Panel C: gender-neutral occupations). Coefficients are scaled to represent the effect of a 10% increase in the female-to-male relative (potential) wage. Each column presents a different fertility outcome. Standard errors are clustered at the state level, and regressions are weighted by the female population in each cell. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Data sources: IPUMS 1980–2000 decennial Censuses and the 2010 ACS.

Table 7: Effect of Female-to-Male Relative Wages on Time Use

	Market Work		Non-Market Work		Child Care	
	Women	Men	Women	Men	Women	Men
Relative Wage (F/M)	16.47***	-8.635**	-10.19***	-1.277	-3.918***	-1.470*
	(4.502)	(4.277)	(2.748)	(2.49)	(1.398)	(0.786)
Observations	100	100	100	100	100	100
R-squared	0.535	0.832	0.727	0.624	0.802	0.646

	Total Work Relative (F/M)	Leisure Relative (F/M)
Relative Wage (F/M)	0.328***	-0.131***
	(0.082)	(0.041)
Observations	100	100
R-squared	0.270	0.387

Notes: This table reports coefficients from regressions of weekly hours on the log female-to-male relative wage. Panel A shows effects separately for women and men in market work, nonmarket work, and child care. Panel B shows effects on relative (female-to-male) time use for total work and leisure. Total work is defined as market work + nonmarket work + child care. The unit of observation is a cell defined by five age groups (18–29, 30–39, 40–49, 50–59, 60–65), four education categories (less than high school, high school, some college, college or more), and five years (1965, 1975, 1985, 1993, 2003). All models include fixed effects for age group, education, and year. Standard errors are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Data sources: Aguiar and Hurst (2007); IPUMS 1960–2000 decennial Censuses.

Table 8: Effect of Relative Time Use (F/M) on Fertility Outcomes

	Has Child			Number of Children			Age at First Birth		
VARIABLES	All Ages	18-49 yrs	All Ages	All Ages	18-49 yrs	All Ages	All Ages	18-49 yrs	All Ages
Rel Market Work	-0.197***	-0.232***	-0.0454**	-0.710***	-0.939***	-0.201***	2.687**	2.100*	1.714***
	(0.064)	(0.068)	(0.0214)	(0.174)	(0.192)	(0.0708)	(1.229)	(1.124)	(0.434)
R^2	0.088	0.167	0.942	0.145	0.293	0.919	0.046	0.057	0.932
Rel Non-Market Work	0.149***	0.137**	0.0129	0.566***	0.662***	0.125	-1.125	-1.319	-0.660
	(0.0528)	(0.0623)	(0.024)	(0.144)	(0.178)	(0.080)	(1.025)	(0.992)	(0.511)
R^2	0.076	0.077	0.939	0.137	0.192	0.914	0.012	0.030	0.921
Rel Child Care	0.0327	-0.128***	-0.0159	0.127	-0.244	-0.0381	-2.674***	-3.516***	0.112
	(0.029)	(0.0468)	(0.0101)	(0.0825)	(0.148)	(0.0343)	(0.457)	(0.618)	(0.205)
R^2	0.013	0.114	0.938	0.025	0.044	0.912	0.269	0.358	0.923
Rel Total Work	-0.597***	-0.497*	-0.0439	-1.558***	-1.452	-0.0314	11.46***	7.028	1.873*
	(0.161)	(0.293)	(0.050)	(0.457)	(0.897)	(0.170)	(3.008)	(4.568)	(1.061)
R^2	0.124	0.047	0.939	0.106	0.043	0.912	0.129	0.039	0.923
Age FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
EDUC FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	No	No	Yes	No	No	Yes	No	No	Yes
Observations	100	60	100	100	60	100	100	60	100

Notes: This table reports coefficients from regressions of fertility outcomes on the log female-to-male ratio of time use (in weekly hours).Each column presents a different fertility outcome. Standard errors are reported in parentheses. All models are weighted and include the fixed effects indicated in the table. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Data sources: Aguiar and Hurst (2007); IPUMS 1960–2000 decennial Censuses.

