The Dynamics of Fertility, Bargaining, and Human Capital Accumulation

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Abstract

This paper studies how intra-household bargaining shapes fertility and female labor supply. Exploiting the relaxation of One-Child Policy in China, I show that couples with misaligned fertility preferences exhibit smaller fertility responses and higher divorce rates than couples who agree in the post-reform years. Divorce is concentrated among households where husbands have stronger fertility preferences and wives have stronger outside options. To understand the underlying bargaining mechanisms, I develop a quantitative life-cycle model with endogenous marriage, fertility, and labor supply under a limited-commitment framework. The model reveals a tradeoff between women's bargaining power and fertility: women with low fertility preferences strategically delay marriage and childbirth to accumulate human capital and strengthen their bargaining positions. Counterfactual analysis shows that eliminating commitment frictions would raise their completed fertility by 4.06% and increase marriage rates by 2.12%. Finally, childcare transfers targeted at divorced mothers generate sizable fertility responses among married couples, highlighting the importance of strengthening women's outside options when designing effective fertility policies.

Keywords: fertility, bargaining power, marriage and divorce, female labor supply, human capital

JEL Codes: D13, J13, J16

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1 Introduction

The global decline in fertility rates has attracted intense research attention (Doepke, Hannusch, Kindermann, and Tertilt, 2023). Yet, one of its most fundamental determinants remains largely unexplored: the role of intra-household bargaining. Childbearing imposes asymmetric costs on wives and husbands, generating systematic disagreements over fertility within couples (Doepke and Kindermann, 2019). At the same time, women's decision power and female autonomy have been rising (Goldin, 2025, Tertilt, Doepke, Hannusch, and Montenbruck, 2022), with direct consequences for how these disagreements are resolved. Crucially, women's wages and outside options are themselves endogenous to prior fertility decisions, so the household's balance of bargaining power evolves over the life cycle and feeds back into subsequent birth decisions. However, this feedback loop, bargaining shapes fertility, fertility shapes bargaining, has not been studied within a unified framework.

This paper investigates how intra-household bargaining shapes fertility and female labor supply over the life cycle. I develop a quantitative life-cycle model featuring endogenous birth timing, completed fertility, marriage and divorce, and labor supply under a limited-commitment framework, where the division of marital surplus depends on both partners' outside options as singles. A central innovation of the model is the evolution of women's bargaining positions following childbirth: parenthood reduces women's labor supply and wages, weakening their outside options relative to their spouses and altering their bargaining power within marriage. By incorporating endogenous human capital accumulation through working, the model captures how child penalties translate into shifts in bargaining positions over the life cycle, and how these shifts feed back into future negotiations and marital stability. Counterfactual results highlight the quantitative importance of these dynamics: for women with low fertility preferences, moving from limited to full commitment, where couples can fully compensate one another for the asymmetric costs and benefits of childbearing, raises completed fertility by 4 percent and the marriage rate by 2 percent. Policies that strengthen women's outside options can therefore have important fertility effects.

The relationship between bargaining power and fertility runs in both directions. On one side, bargaining power shapes fertility decisions. Couples may disagree over birth timing because childbearing requires women to forgo earnings growth during the early and mid-career stages (Melentyeva and Riedel, 2025). In addition, spouses often want different numbers of children, and these disagreements affect realized fertility outcomes (Doepke and Tertilt, 2018). When partners disagree, the one with stronger bargaining power can shift birth decisions in their favor. Bargaining, therefore, determines not only whether and when a child is born, but also how the costs and benefits of childbearing are allocated within the household. On the other side, having children weakens women's bargaining positions. After the birth of a first child, women experience substantial and persistent declines in employment and earnings, as well as lasting wage losses (Kleven, Landais, and Leite-Mariante, 2024). Since wages are a key de-

terminant of outside options in marriage (Theloudis, Velilla, Chiappori, Giménez-Nadal, and Molina, 2025), the widening gender wage gap shifts the balance of bargaining power in favor of husbands. Women who anticipate this deterioration may therefore delay or avoid having children altogether, putting further downward pressure on fertility.

To assess whether limited-commitment frictions arise in practice and how women's bargaining positions matter for fertility decisions, the first part of the paper provides empirical evidence on how couples negotiate birth decisions when their fertility preferences differ. To address the endogeneity concern that women with stronger fertility preferences may self-select into weaker bargaining positions, I exploit the relaxation of China's One-Child Policy in 2016 as an exogenous shock to fertility constraints. The data is from the China Family Panel Studies (CFPS, 2010-2020). Specifically, I focus on couples formed before the policy reform, so that matching in fertility preferences is predetermined, while heterogeneity in women's labor market outcomes generates variation in bargaining power within marriage. Using an event-study approach, I find that after the policy, couples with misaligned fertility preferences had 0.12 fewer children and divorce rates that were 1.6 percentage points higher than those of couples with aligned preferences. This divorce effect is primarily driven by households where husbands hold stronger fertility preferences and wives hold stronger outside options. Since the policy expanded the feasible fertility set and thus the Pareto frontier for households, the divorce response is inefficient and represents a key margin through which limited-commitment frictions manifest.

Motivated by these findings, the paper develops a quantitative life-cycle collective model of endogenous marriage, fertility, and female labor supply under limited commitment. In the model, married couples make cooperative decisions, and women's bargaining power, also known as the Pareto weight, is defined as their degree of influence over household decision-making (Jayachandran and Voena, 2026). Due to limited commitment, the division of marital surplus depends on both partners' outside options (Mazzocco, 2007, Voena, 2015).[1]

Specifically, women's bargaining power evolves endogenously over the life cycle through two channels: the initial sorting of couples and the dynamic renegotiation process within marriage (Lise and Yamada, 2019). First, at the time of marriage, individual bargaining power depends on each partner's characteristics, including education and fertility preferences. I introduce heterogeneity along these dimensions so that women self-select into different career and family trajectories based on their returns to human capital and their tastes for children, thereby generating variation in initial bargaining weights. Second, during marriage, individual bargaining power is updated as each partner's outside option evolves, with wages being the key determinant. Higher wages improve women's outside options, increasing the share of marital surplus they can claim when entering marriage and making it easier for them to exit the

[1]Importantly, the collective model in which the Pareto weight μ_t evolves under limited commitment is consistent with the repeated Nash bargaining framework (Ciscato, 2024). Changes in the Pareto weight reflect either shifts in the Nash bargaining parameter or changes in outside options.

marriage or renegotiate intra-household allocations.

In the model, wages depend on the stock of human capital, which accumulates through work experience and depreciates during career interruptions (Adda, Dustmann, and Stevens, 2017, Blundell, Costa Dias, Meghir, and Shaw, 2016). Human capital depreciation is therefore the central mechanism through which fertility shapes women's bargaining positions. The key innovation here is to link earnings dynamics directly to bargaining outcomes: career interruptions following childbirth and time devoted to home production reduce women's future earning potential and weaken their outside options. The deterioration of their outside options weakens their ability to credibly threaten exit and restricts women's ability to leave unsatisfactory marriages (Kureishi, Paule-Paludkiewicz, Tsujiyama, and Wakabayashi, 2025). Therefore, women face a new intertemporal trade-off: time devoted to childbearing today reduces bargaining positions tomorrow. Women must therefore weigh the utility of children against the long-run cost of a weaker position within marriage. Ignoring this trade-off understates the extent to which childbearing reinforces gender inequality within the household.

I estimate the model using the method of simulated moments, targeting moments from the pre-reform period in China (2010-2014). I then assess external validity by examining whether the model can match key untargeted moments. The model successfully replicates the fertility and divorce responses to the policy shock, with magnitudes quantitatively consistent with the reduced-form estimates. It also closely matches the observed decline in female labor supply around the first birth. Therefore, in the final part of the paper, I use the model to conduct three sets of counterfactual analyses.

To evaluate the long-run effects of a permanent relaxation of fertility constraints, I consider women who face a one-child restriction in the baseline and are then allowed to have up to two children from the beginning of their reproductive period. By expanding women's feasible fertility sets and reshaping their expectations, the reform affects the timing of marriage and childbearing, human capital accumulation, and bargaining positions within the household, with effects that vary systematically across women with different fertility preferences. Women with high fertility preferences accelerate marriage and childbearing, but do so at the cost of weaker bargaining positions and lower lifetime labor market attachment. Women with low fertility preferences, by contrast, postpone family formation and invest more in human capital in order to strengthen their bargaining positions within marriage. As a result, the permanent relaxation of fertility constraints intensifies the tradeoff between early childbearing with weaker bargaining power and delayed fertility with stronger bargaining power. By considering both short-term divorce responses and long-term marriage adjustments, this paper is the first to capture how the fertility policy reshapes household composition.

To quantify the role of bargaining frictions in shaping fertility choices over the life cycle, I compare long-run fertility and marital stability in the limited-commitment model against two alternative scenarios. The first assumes full commitment within marriage, eliminating bargaining frictions entirely. The second assigns full child custody to mothers following divorce,

making the financial and childcare burdens heavier for mothers, reducing the value of being single, and thus amplifying bargaining frictions. For women with low fertility preferences, full commitment raises completed fertility by 4.1%, as compensating transfers allow couples to internalize child-rearing costs without being constrained by how they are distributed between spouses. In contrast, assigning full child custody to mothers weakens women's outside options and exacerbates bargaining frictions, reducing fertility by 1.2%. These two scenarios have important implications for marital stability: full commitment increases marriage rates by 2.1% by eliminating inefficient divorce, while full maternal child custody reduces marriage rates by 6.5%, as women are more reluctant to enter marriage due to lower bargaining positions.

Finally, to examine how policies can simultaneously empower women and raise fertility, I simulate three policy experiments: a job-protection policy, a universal pronatalist transfer, and a childcare transfer targeted at divorced mothers. For women with low fertility preferences, job protection substantially improves working hours and wages but has little impact on fertility. This indicates that labor market policies alone are insufficient to generate sizable fertility responses, despite their effectiveness at improving women's bargaining positions by improving their labor market outcomes. By contrast, pronatalist transfers modestly raise fertility by 1.4% but reduce women's working hours by 2.6% and exacerbate intra-household inequality by increasing their unpaid home production. The largest fertility response arises from childcare transfers targeted at divorced mothers. This policy increases completed fertility by 4.1% while reducing women's home production hours relative to their husbands' by 0.9%. Given that the divorce rate in the CFPS sample was only 1.5% in 2014, the targeted sample is small, while it affects a much broader population by raising the value of being single for mothers. By strengthening women's outside options, it mitigates bargaining frictions within marriage and generates a higher fertility response at a relatively low fiscal cost. These results highlight the importance of addressing bargaining frictions directly when designing fertility-promoting policies.

The remainder of the paper is organized as follows. Section 2 discusses the related literature. Section 3 provides the empirical evidence. Section 4 develops the life-cycle model. Section 5 discusses estimation and Section 6 analyzes validation. Section 7 studies the counterfactual analysis. Section 8 concludes.

2 Related Literature

This paper contributes to three streams of literature. First, it contributes to the growing literature on fertility decisions under limited commitment. Doepke and Kindermann (2019) shows that fertility can be depressed when mothers bear a disproportionate share of childcare responsibilities, reducing their outside options and preventing couples from reaching mutually beneficial fertility agreements. This paper builds on these insights and extends them in three ways. First, in their framework, wages are unaffected by childbearing, and the asymmetry between the wife's and husband's outside options stems from fixed default cost shares determined by traditional gender roles or environmental factors. I show that a further source of asymmetry

arises from diverging labor market performance within couples: as wives' wages fall relative to their husbands' following childbirth, their outside options weaken endogenously. Second, in their framework, outside options reflect a non-cooperative equilibrium within a continuing relationship, whereas in my model, they are determined by the value of divorce, which allows me to analyze how bargaining positions affect not only fertility rates but also household formation and dissolution. Third, by endogenizing outside options, which are shaped by past fertility and labor supply choices and influencing future outcomes, the model shows that fertility need not be blocked even when wives bear a disproportionate share of childcare costs, as long as they can secure their bargaining positions sufficiently to claim a larger share of the marital surplus.

Relatedly, Doepke and Kindermann (2024) shows that women can reduce the marginal child penalty by purchasing market childcare, thereby alleviating bargaining frictions and raising fertility. In my model, the marginal child penalty is also endogenous, but through a different channel: women's bargaining power within marriage, which determines how much of the childcare burden is shifted to husbands.

Second, this paper contributes to the literature on collective household models. The collective approach was developed by Chiappori (1988, 1992), and more recent work has found strong evidence in favor of limited commitment, rejecting both full commitment and no commitment (Theloudis, Velilla, Chiappori, Giménez-Nadal, and Molina, 2025). Previous studies emphasize that the inability to commit to post-divorce allocations can limit household specialization and generate inefficient outcomes (Lafortune and Low, 2023, Mazzocco, Ruiz, and Yamaguchi, 2014, Reynoso, 2024). In particular, Lafortune and Low (2023) show that investment in public goods reduces individual human capital and thus creates inefficiencies through divorce risk. In dynamic collective model settings, intertemporal choices are often modeled with fertility treated as exogenous (Bronson, 2019, Bronson, Haanwinckel, and Mazzocco, 2024, Foerster, 2024, Low, Meghir, Pistaferri, and Voena, 2025). I extend this literature by endogenizing fertility decisions through intra-household bargaining, and by showing that fertility adjustments occur through the divorce margin, a mechanism largely absent in previous work. The analysis also highlights the tradeoff between strengthening women's bargaining power and achieving higher fertility.

Third, this paper contributes to the literature on life-cycle models where fertility and female labor supply are jointly determined. While existing studies examine the human capital and labor market consequences of childbirth, they largely abstract from the implications for intra-household bargaining (Adda, Dustmann, and Stevens, 2017, Bang, 2022, Bick, 2016, Cruces and Rodrıguez-Roman, 2025, Eckstein, Keane, and Lifshitz, 2019, Francesconi, 2002, Guner, Kaya, and Sánchez-Marcos, 2024, Wang, 2022, Yamaguchi, 2019). The bargaining mechanism is essential for understanding the interaction between rising female labor force participation and declining fertility and implies that policies that strengthen women's outside options can substantially reduce bargaining frictions and generate large fertility responses over the life cycle.

The studies in this literature closest to mine are Jakobsen, Jørgensen, and Low (2024) and

Cruces and Rodrıguez-Roman (2025). Specifically, Jakobsen, Jørgensen, and Low (2024) examine the feedback mechanisms between fertility and labor supply, showing that fertility adjustments amplify women's labor supply elasticities through a "fertility multiplier" channel. I build on their framework by adding that this feedback operates through an additional channel: intra-household bargaining. In their model, the household acts as a unitary agent with fixed bargaining weights; in mine, bargaining weights are endogenous and respond to wages and outside options. Cruces and Rodrıguez-Roman (2025) study how financial incentives shape fertility in both the short and long run, calibrating a rich life-cycle model to Spain's 2007 baby check. An important feature of their framework is that women are modeled as the sole decision-makers, and heterogeneity in desired fertility is incorporated at the individual level using survey data. I depart from this in two respects. First, I allow for preference heterogeneity within the couple, and explicitly model how such intra-household conflicts are resolved and how the resulting compromise shapes realized fertility outcomes. Second, financial incentives such as cash transfers also shift the intra-household balance of power, and can therefore affect fertility even when female desired fertility remains unchanged.

3 Empirical Evidence

In this section, I provide empirical evidence on how couples negotiate birth decisions based on their fertility preferences and bargaining positions within the household. To address the endogeneity concern that women with stronger fertility preferences may self-select into weaker bargaining positions, I exploit the relaxation of China's One-Child Policy as an exogenous shock to fertility constraints. The One-Child Policy was one of the largest family planning policies in China, restricting households to a single child. It was fully abolished in 2016, allowing all married couples to have a second child, and affected a substantial share of married couples in China.[2] Since the reform was universal, the goal is not to identify its overall causal effect, but rather to examine differential policy responses between couples who agree and those who disagree on fertility preferences.

The data is from the China Family Panel Studies (CFPS, 2010-2020), which provides rich information on individuals' marriage and fertility histories, labor market outcomes, and stated fertility preferences. I restrict the sample to already-formed couples prior to the reform, as these households were affected by the policy while their pre-existing bargaining arrangements remained unchanged. More details on data, sample restrictions, and variable construction are described in Appendix A.1. In the pre-reform wave (2014), respondents are asked: *"Without considering any policy restrictions, how many children do you consider ideal?"* I use responses to this question to measure individuals' fertility preferences, defined as the ideal number of children they desire. Importantly, both wives and husbands answer this question, allowing me to assess whether fertility preferences are aligned within couples.

Using the event-study approach, I compare households with misaligned preferences (treat-

[2]The institutional background and policy details are provided in Appendix A.3.

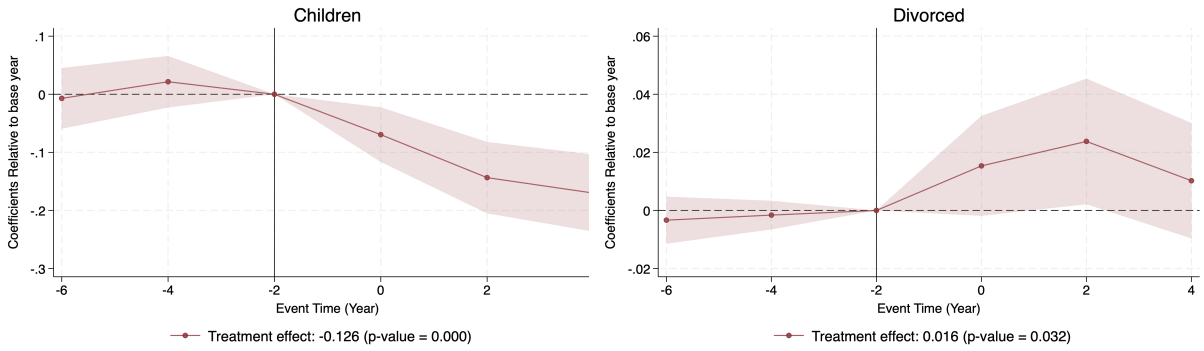
ment group) to those with aligned fertility preferences (control group) and estimate:

$$Y_{it} = \sum_{t \neq 2014} \eta_t \alpha_t + \sum_{t \neq 2014} \gamma_t (\alpha_t \times Treat_i) + \alpha_i + \alpha_A + \nu_{it} \tag{1}$$

where α_t are year fixed effects, with 2014 serving as the reference period so that each η_t captures the mean outcome at time t relative to 2014. γ_t are time-varying treatment effects that capture how the outcomes of households with misaligned preferences evolve relative to those with aligned preferences following the reform. α_A denotes women's age-group fixed effects, which flexibly account for age-specific life-cycle patterns,[3] and α_i are household fixed effects.

Figure 1 presents the event study results. Following the 2016 policy relaxation, households with misaligned fertility preferences exhibit smaller fertility responses than those with aligned preferences.[4] Furthermore, divorce rates increase significantly by 1.6 percentage points in households with misaligned preferences. Given that the average divorce rate was 1.55% in 2014, this represents a quantitatively large effect. Furthermore, the pre-2014 coefficients are statistically insignificant and fluctuate around zero with no discernible trend, supporting the parallel trends assumption.

The divorce outcomes account for the possibility of remarriage. As shown in Appendix B.2, remarriage rates do not differ significantly following the policy for couples with misaligned preferences compared to the control group, in both the male and female samples. Moreover, fewer than 30% of divorced individuals in the sample remarry. I therefore abstract from remarriage in the subsequent analysis.



(a) Children (b) Divorce

Figure 1: Policy Effects on Fertility and Divorce

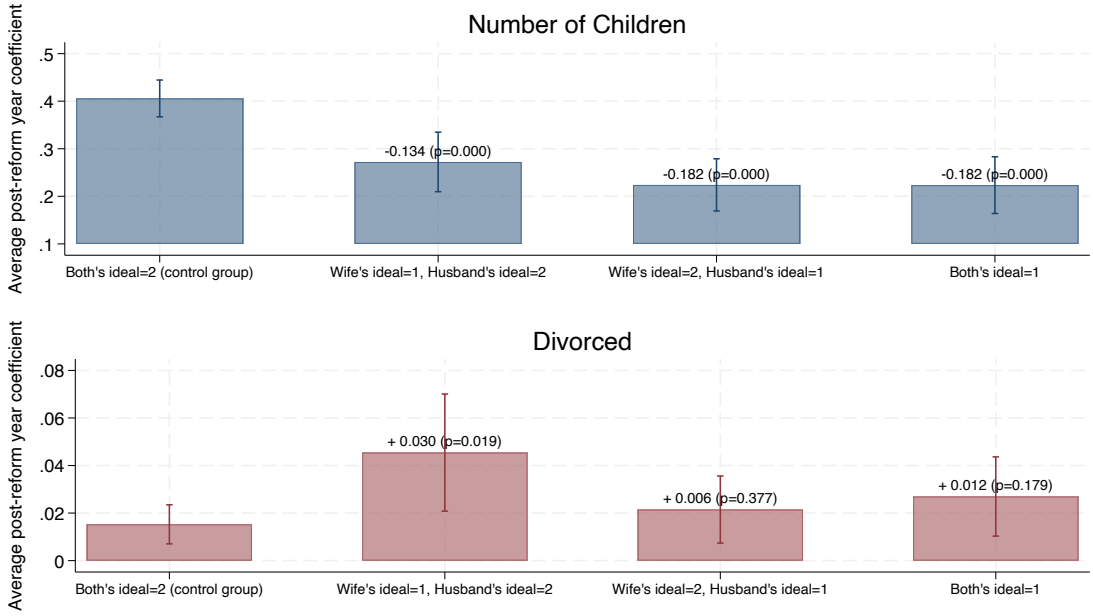
Next, to examine whose fertility preferences prevail when couples disagree, I further classify households into four groups based on each spouse's reported ideal number of children. Specifically, a household is classified by whether each spouse ideally wants one child or two children: (i) only the husband wants a second child (husband's ideal = 2, wife's ideal = 1); (ii)

[3] Age groups are defined in five-year intervals: [18, 23], [24, 29], [30, 35], [36, 41], and [42, 47].

[4] Appendix B.1 shows that the fertility responses for both household types are positive.

only the wife wants a second child (husband's ideal = 1, wife's ideal = 2); (iii) neither partner wants a second child (both ideals = 1); and (iv) both partners want a second child (both ideals = 2). Groups (i) and (ii) represent households where spouses disagree on fertility, while groups (iii) and (iv) represent households where spouses agree.[5] Following the same event study design in equation (1), I use households where both partners want a second child as the control group and estimate differential policy effects for the remaining three household types.

Figure 2 reports the average post-policy coefficients for each group relative to the base year 2014. First, the households, where both partners want a second child, exhibit the largest fertility increase and smallest divorce response, capturing both the direct policy effect and broader contemporaneous trends. Second, whenever at least one spouse does not want a second child, the fertility response is significantly smaller. Third, divorce responses display a strong asymmetry: rates are significantly higher only when the husband wants a second child but the wife does not, while households where only the wife wants a second child show no significant difference. Consequently, the post-policy rise in divorce is primarily driven by households in which the husband's desired fertility exceeds the wife's.



Note: The average post-reform treatment effect (relative to the control group) is reported above the bars.

Figure 2: Heterogenous Polciy Effects: By Couples' Fertility Preferences

Finally, to examine how women's bargaining positions affects divorce outcomes, I consider three proxies. The first proxy is the wife's educational attainment, which captures persistent heterogeneity in women's earnings potential over the life cycle. Women are divided into two groups: those with a high school education or above, and those without. The second is the

[5] As shown in Appendix Figure A.2, most couples are in agreement: approximately 57% report that both spouses ideally want at least two children. However, disagreement is also common. In 13% of households, the husband wants at least two children while the wife is content with one; in 12% of households, the reverse holds, with the wife wants at least two children while the husband prefers only one.