Table 9: Effect of Relative Wage (F/M) on Time Use (Women Only)

VARIABLES	ESP	Leisure 2	Leisure 3	Child (Full)	Child (Play)
Relative Wage (F/M)	3.178**	8.300**	7.844**	-3.918***	0.955***
	(1.529)	(3.781)	(3.726)	(1.398)	(0.347)
Age FE	Yes	Yes	Yes	Yes	Yes
Education FE	Yes	Yes	Yes	Yes	Yes
Year FE	No	No	No	Yes	No
Observations	100	100	100	100	100
R^2	0.419	0.518	0.440	0.802	0.410

Notes: This table reports coefficients from regressions of women's weekly hours on the log female-to-male relative wage. ESP refers to eating, sleeping, and personal care. Leisure 2 includes time spent socializing, in passive leisure, in active leisure, volunteering, in pet care, gardening, and in eating, sleeping, and personal activities. Leisure 3 includes Leisure 2 plus time spent with children. Standard errors are reported in parentheses. All models are weighted and include the fixed effects indicated in the table. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Data sources: Aguiar and Hurst (2007); IPUMS 1960– 2000 decennial Censuses.

A Appendix

A.1 Illustrative Model, Assumptions, and Predictions

Marriage markets and wages. Marriage markets are indexed by $\mu \in \mathcal{M}$ (e.g., state $\times$ race $\times$ education). Each market μ at time t has potential wages for women and men, w_f and w_m, constructed externally using a Bartik-style approach. Define the relative potential wage

$$\Gamma \equiv \ln w_f - \ln w_m. \tag{4}$$

Throughout, consider a compensated change in Γ: a rise in Γ increases w_f and reduces w_m while holding average wages roughly fixed.

Choices. A woman i meets a potential partner j in market μ. If married, the couple chooses consumption $c \geq 0$, number of children $n \geq 0$, market hours $(t_m, t_f) \in (0, 1)$, and home hours $(h_m, h_f) \in (0, 1)$. Leisure for spouse $g \in \{m, f\}$ is $\ell_g = 1 - t_g - h_g$. If single, the same problem applies with $t_m = h_m = 0$. Time endowments are normalized to 1.

Child production (no marketization). Households cannot purchase childcare services. Women remain the primary provider of childcare time, and men can partially substitute. Let $\kappa \in (0, 1]$ measure paternal substitution (one hour of father time replaces κ hours of mother time), and let $\tau > 0$ denote the effective childcare requirement per child. Total requirement for n children is τn, met purely by parental home time:

$$h_f + \kappa h_m = \tau n. \tag{5}$$

Unit cost per child. Childcare is provided by the cheapest effective input. Given wages (w_f, w_m), the household chooses (h_f, h_m) to minimize the resource cost of producing the required effective childcare for one child. With no purchased input, the unit cost is

$$C(w_f, w_m) = \min\left\{ w_f,\ \frac{\alpha w_m}{\kappa} \right\}, \tag{6}$$

where $\alpha \in (0, 1]$ scales the contribution of spouse income and κ captures paternal time productivity.

Utility and preferences. Let bargaining weights (λ_f, λ_m) depend on Γ via $\lambda_f = \lambda_f(\Gamma)$ with $\lambda_f'(\Gamma) > 0$ and $\lambda_m = 1 - \lambda_f$. The household values children through $V(n)$ with $V(0) = 0$, $V'(n) > 0$, and $V''(n) < 0$. Allow a taste shifter $\Theta(\Gamma)$ on $V(n)$, where $\Theta'(\Gamma) \leq 0$. Per-period welfare is a weighted sum of spouse utilities:

$$U = \lambda_f(\Gamma)[u(c) - \Phi_f(\Gamma)h_f + v(\ell_f)] + \lambda_m(\Gamma)[u(c) - \Phi_m h_m + v(\ell_m)] + \Theta(\Gamma)V(n), \tag{7}$$

with $u' > 0$, $u'' < 0$.

Budget constraint. Income comes from each spouse's market work. Consumption is

$$c = w_f t_f + \alpha w_m t_m - C(w_f, w_m)\, n, \tag{8}$$

where the last term is total childcare expenditure. Time and wage normalization imply $t_g \in (0, 1)$.

Fertility choice. The household chooses n to maximize utility. The first-order condition equates marginal benefit and marginal cost of a birth:

$$\Theta(\Gamma)\, V'(n) \;=\; \mathcal{C}(w_f, w_m). \tag{9}$$

Remark (i). The time-allocation problem for (h_f, h_m) is nested inside the unit-cost problem. By the envelope theorem, the minimized unit cost $C(w_f, w_m)$ fully summarizes the marginal resource requirement of an additional child, so comparative statics for n can be derived from (9) without solving (h_f, h_m) explicitly.

Remark (ii). Because both spouses share the same subutility over consumption and leisure, the bargaining weights $\lambda_g(\Gamma)$ affect the fertility decision only indirectly. Changes in women's bargaining power $\lambda_f(\Gamma)$ influence fertility through the household's effective valuation of children, summarized by the taste shifter $\Theta(\Gamma)$. Hence, $\Theta(\Gamma)$ can be interpreted as capturing both direct preference changes and the endogenous impact of bargaining power on childbearing preferences.

Comparative Statics

Totally differentiate (9):

$$\Theta'(\Gamma)V'(n) + \Theta(\Gamma)V''(n)\,\frac{dn}{d\Gamma} \;=\; \frac{\partial C}{\partial \Gamma} \quad\Longrightarrow\quad \frac{dn}{d\Gamma} \;=\; \frac{\dfrac{\partial C}{\partial \Gamma} - \Theta'(\Gamma)V'(n)}{\Theta(\Gamma)V''(n)}. \tag{10}$$

Because $V''(n) < 0$ and $\Theta(\Gamma) > 0$,

$$\operatorname{sign}\left(\frac{dn}{d\Gamma}\right) = \operatorname{sign}\left(\Theta'(\Gamma)V'(n) - \frac{\partial C}{\partial \Gamma}\right).$$

Predictions

Prediction 1 (Opportunity cost). If mother time is marginal so that $C = w_f$, then under a compensated rise in Γ we have $\partial C/\partial\Gamma = dw_f/d\Gamma > 0$ and $\Theta'(\Gamma)V'(n) \leq 0$. From (10), $\frac{dn}{d\Gamma} < 0$: fertility falls when female relative wages rise.

Proof. Immediate from $\mathcal{C} = w_f$ and $dw_f/d\Gamma > 0$ in a compensated increase; with $V' > 0$, $V'' < 0$, the numerator in (10) is strictly positive (or larger than any weakly negative $\Theta' V'$), while the denominator is negative. □

Prediction 2 (Specialization breakdown). If the marginal input switches to father time (i.e., $\mathcal{C} = \alpha w_m/\kappa$), then

$$\frac{\partial C}{\partial\Gamma} = \frac{\alpha}{\kappa}\frac{dw_m}{d\Gamma} \; < \; 0. \tag{A.8}$$

The opportunity-cost component in (10) turns positive, which attenuates and can reverse the negative slope from Prediction 1.

Proof. With $dw_m/d\Gamma < 0$, we have $\partial\mathcal{C}/\partial\Gamma < 0$. In (**??**), the numerator $\partial\mathcal{C}/\partial\Gamma - \Theta' V'$ increases (becomes less positive or negative); since the denominator is negative, $\frac{dn}{d\Gamma}$ moves toward zero and can become ≥ 0. □

Prediction 3 (Bargaining and tastes). Holding costs fixed (i.e., $\partial\mathcal{C}/\partial\Gamma = 0$), and under the maintained assumptions that higher female relative wages increase women's bargaining weight ($\lambda_f'(\Gamma) > 0$) and tilt preferences toward fewer children ($\Theta'(\Gamma) \leq 0$),, then $\frac{dn}{d\Gamma} \leq 0$.