	Dependent variable: Divorce					
	By Wife's Education		By Wife's Hourly Wage		By Wife-Husband Income Ratio	
	(1)	(2)	(3)	(4)	(5)	(6)
	Low	High	Low	High	Low	High
(1) Post-Policy × (Wife ideal = 1, Husband ideal = 2)	0.023	0.043*	0.028*	0.047*	0.025	0.067**
	(0.016)	(0.022)	(0.016)	(0.028)	(0.019)	(0.032)
(2) Post-Policy × (Wife ideal = 2, Husband ideal = 1)	0.006	0.009	0.017	-0.003	0.005	0.005
	(0.011)	(0.008)	(0.014)	(0.007)	(0.009)	(0.009)
(3) Post-Policy × (Both ideal = 1)	0.013	0.004	0.010	0.002	0.016	-0.006
	(0.014)	(0.011)	(0.013)	(0.015)	(0.014)	(0.004)
Household fixed effects	✓	✓	✓	✓	✓	✓
Wife's Age Group fixed effects	✓	✓	✓	✓	✓	✓
Year fixed effects	✓	✓	✓	✓	✓	✓
Pre-policy mean	0.010	0.011	0.009	0.014	0.004	0.001
p-value: (1)-(2)	0.363	0.156	0.625	0.077	0.338	0.057
Observations	3960	3305	3130	2613	4053	1731
R-Square	0.300	0.317	0.298	0.341	0.301	0.304

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 1: Heterogeneous Effects on Divorce by Wife's Bargaining Power

wife's pre-reform hourly wage, split at the sample mean, reflecting differences in outside options. The third proxy is the wife's pre-reform annual income relative to her husband's. Since bargaining power is determined not only by absolute wages but also by the share of household income contributed by each spouse, a higher income ratio indicates a stronger bargaining position for the wife (Basu, 2006). In each case, I split the sample into low and high subgroups and estimate the differential post-policy divorce effect for each household type relative to the control group (both partners' ideal = 2).

Table 1 reports the divorce results. The divorce response is concentrated in households in which the husband wants a second child but the wife does not (row 1). Across all three bargaining power proxies, the coefficients are statistically significant and larger in magnitude in the high subgroups, while the corresponding low subgroup coefficients are mostly insignificant. This suggests that wives with stronger outside options are more likely to divorce when couples face fertility-related conflicts. The corresponding fertility results are reported in Appendix 7.

Summary of empirical patterns To summarize, I document three key empirical patterns:

1. Couples with misaligned fertility preferences exhibit smaller fertility responses and higher divorce rates following the policy relaxation, relative to couples with aligned preferences.

2. The divorce response is asymmetric: it is driven entirely by households where the husband desires a second child but the wife does not, while households where only the wife desires a second child show no significant divorce response.

3. Among households where only the husband desires a second child, divorce is significantly more likely when the wife has stronger outside options.

First, the divorce response is an unintended consequence of the reform. In principle, couples could remain together without changing their fertility choices, yet some respond by divorcing. Since the policy relaxed the fertility constraint and potentially expanded the Pareto frontier for

households where at least one partner desires another child, the observed divorce response is inefficient and represents a key margin through which limited-commitment frictions manifest.

Second, the asymmetric divorce response suggests that both disagreement in fertility preferences and the asymmetric costs of childbearing between spouses are equally important.[6] When the husband has stronger fertility preferences than the wife, she faces dual pressures: the prospect of an unwanted birth and a further deterioration in her labor market position. The gains from marriage therefore decrease, her participation constraint becomes binding, and she prefers the outside option. In contrast, when the wife desires more children than the husband, divorce rates do not rise significantly. In this case, achieving her desired fertility raises the wife's utility and partially offsets the unequal costs of childbearing borne by mothers, making marital dissolution less likely.

Finally, women with stronger outside options are both more willing and more able to exit the marriage following unfavorable fertility negotiations, which explains why the divorce response is concentrated among wives with higher bargaining positions. To understand how limited commitment and intra-household bargaining jointly shape marriage, fertility, and labor supply over the life cycle, the next section develops a quantitative life-cycle model.

4 Model

This section presents a life-cycle collective model that incorporates endogenous marriage and divorce, labor supply, fertility choices, and home production.

In the model, time is discrete and the framework is partial equilibrium. All individuals enter the model at age T_0 and retire at age T_R. Each individual is endowed with a set of exogenous traits, including education and fertility preferences. Both traits are binary (high or low) and remain fixed over time. At the beginning of each period t, individual $j \in \{w, m\}$ may be unmarried, married, or divorced. Married couples make cooperative decisions over fertility, consumption, and the allocation of time between market work, leisure, and home production activities, such as childcare and housework. They also decide whether to divorce based on changes in their outside options and shocks to marital quality. Under limited commitment, Pareto weight is updated through negotiation, and divorce occurs only if reallocation cannot render marriage preferable to singlehood. Unmarried individuals in each period t are randomly matched with a potential partner, observe their characteristics and marriage quality shocks, and mutually decide whether to marry. If they marry, initial bargaining power is determined via Nash bargaining. Retirement occurs exogenously at T_R, and optimization during retirement is described in Appendix C.1.

[6] By asymmetric costs we mean that women bear a disproportionate share of childbearing costs. Appendix B.4 examines the labor market consequences of the first birth for both women and men. Women experience substantially larger declines in employment, wages, working hours, and earnings following childbirth than men in China.

4.1 Preferences and Technology

Preferences Individual j derives flow utility from consumption c_t, leisure ℓ_{jt}, public good Q_t and the number of children n_t:

$$u^j(c_t, \ell_{jt}, Q_t, n_t) = \frac{(c_t/\Lambda(n_t))^{1-\sigma_C}}{1-\sigma_C} + \alpha_\ell \cdot \frac{(\ell_{jt})^{1-\sigma_\ell}}{1-\sigma_\ell} + \alpha_Q(\kappa_t) \cdot log(Q_t) - \alpha_n \cdot (n_t - I_j)^2$$

Individuals derive utility from consumption adjusted by the household equivalence scale $\Lambda(n_t)$ and have preferences for leisure α_ℓ. Children enter utility through three terms: first, the number of children affects the household consumption levels; Second, children affects individuals' preference for public goods $\alpha_Q(\kappa_t)$, which changes with the age of the youngest child κ_t.The arrival of children increases the value of time spent in home production, and the public good includes the welfare of children (Reynoso, 2024). Third, individuals have disutility α_n if the realized number of children n_t deviates from their intrinsic fertility preference I_j. A couple may want a child because they value the time spent with children or because the existence of children satisfies their fertility preference.

Home production function The household public good Q_t of married couples is produced by the time allocated to home production by the wife and husband, q_{wt} and q_{mt}, respectively, using a constant elasticity of substitution (CES) technology:

$$Q_t = (\pi_w q_{wt}^\rho + \pi_m q_{mt}^\rho)^{\frac{1}{\rho}}, \tag{2}$$

where π_w reflects the relative productivity of the wife in home production.[7] The parameter ρ determines the degree of complementarity between spouses' time inputs.

The household public good Q_t of singles is produced by their own home hours q_{jt}:

$$Q_t = \pi_j q_{jt} \tag{3}$$

For women, labor supply choices are discrete: non-participation, part-time work, and full-time work, $h_{wt} \in= \{h_{wt}^U, h_{wt}^P, h_{wt}^F\}$. Men always work full-time. The time constraint for individual $j \in \{w, m\}$ is:

$$\ell_{jt} + h_{jt} + q_{jt} = T \tag{4}$$

4.2 Wages and Human Capital

Individual j's log wage, $\log w_{jt}^e$, is a function of the stock of human capital K_{jt} and the education level e_j:

$$\log w_{jt} = \eta_{j,1}^e + \eta_{j,2}^e K_{jt} + \eta_{j,3}^e K_{jt}^2 + \epsilon_{jt} \tag{5}$$

Individuals choose their labor supply while anticipating that future wages can be increased through work. Accumulating human capital serves as a form of self-insurance against potential

[7] I normalize the home productivity of both spouses such that $\pi_w + \pi_m = 1$.

divorce. Conditional on education and human capital, wages remain heterogeneous due to idiosyncratic temporary labor market shocks, $\epsilon_{jt} \sim N(0, \sigma^2_{\epsilon j})$.

Female human capital $K_{jt} \in [\underline{K}, \bar{K}]$ is accumulated through learning by doing, which evolves according to

$$K_{j,t+1} = \begin{cases} K_{jt} + 1, & \text{if } h^F_{jt} = 1, \\ K_{jt}, & \text{if } h^P_{jt} = 1, \\ \delta^U K_{jt}, & \text{if } h^U_{jt} = 1. \end{cases} \tag{6}$$

where human capital in the next period $K_{j,t+1}$ increases by one unit for each year of full-time work and depreciates at δ^U if not working at t.

Women also face uncertainty in the labor market and may not always be able to secure employment. Let job_t denote the job opportunities available at the beginning of period t. If $p_{job_t} = 0$, the woman is unemployed and her working hours are zero. If $p_{job_t} > 0$, there is no restriction on her labor supply choice. Hence, unemployment may arise either voluntarily or involuntarily due to adverse economic environments.

4.3 Budget Constraint

For a married couple, the household budget constraint is given by:

$$c_t = \sum_{j \in \{w,m\}} w_{jt} h_{jt} + y_t(e_w, e_m) - CC_t(n_t, \kappa_t, e_w), \tag{7}$$

where $CC_t(n_t, \kappa_t, e_w)$ represents the fixed monetary cost of children, which depends on the number of children n_t, the age of the youngest child κ_t, and the wife's education level e_w.[8] Household non-labor income y_t depends on spousal education levels, capturing the roles of savings and asset accumulation[9], and assortative matching in spousal education

For divorced or unmarried individuals, the budget constraint is:

$$c_{jt} = w_{jt} h_{jt} + y_{jt}(e_j) - CC_t(n_{jt}, \kappa_{jt}, e_j), \tag{8}$$

The role of education in the model To summarize, educational attainment e_j influences several key dimensions of the model. First, it determines the returns to human capital in the wage process. Second, education shapes child-related monetary expenditures that households must incur. Third, it affects the level of non-labor income and captures urban-rural differences in income composition: less-educated individuals rely more heavily on agricultural or self-

[8] I do not consider market-based childcare services as such expenditure occurs in less than 1% of cases in the data, as shown in Appendix Figure A.5.

[9] In the literature, assets in the event of divorce are usually assumed to be equally distributed (see, for example, Berresheim and Koll (2025), Foerster, Obermeier, and Schulz (2024), Jakobsen, Jørgensen, and Low (2024)). In this way, asset levels affect the husband's and wife's outside options symmetrically, which would change the estimated parameters but would not qualitatively alter the model's predictions. Due to insufficient information in the CFPS dataset on how couples actually distribute their savings and assets, I abstract from modeling asset accumulation and the property division following divorce.

employment income, whereas higher-educated individuals derive a larger share of their income from wages. Finally, it constrains the maximum number of children feasible over the life cycle, which will be discussed in Section 5 below.

4.4 Fertility Process and Children

Letting $p_t = 1$ denotes that the couple chooses to conceive a child in period t, and $p_t = 0$ else. The number of children evolves as

$$n_{t+1} = n_t + b_t(p_t, f_t) \tag{9}$$

whether b_t denotes the birth of a child, which is a function of couple's conception effort p_t and the biological fecundity f_t, which declines with women's age. I do not consider unintended childbirths, and thus $b_t = 1$ is possible only when the couple chooses to conceive a child $p_t = 1$ and fecundity prob $f_t > 0$. Fertility is an option only within marriage. Singles have no children, i.e., $n_{jt} = 0$. Divorced people will have no further births, thus $n_{j,t+1} = n_{j,t}$.

Furthermore, I categorize the age of the youngest child, κ_t, into four groups: no children, ages $0-6$, ages $7-12$, and ages 13 and above. To reduced the state space, Children age probabilistically and become older with a probability of $1/6$ and can move out after the fertile period T_f concludes and children aged 13 or older. Further details regarding the how the age of youngest child is determined and children moving out process are provided in Appendix C.2.

4.5 Problem of the Divorcee

At each period t, divorcee j chooses consumption c_t, time allocation on work h_{jt}, leisure ℓ_{jt} and home hours q_{jt}, and thus the choice vector is $C_t^d = \{c_t, \ell_{jt}, q_{jt}, h_{jt}\}$. The state variables of a divorced individual j at period t are $S_t^d = \{K_{jt}, n_{jt}, \kappa_{jt}, e_j, I_j, \epsilon_{jt}\}$. I consider the value of divorce as the outside option for individuals within a marriage. Divorce is an absorbing state.