Proof. From (10) with $\partial\mathcal{C}/\partial\Gamma = 0$, $V'(n) > 0$, $\Theta'(\Gamma) \leq 0$, and denominator < 0. □

Prediction 4 (Marriage link). Let $M(\Gamma)$ be the share married. Aggregate fertility is

$$B(\Gamma) \; = \; M(\Gamma)\, n_M(\Gamma) + \big(1 - M(\Gamma)\big)\, n_S(\Gamma), \tag{11}$$

where n_M and n_S solve (9) using the relevant unit costs. For singles, $t_m = h_m = 0$, so the marginal childcare input is the mother and $C_S = w_f$. Then

$$\frac{dB}{d\Gamma} = M'(\Gamma)\left(n_M - n_S\right) + M(\Gamma)\frac{dn_M}{d\Gamma} + \big(1 - M(\Gamma)\big)\frac{dn_S}{d\Gamma}. \tag{12}$$

If $M'(\Gamma) \leq 0$ and $n_M > n_S$, the composition term $M'(\Gamma)\big(n_M - n_S\big)$ is negative, so the marriage margin amplifies within-status declines.

Remarks

(i) Prediction 1 is a pure pecuniary opportunity-cost result under a compensated increase in Γ. (ii) Prediction 2 captures specialization breakdown: as Γ rises, the marginal input can switch from mother to father, shrinking $\left|\partial C/\partial\Gamma\right|$ and attenuating the fertility response. (iii) Prediction 3 isolates the bargaining and taste channel through $\Theta'(\Gamma)$. (iv) Prediction 4 links the model to composition effects through marriage, with singles' marginal cost $C_S = w_f$.

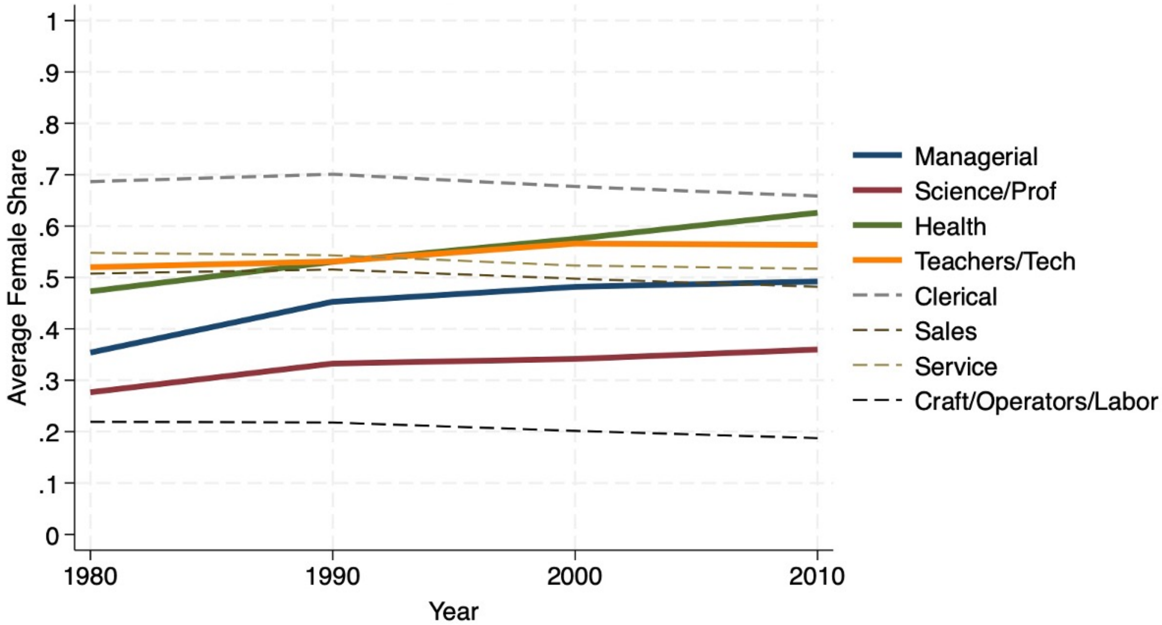
A.2 Further Tables and Figures

Table A1: Summary Statistics

	All		1980		2010	
	Mean	SD	Mean	SD	Mean	SD
White	0.75	0.43	0.82	0.39	0.67	0.47
Black	0.13	0.34	0.12	0.33	0.15	0.35
Hispanic	0.11	0.32	0.06	0.24	0.18	0.39
Ever Married	0.73	0.44	0.80	0.40	0.63	0.48
Never Married	0.27	0.44	0.20	0.40	0.37	0.48
Divorced	0.12	0.32	0.12	0.32	0.10	0.31
Has at least One Child	0.60	0.49	0.60	0.49	0.58	0.49
Avg No of Child Per Woman	1.18	1.23	1.24	1.30	1.14	1.23
Avg No of Child Per Mother	1.98	0.98	2.06	1.06	1.98	0.98
Single Mother	0.06	0.24	0.02	0.14	0.11	0.32
Age at First Birth	24.01	4.71	22.61	3.79	24.78	5.13
Years of Education	13.39	2.57	12.94	2.66	13.80	2.62
Employed	0.86	0.34	0.83	0.37	0.90	0.30
Weekly Hours	36.86	11.23	35.75	11.03	36.58	11.20
Weekly Earnings	451.62	772.24	185.82	230.18	653.43	679.06
Annual Earnings	19928.2	22965	7663.46	6113.5	30222.27	30517.6
Observations	5,088,955		1,318,402		304,221	

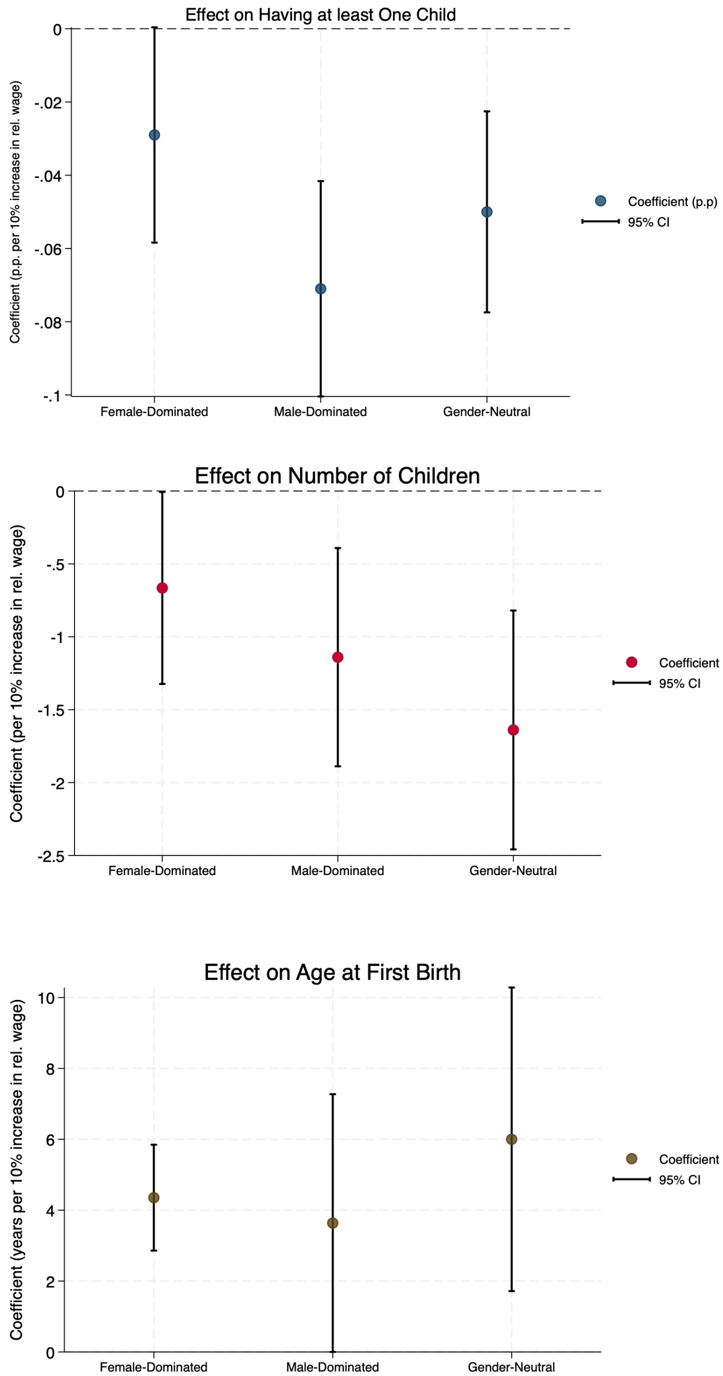
Notes: This table shows summary statistics for white non-Hispanic, Black Non-Hispanic, and Hispanic women ages 22–44. Statistics are weighted by census-provided weights. Data Source: IPUMS 1980– 2000 decennial Censuses and the 2010 ACS.