The value of being divorced Let $V_{jt}^d(S_t^d)$ be the value function of an individual being divorced at period t, the recursive problem for divorced people can be formalized as:

$$\begin{aligned} V_{jt}^d(S_t^d) = \quad & \max_{C_t^d} u^j(c_{jt}, \ell_{jt}, Q_{jt}, n_t) + \beta \mathbb{E}_t[V_{j,t+1}^d(S_{t+1}^d)] \\ & \text{s.t. time constraint (4), individual budget constraint (8), home production (3),} \\ & \text{wage process (5), human capital evolution (6).} \end{aligned}$$

Child custody and alimony First, in the event of divorce, all children either remain with their mother with exogenous probability p_{cust_f}, or with their father with probability $1 - p_{\text{cust}_f}$.[10] Second, alimony or spousal support is generally not granted, and only a small fraction of sole parents receive child maintenance. Given these institutional features in China, I do not model maintenance payments and therefore abstract from any strategic interactions between

[10]For simplicity, I do not consider split custody arrangements in the case of multiple children.

divorcees.Third, I assume that the number of children realized does not depend on an individual's custody status. Consequently, an individual who desires only one child may choose divorce to avoid potential future births and to prevent deviations from their fertility preference.

4.6 Problem of the Married Couple

Married couples cooperatively make household decisions subject to limited commitment. In each period t, Couples choose labor supply h_{wt}, h_{mt}, leisure ℓ_{wt}, ℓ_{mt}, and time spent in home production q_{wt}, q_{mt}, whether to have a child $p_t \in \{0, 1\}$, and the household consumption level c_t. They also receive a marriage-quality shock, ψ_t, and need to decide whether to continue their marriage or divorce $D_t \in \{0, 1\}$. Therefore, the choice vector $C_t^m = \{h_{wt}, h_{mt}, \ell_{wt}, \ell_{mt}, q_{wt}, q_{mt}, p_t, c_t, D_t\}$. The state variables of married couples are $S_t^m = (K_{wt}, K_{mt}, n_t, \kappa_t, e_w, e_m, I_w, I_m, \epsilon_{wt}, \epsilon_{mt}, \psi_t)$ and the bargaining power μ_{t-1} at the start of the period t, which may be updated at t as introduced below. The bargaining process and the recursive formulation for a married couple are as follows, with the notation for value functions following Jorgensen, Hallengreen, and Olesen (2025).

The value of remaining a couple Given women's bargaining power μ_{t-1}, I define the value for individual j of entering period t as married and remaining married until period $t+1$ as $V_{jt}^{m\to m}$. Conditional on remaining married ($D_t = 0$), the couple solves a maximization problem that maximizes a weighted sum of individual utilities:

$$\max_{C_t^m} \quad \mu_{t-1} V_{wt}^{m\to m}(S_t^m, \mu_{t-1}) + (1-\mu_{t-1}) V_{mt}^{m\to m}(S_t^m, \mu_{t-1})$$

s.t. time constraint (4), household budget constraint (7), home production (2), wage process (5), human capital evolution (6), children evolution (9).

where individual j's value of marriage at t is

$$V_{jt}^{m\to m}(S_t^m, \mu_{t-1}) = u^j(c_t, \ell_{jt}, Q_t, n_t) + \psi_t + \beta \mathbb{E}_t[V_{j,t+1}^m(S_{t+1}^m, \mu_{t-1})]$$

The match quality ψ_t evolves as a random walk $\psi_t = \psi_{t-1} + \xi_t$ with $\xi_t \sim N(0, \sigma_\xi^2)$.

Renegotiation and bargaining process Next, for each married individual j, the outside option is defined as the value of being divorced in period t, denoted by $V_{jt}^d(S_t^d)$. Comparing this outside option with individual j's value of marriage under the current bargaining power, $V_{jt}^{m\to m}(S_t^m, \mu_{t-1})$, determines whether the participation constraint is satisfied in period t. To formalize this comparison, I define the marital surplus of spouse j as

$$G_{jt}(S_t^m, \mu_{t-1}) \equiv V_{jt}^{m\to m}(S_t^m, \mu_{t-1}) - V_{jt}^d(S_t^d),$$

where the signs of $G_{jt}(S_t^m, \mu_{t-1})$ for both partners jointly determine whether the existing bargaining power must be renegotiated.

If both partners' marital surpluses are non-negative, the couple remains married and divorce does not occur, i.e., $D_t^* = 0$. At the other extreme, if both partners' marital surpluses are negative, divorce occurs immediately, $D_t^* = 1$. When only one spouse's participation constraint is violated, the household enters a renegotiation phase. Suppose spouse j (e.g., the wife) has a non-negative marital surplus, while the other spouse j' (e.g., the husband) has a negative surplus. To prevent divorce, the former transfers bargaining power to the latter. The updated bargaining weight, μ_t, is chosen so that the husband is exactly indifferent between remaining married and divorcing. As long as such a μ_t exists and yields non-negative surplus for both spouses, the couple remains married and $D_t^* = 0$. If no feasible reallocation of bargaining power can simultaneously satisfy both participation constraints, renegotiation fails and divorce occurs, $D_t^* = 1$. Importantly, divorce can occur unilaterally: it is sufficient for one spouse's participation constraint to bind if renegotiation cannot restore incentives to remain married.[11] Therefore, the bargaining weight μ_t evolves according to

$$\mu_t = \mu_t^*(S_t^m, \mu_{t-1}). \tag{10}$$

Women's bargaining positions before childbirth When the marital surplus is sufficiently large, both spouses strictly prefer remaining married to their outside options. This is particularly likely to be the case before the first birth. Marriage provides couples with the option value of achieving their desired fertility in the future, as marriage is a prerequisite for childbearing in many East Asian countries (Myong, Park, and Yi, 2021). Exiting the relationship at this stage would eliminate this possibility, making separation unlikely. Consequently, the bargaining weight remains unchanged, $\mu_t = \mu_{t-1}$, as long as all participation constraints are slack, and it stays close to its initial level at the time of marriage. At this stage, women's bargaining position primarily reflects the match between individual characteristics, such as education and long-run earning potential.

Women's bargaining positions after childbirth The renegotiation case is particularly relevant after childbirth, when the nature of marital surplus changes fundamentally. On the one hand, once fertility is realized, the option value of remaining married declines: the gap between the gains from marriage and the outside options narrows for both spouses, since the primary fertility-related benefit of marriage has already been exercised. On the other hand, childbirth disproportionately reduces women's labor supply, leading to lower future wages. In contrast, husbands are more likely to maintain labor market attachment, which strengthens their earnings potential over time. These forces disproportionately weaken women's outside options relative to their spouses, thereby amplifying gender asymmetries in intra-household bargaining positions.

[11] This institutional feature in China is consistent with a unilateral divorce setting. Appendix A.3 describes the divorce law in China, including the quasi-unilateral divorce regime, under which either spouse may initiate and obtain a divorce by asserting a lack of mutual affection after a two-year separation period.

The value of entering period t as married The value of entering period t as married for individual j is

$$V_{jt}^{m}(S_t^m, \mu_{t-1}) = D_t^* V_{jt}^{d}(S_t^d) + (1 - D_t^*) V_{jt}^{m \to m}(S_t^m, \mu_t^*),$$

where D_t^* denotes the optimal divorce decision in period t and therefore depends on the total marital surplus, both partners' outside options, the wife's bargaining power, and the realization of the match-quality shock. Divorce can be inefficient because couples cannot commit to future transfers. Even if both partners would prefer to stay married under certain future contingencies, one partner may anticipate that future bargaining could leave them worse off, leading them to choose divorce prematurely.

4.7 Problem of the Unmarried

The choices of unmarried individuals are denoted by $C_t^s = \{c_t, \ell_{jt}, q_{jt}, h_{jt}\}$, which are identical to those of divorced individuals. The state variables of an unmarried individual are $S_t^s = \{K_{jt}, n_{jt}, \kappa_{jt}, e_j, I_j, \epsilon_{jt}\}$. Notably, for singles, the number of children $n_{jt} = 0$ and no children reside at home.

Unmarried individuals face a marriage decision. In period t, a single woman meets a potential partner with probability λ_t, which captures search frictions and reflects the time required to encounter potential partners. Each potential partner is characterized by his human capital K_{pt}, education level e_p, desired number of children I_p, and a temporary wage shock ϵ_{pt}, which is realized before the marriage decision. Thus, the state of a potential partner is $S_t^p = \{K_{pt}, n_{pt}, \kappa_{pt}, e_p, I_p, \epsilon_{pt}\}$. Upon meeting, the pair draws an initial match quality ψ_0 and jointly decides whether to marry. Details of the marriage process are described in Appendix C.3.

For newly married, the initial Pareto weight μ_t^0 is determined by the symmetric Nash bargaining game. The model assumes imperfectly transferable utility, which implies that the Pareto weight μ_t^0 affects both the size and the allocation of marital gains. A woman prioritizing her career can increase her future bargaining position, thereby increasing her share of marital surplus and providing an incentive to delay marriage. However, this incentive is moderated by search frictions on the marriage market and the curvature of the Pareto frontier: transferring utility between partners is increasingly costly, limiting the ability to shift bargaining power (Knowles, 2013). Thus, the decision to marry balances the immediate gains from marriage against the potential future benefits of remaining single.

The Gains to Marriage To summarize, individuals' incentives to enter marriage arise from several channels: (1) economies of scale in consumption, (2) the ability to share household public goods and gains from specialization, (3) the desire to achieve an ideal number of children, (4) income pooling, (5) (partial) risk sharing in the face of negative wage shocks, and (6) match-specific love shocks.

5 Estimation

The estimation proceeds in three steps. First, a subset of parameters is fixed either by adopting standard values from the literature. Second, some parameters are directly calibrated using the CFPS data. Third, the remaining parameters are estimated using the method of simulated moments (MSM) to match moments from the model to those observed in the data.

5.1 Externally Calibrated Parameters

In the model, all individuals enter the model at age $T_0 = 22$, while women retire at age $T_R = 50$ and live for two additional periods, yielding a final period of $T = 52$. Each model period t corresponds to two real-world years, resulting in a total of $T = 15$ periods.

I assign several parameters standard values commonly used in the literature. The discount factor, β, is set to 0.96 following Adda, Dustmann, and Stevens (2017). The coefficient of relative risk aversion for consumption, σ_C, is fixed at 1.5 in line with Blundell, Browning, and Meghir (1994), while the curvature parameter governing leisure preferences, σ_L, is set to 1.826 based on the estimates reported in Gayle and Shephard (2019). The household equivalence scale $\Lambda(n_t) = 1 + 0.7 \cdot M_t + 0.5 \cdot n_t$ follows the OECD standard. Human capital is assumed to depreciate during periods of non-employment at an annual rate of $\delta^U = 0.1$, consistent with the values used in Keane and Wasi (2016).

Next, I calibrate a subset of parameters using empirical moments on individuals aged 20 to 50 with no more than two children from the pre-reform period (2010–2014) of the CFPS. These ages correspond to the main fertile period relevant to the estimation.[12] Importantly, to fully capture women's wage profiles and fertility preferences, I include moments for women who had two children before the implementation of the two-child policy.

Hours, Wage Profiles, and Non-Labor Income Labor supply choices are discrete, and weekly work hours are restricted to three values: non-participation (0 hours), part-time work (30 hours), and full-time work (50 hours).[13] Individuals have a total of $T = 100$ hours per week. Furthermore, for women, wage profiles are estimated internally within the model, and the weekly probability of unemployment is set to $1 - p_{job,t} = 4\%$, based on World Bank statistics on female unemployment in China. For men, life-cycle wage profiles are estimated directly using CFPS data. Further details of the estimation procedures are provided in Appendix D.1. Finally, I define non-labor income as total family income net of primary wage income. I then compute the average non-labor income by marital status and educational attainment. The detailed levels of non-labor income are reported in Appendix D.2.

Biological Fecundity, Childcare Costs, and Custody First, biological fecundity, denoted f_t, is estimated based on medical evidence from Leridon (2004). The age-specific probabil-

[12] I compute the empirical moments by weighting them according to the age-specific sample size following Foerster (2024).