Figure A1: Trends in Female Share by OCC Group (1980-2010)



Note: his figure shows trends in the female share of employment by major occupational group between 1980 and 2010. Data sources: IPUMS 1980–2000 decennial Censuses and the 2010 ACS.

Figure A2: Heterogeneous Responses by Occupational Gender Dominance



Note: This figure reports coefficients from equation (1) estimated separately by occupational gender dominance, defined using pooled data from 1980–2020 occupational gender composition. Coefficients are scaled to represent the effect of a 10% increase in the female-to-male relative (potential) wage. Each panel presents a different fertility outcome: having at least one child, number of children, and age at first birth. Standard errors are clustered at the state level, and regressions are weighted by the female population in each cell. Data sources: IPUMS 1980–2000 decennial Censuses and the 2010 ACS.

Table A2: Average Weekly Hours Spent on Market Work, Nonmarket Work, and Child Care

	1965	1975	1985	1993	2003	Difference 2003–1965
Panel A: All						
Market Work	35.98	33.79	32.67	33.22	31.71	-4.27
Nonmarket Work	22.09	20.15	21.00	18.40	18.31	-3.78
Child Care	3.67	3.11	3.64	3.11	5.50	1.83
Total Work	61.74	57.05	57.31	54.73	55.53	-6.21
Sample Size	1854	1673	3168	5347	15091	
Panel B: Men						
Market Work	51.58	46.53	43.36	42.74	39.53	-12.05
Nonmarket Work	9.67	10.85	13.96	12.44	13.43	3.76
Child Care	1.44	1.40	1.66	1.47	3.24	1.80
Total Work	62.69	58.78	58.97	56.65	56.20	-6.49
Sample Size	833	756	1412	2483	6699	
Panel C: Women						
Market Work	22.45	22.74	23.41	24.97	24.93	2.48
Nonmarket Work	32.86	28.21	27.10	23.56	22.55	-10.31
Child Care	5.60	4.60	5.36	4.54	7.46	1.86
Total Work	60.91	55.55	55.87	53.06	54.94	-5.97
Sample Size	1021	917	1756	2864	8392	

Notes: This table reports average weekly hours spent on market work, nonmarket work, child care, and total work (work + nonmarket + child Care). The sample includes nonretired, nonstudent individuals ages 21–65 with complete time diaries (1440 minutes) and nonmissing information on age, education, and child presence. All surveys apply sample weights, except the 1965 survey, where respondents are weighted equally. Weights are adjusted to ensure uniform representation of days across the week. Data source: Aguiar and Hurst (2007).

A.3 Relative Potential Wage Construction Appendix

Tables A3 shows the 17 industry and 28 occupation groupings used to construct the relative potential wage measure. These groupings are taken directly from Shenhav (2021), who classifies occupations using broad IPUMS work-type categories and classifies industries similarly to Katz and Murphy (1992), with manufacturing disaggregated into three categories.

I also follow Shenhav (2021) in constructing hourly wage measures from the Census and CPS. Specifically, I drop all imputed wage observations. Top-coded annual earnings are multiplied by 1.5, and top-coded hourly wages are capped at annual earnings multiplied by 1.5 divided by 1400 hours. The final hourly wage is calculated as annual earnings divided by weeks worked times usual weekly hours. Wages are averaged using CPS sample weights multiplied by hours worked.

Table A3: Industry and Occupation Groupings

	Industry Groupings		**Occupation Groupings**
1.	Agriculture, forestry, and fishing	1.	Management
2.	Mining	2.	Engineers and scientists
3.	Construction	3.	Other technicians
4.	Low Tech Manufacturing	4.	Physicians/Nurses
5.	Basic Tech Manufacturing	5.	Health assistants
6.	High Tech Manufacturing	6.	Teachers and social workers
7.	Transportation	7.	Lawyers and judges
8.	Communication	8.	Entertainment
9.	Utilities	9.	Sales
10.	Wholesale Trade	10.	Administrative support
11.	Retail Trade	11.	Cleaning services
12.	Finance	12.	Other personal service
13.	Protective services	13.	Protective services
14.	Personal Services	14.	Food service
15.	Entertainment and Recreation	15.	Farm and forestry workers
16.	Professional Services	16.	Mechanical and electronic repair
17.	Public Administration	17.	Construction trades
		18.	Mining extraction
		19.	Metal or wood work or calibrators
		20.	Plant operator
		21.	Metal work operator
		22.	Textile work
		23.	Misc machine operator
		24.	Assemblers/fabricators
		25.	Vehicle operators
		26.	Construction, movers
		27.	Financial specialists
		28.	Management support

Source: Shenhav (2021).

A.4 Decomposition of the Relative Wage Effect on Fertility via Marriage

To assess whether changes in marriage patterns represent an important channel through which female-to-male relative wages affect fertility, I conduct a sequential regression decomposition. This analysis focuses on my main fertility outcome, the likelihood that a woman has at least one child, and uses the same specification as in the main model (Equation 1), with identical controls, fixed effects, weighting, and clustering.

Step 1: Total effect on fertility First, I estimate the baseline specification with "Has Child" as the dependent variable:

$$\text{HasChild}_{\mu ct} = \beta_1 \log\left(\frac{\hat{w}_{\mu\,\text{female},t}}{\hat{w}_{\mu\,\text{male},t}}\right) + \alpha_\mu + \delta_{rt} + \chi_{et} + \gamma_{st} + \xi_{ct} + \rho_{rs} \cdot t + X_{\mu t}\Phi + \nu_{\mu ct}$$

As shown in Column 1 of Table A4 (Same as Column 1 of Table 1), a 10% increase in relative wages reduces the likelihood of having at least one child by 4.4 percentage points.