[13] Appendix Figure A.3 shows that the average weekly hours for full-time and part-time female workers are 52 and 28 hours, respectively.

ity of conception is reported in Appendix D.3. Women are no longer fertile and cannot have more children after age $T_f = 45$. Second, in China, the largest component of monetary expenditures related to children is education-related costs (Hu, Li, Li, Meng, and Nguyen, 2023). Accordingly, I use these costs as a proxy for the overall monetary cost of childcare. The detailed childcare costs used in the estimation are reported in Appendix D.4. Third, in the event of divorce, I assume that women attain custody with probability $p^f_{cust} = 57.81\%$, based on statistics from Zhang, Chen, and Wang (2024).[14] This implies that women are slightly more likely to retain custody of children. In China, there is no legal preference for awarding custody to mothers. Paternal custody is relatively prevalent due to patriarchal cultural norms, and the proportion of single fathers residing with children is also substantial (Zhang, 2020).[15]

Education-Specific Fertility Constraints I specify the distribution of the maximum number of children, $n_{\max} = \{1, 2\}$, which depends on educational attainment. Appendix D.5 describes the details of how education maps to $n_{\max}$. At the start of adulthood, each woman is probabilistically assigned an $n_{\max}$. Among women without a high school diploma, most are assigned $n_{\max} = 2$ (61.2%), while the remaining 38.8% are assigned $n_{\max} = 1$. The pattern reverses for women with at least a high school education: 78.5% are assigned $n_{\max} = 1$ and 21.5% are assigned $n_{\max} = 2$. After the introduction of the two-child policy, all couples are allowed up to $n_{\max} = 2$, and no further births occur once this threshold is reached.

The distribution of Charactersictis of Single Men and Women In the model, I assume that the husband's age $Age_H = Age_W + 2$, reflecting the average age gap observed in the CFPS data. Therefore, individuals form expectations about potential partners based on the distribution of two key characteristics: educational attainment and the ideal number of children. The probabilities are shown in Appendix D.6.

5.2 Internally Estimated Parameters

For the remaining model parameters, I employ the Method of Simulated Moments (MSM) (McFadden, 1989) for internal estimation. Let m_j^{data} denote moment j in the empirical data and $m_j^{sim}(\theta)$ the corresponding moment generated by the model simulation given parameter vector θ, for $j = 1, \ldots, J$, where J is the total number of moments. I estimate parameters by minimizing the objective function

$$\min_{\theta} J(\theta) = g(\theta)' W g(\theta)$$

[14] Many structural papers assume that women automatically obtain full custody. This modeling difference does not qualitatively affect the model's predictions. Imposing maternal custody would further lower the wife's outside option, reinforcing the bargaining implications in this framework.

[15] More details on the institutional background of custody and divorce law in China are described in Appendix A.3.

where the vector of differences is

$$g'(\theta) = \left[m_1^{data} - m_1^{sim}(\theta), \ldots, m_j^{data} - m_j^{sim}(\theta), \ldots, m_J^{data} - m_J^{sim}(\theta)\right]$$

Simulated moments are obtained from numerical simulations of the model, using a sample of 20,000 women to generate the vector of simulated moments. The weighting matrix W is diagonal, with entries equal to the inverse of the estimated variance of each moment. Standard errors are computed using the inverse of the Jacobian matrix.

The parameter vector θ comprises four sets of parameters: (1) the wage process for women by educational level $(\eta^e_{w,0}, \eta^e_{w,1}, \eta^e_{w,2}, \sigma_{\epsilon,w})$; (2) preferences of women and men over leisure, public goods, and deviations between actual and ideal fertility $(\alpha_\ell, \alpha_Q, \alpha_n)$; (3) parameters governing home production technology (π, ρ); and (4) the variance of match quality (σ^2_ξ) and the probability of meeting a partner (λ).

Target Moments and Identification Our target moments for estimation are classified into five sets, capturing key aspects of labor supply, fertility, marital outcomes, household production, and wages. In total, I have 87 empirical moments to identify 17 structural parameters. I provide a heuristic explanation for how these moments are more directly informative for identifying particular parameters below.

The first set of moments includes the life-cycle profile of women's employment probabilities and working hours (Figure 3, panel (a)). These moments primarily inform the parameter governing women's taste for leisure relative to consumption, α_ℓ. A higher α_ℓ leads to lower employment rates or fewer hours worked.

The second set of moments includes the life-cycle profile of women's hourly wages by educational attainment (Figure 3, panel (b)). These moments identify the parameters governing women's returns to human capital accumulation, $\eta^e_{w,0}, \eta^e_{w,1}, \eta^e_{w,2}$, by education level e. Higher wage levels and steeper wage growth over the life cycle indicate greater returns to experience.

The third set of moments targets fertility outcomes. I first use the life-cycle profile of the number of children women have (Figure 3, panel (c)), which is informative about the timing and cumulative realization of fertility over the life cycle. I then consider the number of children among couples with aligned versus misaligned fertility preferences (Figure 3, panel (d)), which captures the extent to which couples adjust fertility outcomes in response to preference misalignment. Together, these moments identify the dis-utility from deviations between the actual and ideal number of children α_n.

The fourth set of moments relates to the life-cycle profile of the probability of being married and being divorced (Figure 3, panel (e)). Marriage probabilities inform the meeting probability on the marriage market, λ. A higher λ implies a greater likelihood of encountering a potential partner, which is reflected in higher observed marriage rates at younger ages. Divorce probabilities inform the standard deviation of match quality shocks, σ_ξ. A higher σ_ξ increases the likelihood of divorce due to adverse shocks to marital quality.

The fifth set of moments captures married couples' time allocation to household production, conditional on the presence and the age of the youngest child (Figure 3, panel (f)). First, individual hours devoted to household production identify preferences for public goods, $\alpha_Q(\kappa_t)$: higher household production hours, especially when children are young, indicate stronger preferences for household public goods relative to consumption. Second, the comovement of spouses' home production hours identifies the substitutability of spousal inputs in home production, ρ, reflecting the extent to which one spouse can substitute for the other's across child age groups. Third, the absolute gap between women's and men's home production hours, conditional on relative wages, identifies women's relative home productivity, π.

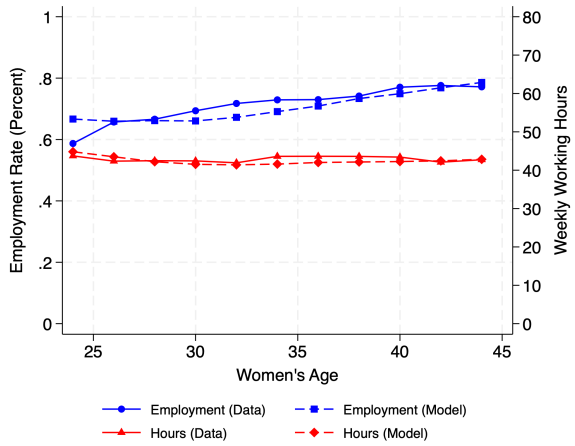
5.3 Estimation Results

Parameters Estimates Table 2 reports the estimated parameters. I find positive preferences for both leisure and household public goods, with substantial variation in the latter across children's ages. In the absence of children, the estimated weight on household public goods is small, reflecting limited utility from routine housework such as cleaning or cooking. By contrast, the presence of young children substantially increases the utility derived from public goods, with the highest weight observed when the youngest child is aged 0–6, consistent with the importance of intensive parental time during early childhood. As children grow older, the estimated preference for public goods declines, reflecting both a reduction in time allocated to home production and rising female labor force participation at later stages of child development. The estimated disutility from fertility mismatch is negative, indicating that individuals experience utility losses when realized fertility deviates from their ideal number of children.

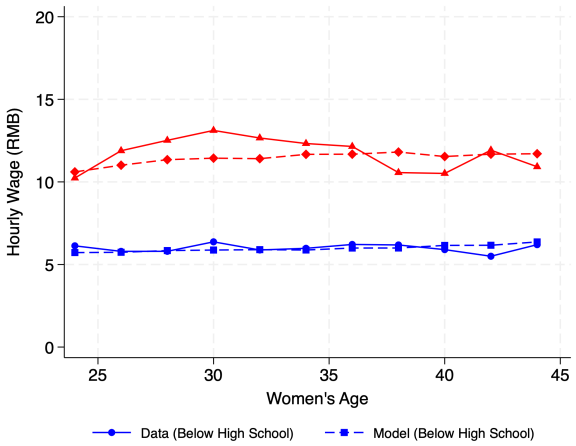
Turning to household production, I find that wives are relatively more productive in home production than their spouses, consistent with the empirical observation that women contribute more intensively to household tasks on average. The estimated elasticity of substitution between spouses' time inputs, $\rho = 0.107$, implies that male and female time inputs are imperfect substitutes in household production. This complementarity is consistent with observed patterns in which spouses' home-production hours move together-rising during periods of intensive childcare and declining as children age.

In terms of wage processes, women without a high school degree exhibit highly persistent wages that increase only moderately with age. The lower returns to labor for these women increase the likelihood of specializing in home production. By contrast, women with a high school education or higher experience steeper wage growth over the life cycle. This pattern reflects endogenous selection into higher education by ability or career ambition, which leads to faster career progression and greater sensitivity of wages to accumulated human capital. The model successfully replicates the concave age-wage profile observed for highly educated women.

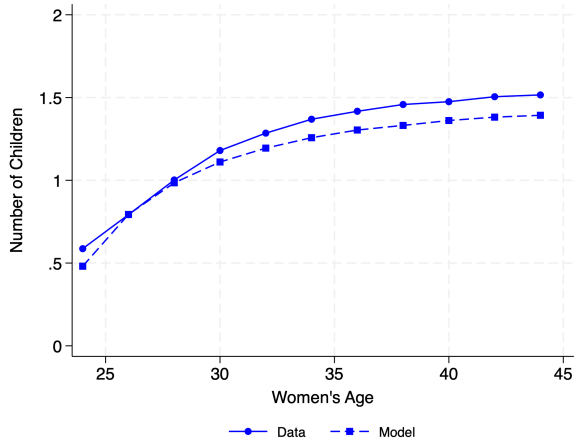
Turning to the marriage process, the estimated arrival rate of potential partners is $\lambda = 0.451$, indicating relatively infrequent marriage opportunities over the life cycle. The estimated



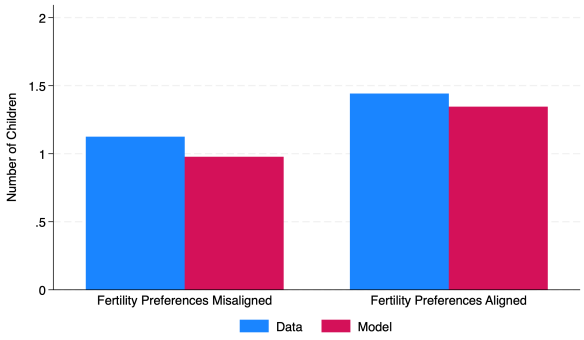
(a) Labor Supply



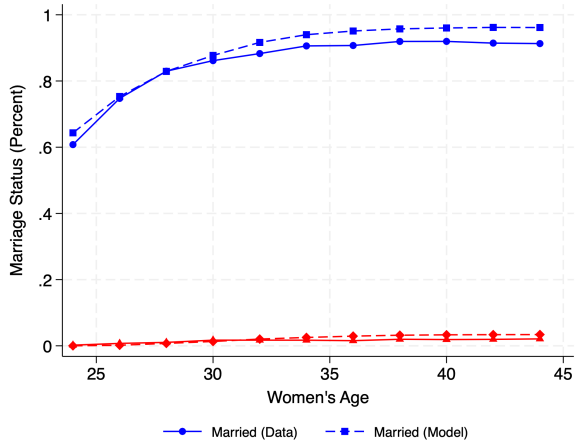
(b) Wage Profiles



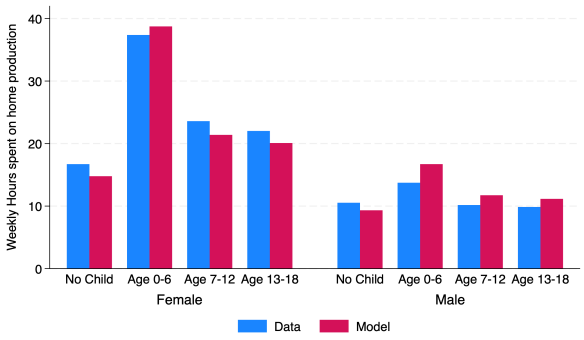
(c) Number of Children



(d) Number of Children
(By Couple's Fertility Preferences)



(e) Marriage and Divoce



(f) Home Production Hours

Figure 3: Model Fit

dispersion of match-specific shocks is small, suggesting limited heterogeneity in match quality conditional on observables.

Table 2: Parameters Estimated by Method of Simulated Moments

Parameter	Estimate	(Std. Error)
Preference for leisure		
α_ℓ	0.822	(0.003)
Preference for public goods		
α_{Q_1} (no children)	0.010	(0.000)
α_{Q_2} (youngest child aged 0–6)	0.063	(0.000)
α_{Q_3} (youngest child aged 7–12)	0.021	(0.000)
α_{Q_4} (youngest child aged 13+)	0.019	(0.000)
Disutility from fertility mismatch (actual vs. ideal)		
α_n	-0.121	(0.000)
Household production function		
π_w	0.613	(0.001)
ρ	0.107	(0.001)
Wage process (women)		
$\eta_{w,1}^{low}$	0.440	(0.001)
$\eta_{w,2}^{low}$	0.054	(0.000)
$\eta_{w,3}^{low}$	-0.0005	(0.000)
$\eta_{w,1}^{high}$	-0.006	(0.000)
$\eta_{w,2}^{high}$	0.139	(0.000)
$\eta_{w,3}^{high}$	-0.002	(0.001)
σ_ϵ^w	0.753	(0.002)
Marriage process		
λ	0.451	(0.000)
σ_ξ	4.477×10^{-3}	(0.000)

Model Fit I evaluate the model's fit by comparing simulated moments to their empirical counterparts. Figure 3 shows that the model provides a good fit to the data. In particular, the model successfully captures (i) the dynamics of women's marriage, fertility choices, and labor market participation throughout the life cycle, (ii) patterns of household specialization and spousal home production hours by the age of the youngest child, and (iii) differences in fertility outcomes between couples with aligned versus misaligned fertility preferences, with aligned couples exhibiting higher fertility on average.

6 Validation

In this Section, I evaluate the external validity of the model by examining its ability to replicate key empirical patterns that are not explicitly targeted in the estimation. I consider two sets of non-target moments. The first set consists of event-study estimates of the effects of the 2016 two-child policy on fertility and divorce. The second set of moments concerns the dynamics of female labor supply surrounding the first birth. The goal of these exercises is to validate that the model captures the key trade-off related to births before using the calibrated model to conduct counterfactual analysis.

6.1 Event-Study Estimates of Two-Child Policy Effects

I first examine whether the model can reproduce the short-run policy effects of the two-child policy estimated in reduced-form analyses. These moments are informative for evaluating whether the model captures the joint responses of fertility and divorce following the policy, which are governed by intrahousehold bargaining channels.

To align the model simulation with the identification strategy in Section 3, I proceed in three steps. First, I account for the fact that women were at different stages of their life cycle when the two-child policy was introduced in 2016. Because fecundity declines with age, younger women had a greater probability of having an additional child following the reform, while older women faced a much lower probability. As a result, the empirical estimates reflect weighted averages of cross-sectional, age-specific responses rather than the full long-run adjustment (Cruces and Rodrıguez-Roman, 2025). To capture this heterogeneity, I compute the empirical age distribution of women at the time of the reform and use it to construct the probability that a woman was exposed to the policy at each age.

Second, in the model, each woman is assigned an exposure age drawn from this distribution. Before reaching her exposure age, she forms expectations over her maximum number of children, as in the pre-reform baseline. Upon reaching it, she updates her expectations to accommodate the possibility of a second child. This approach replicates the exogenous timing of policy eligibility across cohorts. Finally, I impose the same sample restrictions in the simulation as in the reduced form analysis. Specifically, I focus on married couples whose first birth occurred prior to the policy's introduction, and estimate the average effect in the four years following the policy relative to the two years preceding its implementation.

Table 3 compares the empirical coefficients from the CFPS with their simulated counterparts. Specifically, the model successfully matches the patterns observed in the data: fertility responds most strongly when both partners desire a second child, while divorce responds most strongly when the husband wants more children than his wife.

Table 3: Validation of Reduced-Form Estimates: Data and Model

	Number of Children		Divorced	
	Data	Model	Data	Model
Wife=1, Husband=2	-0.409*** [-0.615,-0.204]	-0.485	0.091* [0.015,0.166]	0.029
Wife=2, Husband=1	-0.553*** [-0.741,-0.364]	-0.724	0.018 [-0.023,0.060]	-0.012
Both=1	-0.555*** [-0.755,-0.355]	-0.888	0.035 [-0.016,0.086]	0.028
Both=2 (Reference group)	1.243*** [1.126,1.360]	1.201	0.046*** [0.021,0.070]	0.014

Note: 95% confidence intervals in brackets (Data columns). * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

6.2 Women's Labor Supply Around the First Birth

Next, I examine female labor supply dynamics around the first birth and compare simulated working hours with those observed in the data. Since women with different levels of educational attainment may follow distinct employment trajectories, I plot average working hours separately by education group. I focus on the period from six years before to eight years after the first birth, where period 0 denotes the year of childbirth. These moments provide insight into whether the model adequately captures women's trade-offs between market work and childcare in the presence of children.

As shown in Figure 4, the model replicates both the magnitude and the dynamics of labor supply responses to childbirth. It captures the sharp decline in working hours at the time of birth as well as the gradual recovery in subsequent years. The model also reproduces the heterogeneity across educational groups: higher-educated women experience smaller declines and faster recovery afterward, maintaining longer working hours than less-educated women throughout the post-birth period.

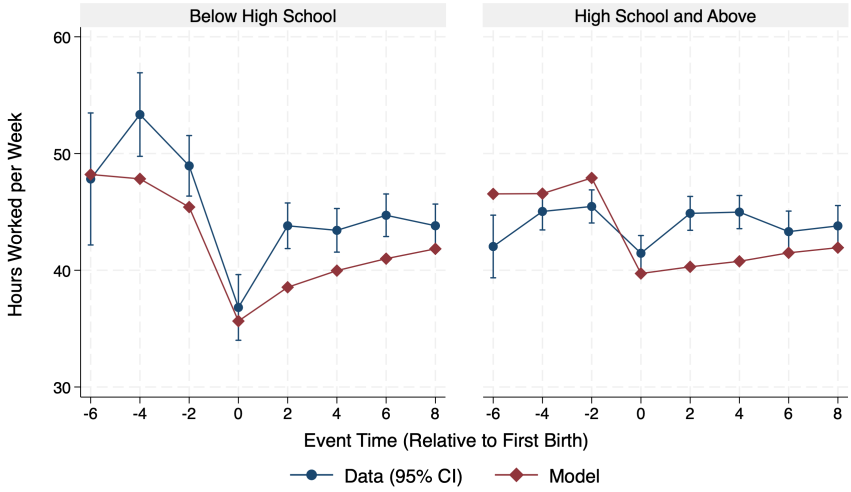


Figure 4: Women's Labor Supply Around the First Birth

7 Counterfactual Analysis

7.1 Long-Run Effects of Relaxing Fertility Restrictions

In this section, I employ the model to analyze the long-run effects of a permanent relaxation of fertility constraints. Specifically, I consider a long-run counterfactual scenario in which women are permitted to have up to two children from the onset of adulthood, compared to the baseline model in which women are restricted to having at most one child during their lifetime.

The objective is to analyze how women would behave if they could fully anticipate the possibility of a second child in a forward-looking manner. Therefore, I examine two sets of responses. First, how do women adjust the timing and total number of births over the life cycle?

Second, how do they adjust along other critical margins, including marriage and labor supply, to maximize lifetime utility under the new reproductive regime? A key source of heterogeneity is women's underlying fertility preferences. The long-run effects differ substantially between women who prefer one child versus those who prefer two, as women could self-select into different life-cycle trajectories. Therefore, I divide the sample into groups based on women's ideal number of children. [16]

Figure 5 presents the long-run effects of relaxing fertility restrictions. The upper left panel of Figure 5 shows that the policy affects both the timing of childbearing and completed fertility. In the long run (solid lines), women with high fertility preferences give birth earlier and achieve higher completed fertility relative to the baseline (dashed lines). This response is primarily driven by earlier access to additional births, which allows these women to progress more quickly toward their desired family size. Consistent with this mechanism, The upper right panel of Figure 5 shows that they also enter marriage earlier. The feasibility of a second birth raises the expected gains from marriage, thereby accelerating family formation. However, the prospect of a larger marital surplus also makes these women less selective in partner choice, which explains the lower marriage rates (reflecting higher divorce rates) observed at older ages.

In contrast, women with low fertility preferences delay both marriage and childbirth. This delay may initially appear counterintuitive, as these women were not constrained by the one-child policy in the baseline. In the long run, however, differences emerge once marriage decisions are endogenized. Since childbearing in East Asian contexts occurs predominantly within marriage, marriage incentives are central to understanding fertility outcomes. The remaining panels in Figure 5 shed light on the mechanism driving these behavioral responses.

The bottom left panel of Figure 5 presents the female labor supply over the life cycle. Relative to the baseline, women with low fertility preferences work more at younger ages. Because early-life labor supply is critical for human capital accumulation, these women acquire more work experience and earn higher wages. As returns to experience eventually decline due to the concavity of women's wage profiles, labor supply falls, and willingness devoted to home production rises later in life. This dynamic helps explain why women with low fertility preferences ultimately achieve higher completed fertility by age 44 than in the baseline.

The bottom right panel of Figure 5 presents the dynamics of women's bargaining power within the household. Women with low fertility preferences enter marriage with stronger bargaining positions and maintain greater bargaining power over the life cycle. The key mechanism is insurance: by deferring marriage, these women invest in human capital and strengthen their bargaining position, enabling them to secure more favorable outcomes when facing dis-

[16] In the long-run analysis, I assume that the distributions of education and fertility preferences among single women and men remain fixed. In principle, relaxing fertility constraints can alter the relative attractiveness of potential partners, changing matching patterns and thus the value of being single (Giorgi and Raiber, 2025, Greenwood, Guner, Kocharkov, and Santos, 2016). Women's educational choices may also respond, driven by the insurance value of education against divorce risk (Guvenen and Rendall, 2015). These extensions are beyond the scope of this paper.

agreements over fertility decisions with their partner. By contrast, women with high fertility preferences accept weaker bargaining positions in marriage in exchange for achieving their desired number of children.

To summarize, fertility choices are shaped not only by contemporaneous preferences but also by expectations about future bargaining dynamics within marriage. Due to limited commitment, the long-run relaxation of fertility constraints intensifies the trade-off women face between early childbearing with weaker bargaining power and delayed fertility with stronger negotiating positions within the household.

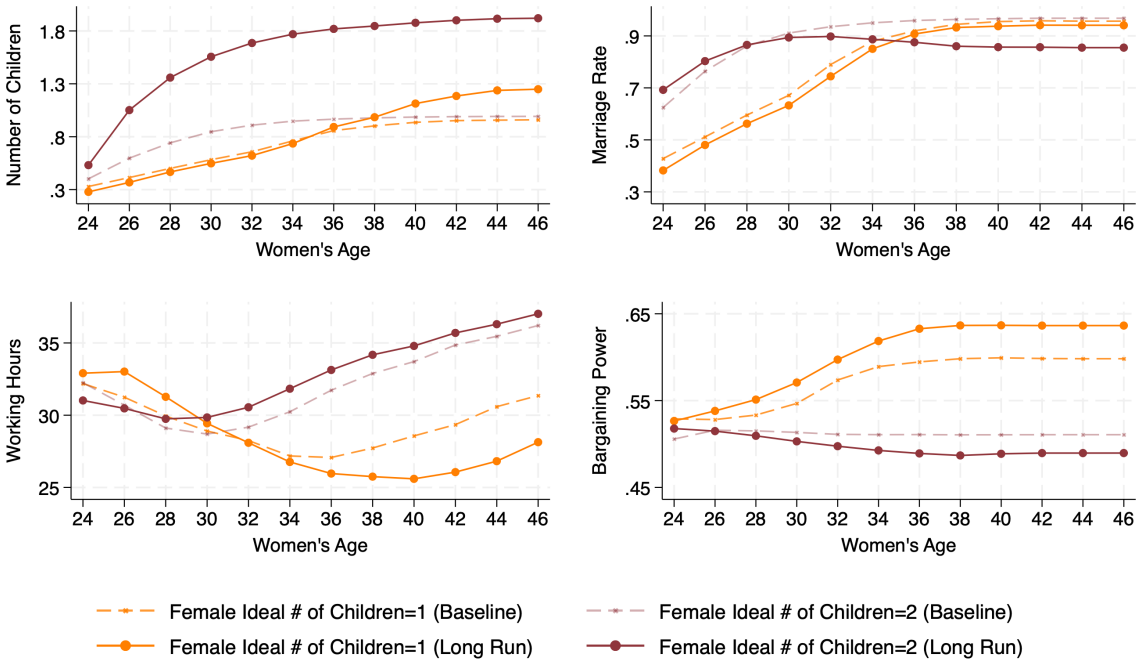


Figure 5: Female Life-Cycle Profiles by Fertility Preferences

7.2 Quantifying Bargaining Frictions

In this section, I compare the limited-commitment model with two counterfactual scenarios to quantify its role in shaping fertility and marriage outcomes. The first assumes full commitment within marriage, thereby eliminating bargaining frictions altogether. The second assigns full child custody to mothers following divorce, making the financial and childcare burdens heavier for mothers, reducing the value of being single, and thus amplifying bargaining frictions.