Step 2: Effect on marriage Next, I estimate the impact of relative wages on the share of women who are married:

$$\text{Married}_{\mu ct} = \beta_2 \log\left(\frac{\hat{w}_{\mu\,\text{female},t}}{\hat{w}_{\mu\,\text{male},t}}\right) + \alpha_\mu + \delta_{rt} + \chi_{et} + \gamma_{st} + \xi_{ct} + \rho_{rs} \cdot t + X_{\mu t}\Phi + \nu_{\mu ct}$$

Column 2 of Table A4 shows that a 10 percent increase in relative wages decreases marriage rates by 5.1 percentage points. This confirms that relative wage growth is associated with sizable declines in marriage.

Step 3: Marriage–fertility link I then estimate the association between marriage rates and fertility, excluding relative wages:

$$\text{HasChild}_{\mu ct} = \beta_3\, \text{Married}_{\mu ct} + \alpha_\mu + \delta_{rt} + \chi_{et} + \gamma_{st} + \xi_{ct} + \rho_{rs} \cdot t + X_{\mu t}\Phi + \nu_{\mu ct}$$

Column (3) of Table A4 shows that a 10 percentage-point increase in marriage rates is associated with a 5.5 percentage-point increase in the probability of having a child. Combining these coefficients, the indirect effect of relative wages on fertility through marriage is $\beta_2 \times \beta_3 = -0.028$, which accounts for roughly 64% of the total effect in Step 1 (β_1).

Table A4: Decomposition of the Relative Wage Effect on Fertility via Marriage

	(1) Has Child	(2) Married	(3) Has Child	(4) Has Child
Relative Wage	-0.044***	-0.051***		-0.015*
	(0.012)	(0.014)		(0.008)
Marriage Rate			0.055***	0.056***
			(0.003)	(0.003)
Observations	23,716	23,543	25,190	23,543
R^2	0.841	0.865	0.875	0.877

Notes: This table shows a sequential regression decomposition estimating how much of the fertility effect of female-to-male relative wages operates through marriage rates. Columns (1)–(3) estimate the total wage effect, the wage effect on marriage, and the association between marriage and fertility. Column (4) includes both marriage rates and wages in the fertility regression. All models use the full set of controls and fixed effects described in Equation 1. Standard errors are clustered at the state level, and regressions are weighted by the female population in each cell. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Data Source: IPUMS 1980–2000 decennial Censuses and the 2010 ACS.

Alternative Specification (Descriptive) As a robustness check, I also estimate a regression that includes both marriage rates and relative wages as covariates in the fertility equation. This setup mirrors the structure of formal mediation models, allowing the coefficient on marriage rates to be interpreted as the direct association with fertility after controlling for wages. The main purpose of this exercise is to assess how the coefficient on relative wages changes when marriage is added to the model. So, I re-estimate Step 3 including both variables:

$$\text{HasChild}_{\mu ct} = \beta_3 \cdot \text{Married}_{\mu ct} + \beta_4 \cdot \log\left(\frac{\hat{w}_{\mu\,\text{female},t}}{\hat{w}_{\mu\,\text{male},t}}\right) + \alpha_\mu + \delta_{rt} + \chi_{et} + \gamma_{st} + \xi_{ct} + \rho_{rs} \cdot t + X_{\mu t}\Phi + \nu_{\mu ct}$$

In this version, as shown in column 4 of Table A4, the marriage coefficient remains large and highly significant (5.6 p.p.), while the wage coefficient falls in magnitude to –1.5 p.p. and is only marginally significant. This pattern is consistent with marriage capturing a substantial share of the wage–fertility relationship. However, because marriage rates are themselves endogenous, β_3 here should not be interpreted as a causal estimate.

Multiplying the marriage effect of relative wages (β_2) by the fertility effect of marriage (β_3) gives an indirect effect of about -0.028, implying that roughly two-thirds of the total fertility response to relative wages operates through changes in marriage rates. When marriage rates are included directly in the fertility regression alongside relative wages, the coefficient on relative wages drops from -0.044 to -0.015, highlighting marriage as a major channel linking wages to fertility. While this specification resembles a formal mediation framework, interpreting β_3 as causal requires strong exogeneity of marriage or an additional instrument.