Table 4 reports the long-run changes relative to the limited commitment benchmark for women with low fertility preferences. Under full commitment, bargaining power is effectively determined at the time of marriage, and spouses can fully commit to future transfers even in the presence of shocks that affect partners asymmetrically (Theloudis, Velilla, Chiappori, Giménez-Nadal, and Molina, 2025). As a result, fertility choices depend only on total effective child-rearing costs rather than on how these costs are distributed between spouses. As shown in Table 4, this leads to an additional 4.06% increase in women's completed fertility rates in

the long run. Furthermore, the average marriage rate for women increases by 2.12%, driven by both a higher propensity to marry and greater marital stability. Under full commitment, divorce occurs if and only if it is Pareto efficient. Hence, a substantial share of divorces observed under limited commitment are inefficient, arising from unresolved fertility-related conflicts rather than from mutual gains to separation.

At the other extreme, when mothers are always assigned full child custody following divorce, completed fertility rates fall by 1.16%. The deterioration of women's outside options makes agreement on additional childbearing more difficult, further compressing fertility. Moreover, marriage rates decline sharply by 6.47%. This may be driven by two forces: women becoming more reluctant to enter marriage in the first place, or, conditional on marriage, husbands becoming more likely to initiate divorce once their desired fertility has been realized.

Results for women with high fertility preferences are reported in Appendix E.1 and are qualitatively consistent with those presented here, while the magnitude of fertility response is smaller, and the marriage response is higher.

Table 4: Alternative Commitment Assumptions: Women with Low Fertility Preferences

	Completed Fertility Rate (% Change)	Marriage Rate (% Change)
Full Commitment	+4.06	+2.12
Full Child Custody to Mothers	−1.16	−6.47

Notes: Changes are expressed as percentage deviations relative to the limited-commitment baseline.

7.3 Policy Experiments

To examine how policies can simultaneously promote fertility and empower women, I simulate three hypothetical policy experiments using the model: a job protection policy, a universal childcare transfer, and a divorce-targeted childcare transfer. Each policy affects fertility through a distinct channel, with different implications for female labor supply and intra-household bargaining. Figure 6 reports long-run average outcomes for women with low fertility preferences. The first bar represents the baseline results under permanent fertility relaxation, and the remaining bars correspond to the three policy experiments.

Job protection policy Job protection policies directly encourage female labor force participation by protecting women of reproductive age from discrimination and supporting career continuity. In the model, this is implemented by reducing women's involuntary unemployment rate from 4% to zero. Eliminating involuntary unemployment increases women's average lifetime working hours by 5.6%, which raises their wages and strengthens their bargaining positions relative to their husbands. Despite these gains, completed fertility declines slightly by 0.7%. The reason is that job protection does not resolve the fundamental tension between family and career. Women still exit the labor market after childbirth due to preferences and comparative advantage in home production, which weakens their outside options. At the same time, im-

proved labor market prospects raise the opportunity cost of childbearing, making fertility less attractive at the margin. These results suggest that labor market policies alone, while effective at improving women's employment outcomes and intra-household bargaining, are insufficient to generate meaningful fertility responses.

Universal childcare subsidy Childcare subsidies are a policy instrument commonly used by governments to directly stimulate fertility. In the model, this is implemented by subsidizing 50% of monetary childcare costs for all households.[17] By directly lowering the cost of childbearing, the subsidy increases completed fertility by 1.4%. However, the subsidy also induces women to spend more time raising children, reducing their average working hours by 2.6% and increasing their share of household production relative to their husbands. While universal pronatalist transfers successfully raise fertility, they unintentionally deepen gender inequality within the household. By increasing women's unpaid labor burden, the subsidy weakens their outside options and exacerbates the intra-household bargaining frictions.

Divorce-targeted childcare transfer The final policy restricts the childcare subsidy to divorced mothers, covering 50% of their monetary childcare costs following separation. Unlike the universal subsidy, this policy directly improves women's outside options by increasing the resources available to them outside of marriage.[18] It is also fiscally less costly than the universal transfer. Despite its narrower targeting, the divorce-targeted transfer generates the largest fertility increase of all three experiments, with completed fertility rising by 4.1%. By strengthening mothers' outside options, the policy reduces limited commitment concerns surrounding fertility decisions and improves women's bargaining positions within the household. Consequently, although women's lifetime home production hours increase by 11% in absolute terms, their share of total home production falls to its lowest level across all policy scenarios. Finally, the policy does not lead to a substantial change in marital stability. The findings here highlight the importance of directly addressing intra-household bargaining concerns when designing effective fertility-promoting policies.

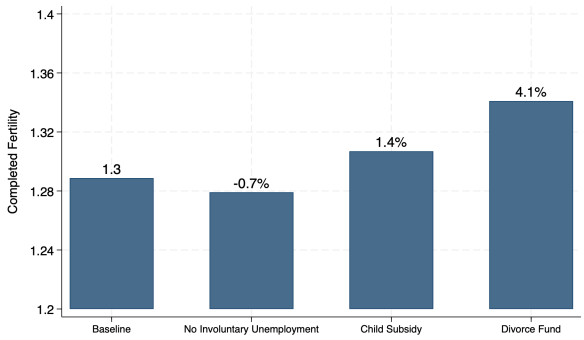
Results for women with high fertility preferences are reported in Appendix E.1. By construction, these women ultimately achieve fertility outcomes close to their ideal number of children, leaving little room for policy-induced fertility increases. Nevertheless, policies affect other margins of adjustment, particularly female labor supply and household specialization, showing patterns qualitatively similar to those discussed above.

8 Conlusions

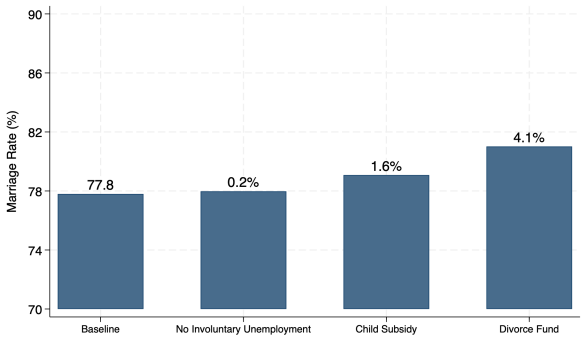
This paper investigates how fertility decisions are shaped when women's bargaining positions within marriage are endogenously determined by labor market outcomes. Exploiting China's

[17] For highly educated mothers with one child aged 0–6, this is equivalent to 1,404 RMB per month, approximately 10% of average annual female income in the data.

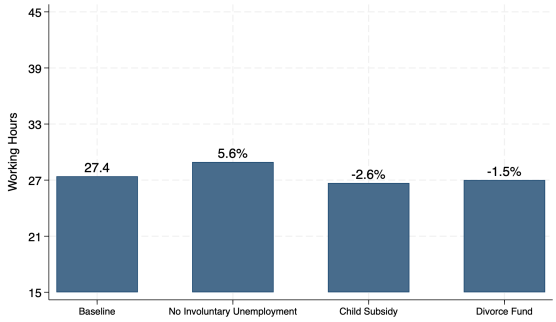
[18] This distinguishes the policy from that proposed by Doepke and Kindermann (2019), which provides targeted monetary transfers to either spouse within marriage.



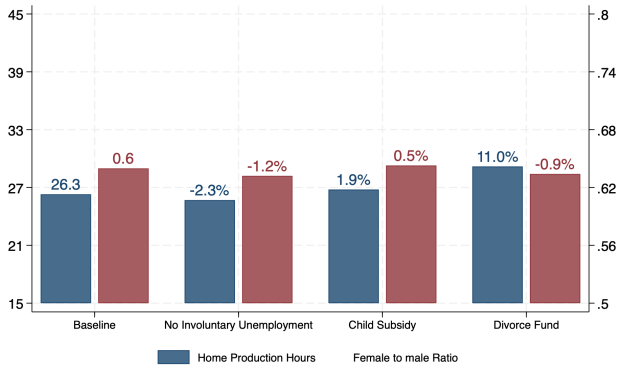
(a) Completed Fertility



(d) Marriage Rate (%)



(b) Working Hours



(c) Home Production

Figure 6

2016 Two-Child Policy as an exogenous expansion of fertility options, I provide reduced-form evidence that relaxing fertility constraints increases both fertility and divorce rates. The quantitative life-cycle model shows that early fertility decisions can have lasting effects on household outcomes by influencing labor market attachment and intra-household bargaining positions. I find that policies that increase fertility by weakening women's labor market incentives, such as untargeted pronatalist transfers, tend to exacerbate bargaining frictions and reduce female labor supply. By contrast, policies that explicitly strengthen women's outside options, such as childcare transfers targeted at divorced mothers, substantially mitigate bargaining frictions and generate the largest fertility responses, while improving women's bargaining positions.

Overall, these results highlight the importance of household bargaining considerations for understanding fertility behavior and for designing effective fertility policies. Interventions that ignore how fertility reshapes women's outside options may have limited or unintended effects, whereas policies that strengthen women's economic autonomy can simultaneously promote fertility and enhance welfare. Future research could extend this framework to explore heterogeneity across institutional environments and social norms, the role of childcare markets, and the interaction between fertility policies and gender wage gaps across different labor market settings.

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APPENDIX

Appendix

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A Data Appendix

A.1 Data and Sample Selection

This paper uses data from the China Family Panel Studies (CFPS, 2010–2020), a nationally representative longitudinal survey designed to capture the social, economic, and demographic dynamics of Chinese households. The baseline survey, conducted in 2010, covers 14,960 households across 25 provinces and municipalities, representing approximately 95% of the Chinese population.[19] Five follow-up waves were conducted in 2012, 2014, 2016, 2018, and 2020, enabling the tracking of households and individuals over a ten-year period.

Our main sample is defined by the following restrictions. First, we restrict to individuals of Han ethnicity, the main population targeted by the One-Child Policy. We exclude rural households whose first child is a daughter, as such households were permitted to have a second child starting in the mid-1980s. Second, we exclude households in which either the husband or wife is an only child, as these households were already eligible for a second child under the policies implemented in 2011 or 2013. Third, we focus on women born between 1972 and 1992, who were of prime reproductive age in 2016. Fourth, we restrict to already-formed couples with one child in 2014, as these households were directly affected by the policy change and their decisions to have a first child is orthogonal to the timing of the policy change. Finally, to ensure reliable comparisons of couples experiencing within-household changes due to the reform, we include only couples observed for at least one wave before 2016 and at least one wave after 2016.

The final sample comprises 3,541 women, resulting in 19,647 individual-year observations. Table A.1 reports summary statistics for the main variables.

A.2 Definitions of Variables

The China Family Panel Studies (CFPS) collects detailed individual-level questionnaires for all household members and thus provides comprehensive information for both spouses. It covers a wide range of variables, including economic activities (e.g., employment status, annual labor income, and household educational expenditures), educational attainment, and family dynamics such as fertility, marriage, and time allocation across activities. Below, I describe the key variables used in the empirical analysis and model estimation.

Fertility Preferences In the 2014 wave of the CFPS, respondents are asked: *"Without considering any policy restrictions, how many children do you consider ideal?"* We use responses to this question to measure individuals' intrinsic fertility preferences, defined as the ideal number of children they desire.[20]

Figure A.1 provide a descriptive overview of the ideal number of children as reported by individuals in the 2014 China Family Panel Studies (CFPS). The sample includes individuals

[19] Excluding Taiwan, Macao, Hong Kong, Tibet, Inner Mongolia, Xinjiang, Qinghai, Ningxia, and Hainan.

[20] Since this question was asked prior to the universal two-child policy reform, it alleviates concerns that reported fertility preferences may be endogenous to policy relaxation.

Table A.1: Summary Statistics (CFPS 2010–2020)

	(1)		(1)
Household characteristics			
Married women	0.63		
Number of children	0.75		
Fertility Preferences (2014)			
Wife's Ideal Number of Children	1.75	Husband's Ideal Number of Children	1.80
Wife's characteristics		*Husband's characteristics*	
Wife's age	31.07	Husband's age	35.34
Wife's years of schooling	10.75	Husband's years of schooling	10.40
Wife's age at first marriage	24.76	Husband's age at first marriage	26.11
Wife's age at first birth	26.04	Husband's age at first birth	27.76
Wife's age at second birth	30.22	Husband's age at second birth	32.18
Wife's labor market performance		*Husband's labor market performance*	
Wife Employed (=1)	0.73	Husband Employed (=1)	0.93
Wife's main annual income (RMB)	15,879.62	Husband's main annual income (RMB)	27,256.25
Wife's hourly wage (RMB)	8.93	Husband's hourly wage (RMB)	11.20
Wife's main work hours	43.53	Husband's main work hours	50.73
Wife's housework time	6.22	Husband's housework time	4.33
Observations	19,647		19,647

Note: The table presents descriptive statistics for the household sample constructed from the CFPS dataset, 2010–2020.

aged 24 to 44 years. The x-axis categorizes responses into four groups: 0 children, 1 child, 2 children, and 3 or more children, while the y-axis measures the percentage of respondents selecting each category. Approximately 18% of individuals report an ideal number of one child, about 73% express a desire to have two children, and around 8% report an ideal number greater than two. Given that very few individuals report an ideal of zero children, we focus on the two dominant preference categories, one versus two children, and restrict our discussion accordingly.

Importantly, both wives and husbands answer this question, allowing us to examine whether fertility preferences are aligned within couples. As shown in Figure A.2, approximately 58% of couples report that both spouses ideally desire at least two children, while 12% report that both spouses prefer one child. Preference discordance is also common: in 13% of households, the husband prefers at least two children while the wife prefers one or fewer, and in 12% of households the reverse holds.

Fertility Outcomes We construct fertility outcomes using the CFPS family questionnaire, which contains detailed information on all household members, including children. The questionnaire reports each child's characteristics, such as age, gender, and co-residence status. We measure fertility by counting the total number of children ever born to or reported by the household.

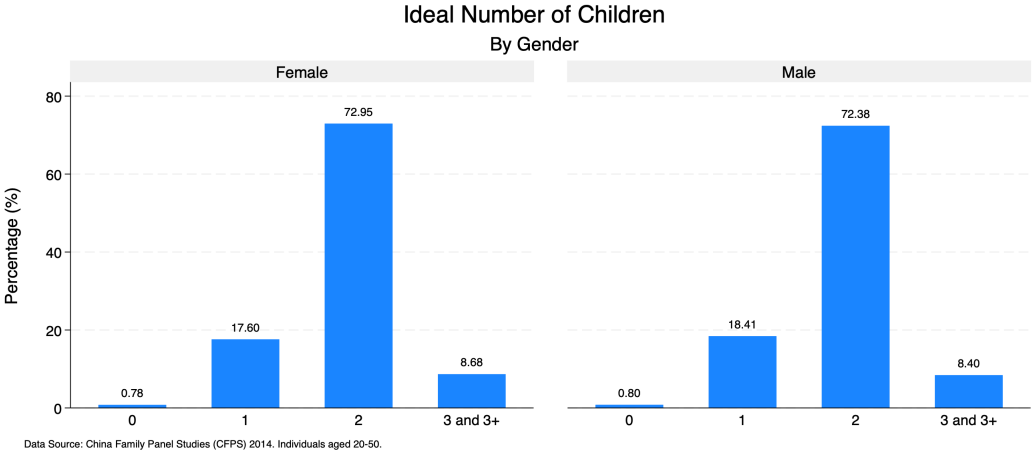


Figure A.1: Ideal Number of Children in CFPS 2014 (by gender)

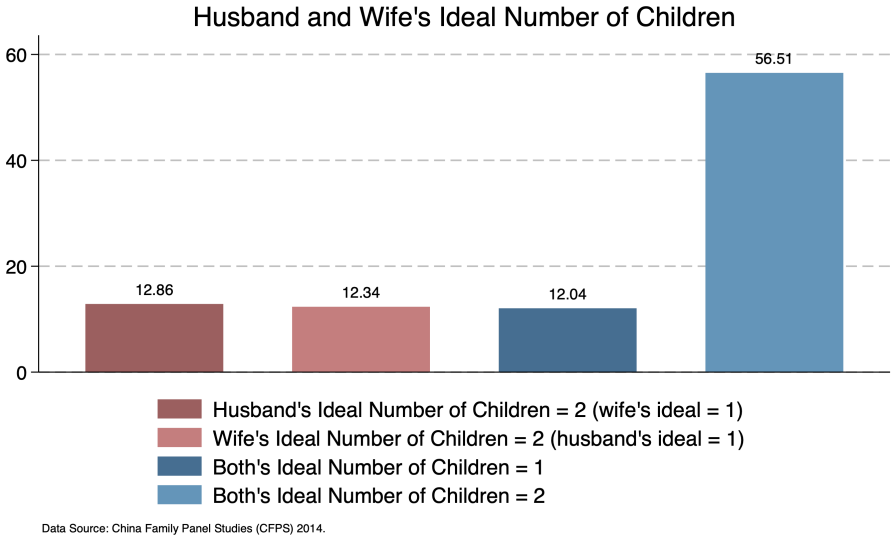


Figure A.2: Husband and Wife's Ideal Number of Children

Educational Groups We classify individuals into two education groups based on their highest completed level of schooling. Individuals with education below high school are categorized as *low education*, while those with a high school degree or above are categorized as *high education*.

Labor Market Outcomes Employment status is defined as a binary indicator equal to one if an individual is currently employed. Both agricultural and non-agricultural workers report employment status. Weekly working hours are measured using the question: *"Excluding lunch breaks but including additional working hours, regardless of whether they are paid, how many hours per week did you spend on this job during the last 12 months?"* Figure A.3 shows that the average weekly hours for full-time and part-time female workers are 52 and 28 hours, respectively. China, like other East Asian countries, is characterized by long working hours, and the average for all workers is 45 hours in the CFPS. [21]



Figure A.3: Distribution of Female Working Hours

Annual labor income is based on the question: *"Including salary, bonuses, cash benefits, and in-kind benefits, and excluding taxes, insurance contributions, and public housing funds, how much in total did you earn from this job in the last 12 months (RMB)?"* Hourly wages are calculated by dividing annual labor income by total annual hours worked, restricting the sample to individuals working more than 10 hours per week. All monetary variables are expressed in 2010 Chinese RMB.

Time Allocation in Home Production The 2010 CFPS wave includes a detailed time-use module that records how respondents allocate their time across different daily activities on both workdays and rest days during a typical non-holiday month. Time spent on family care includes caring for both children and elderly household members. Housework time captures

[21] By comparison, average weekly hours in East Asia are 40.3, 42.7, 45.6, and 44.5 for married women, single women, married men, and single men, respectively, whereas the corresponding hours worked in Western OECD countries are 35.2, 37.9, 44.0, and 42.5. Data Sources are from Appendix Table A7 of Ho and Wang (2024).

hours devoted to household chores such as cooking, cleaning, and laundry. These measures allow us to construct indicators of time spent on home production, encompassing both housework and childcare.

Home production time primarily comprises childcare and housework. We find that time variation depends only on the age of the youngest child, rather than on the number of children, supporting our model assumption that their preferences are functions of the age of the youngest child. The results are shown in Figure A.4.

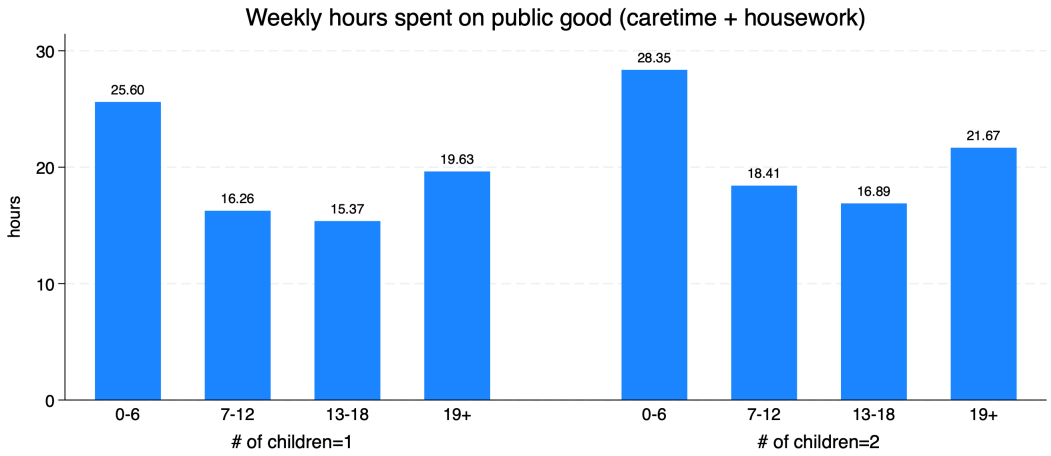


Figure A.4: Hours spent at home by Education Level and Age of Youngest Child

Childcare Arrangements Parents are asked: *"In the most recent month when the parents were not on vacation, who mainly took care of the child during the daytime or nighttime?"* Response options include: (i) the child's father, (ii) the child's mother, (iii) nursery or kindergarten, (iv) babysitter, (v) paternal or maternal grandparents, and (vi) self-care (applicable only when the child is older than 12). Appendix Figure A.5 shows that mothers overwhelmingly serve as the primary childcare providers, while the use of market-based childcare services, such as babysitters, is extremely limited.

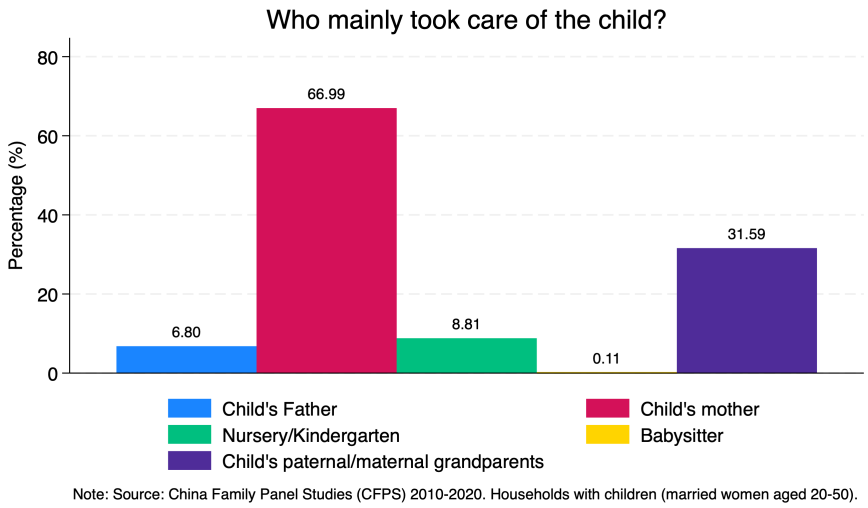


Figure A.5: Childcare Arrangements

A.3 Fertility Policies in China

China's fertility policies have undergone substantial evolution since the late twentieth century. I summarize the policy stages here, as they are directly relevant to the sample restrictions applied below. Figure A.6 presents a schematic timeline illustrating the evolution of key fertility policies in China from the early 1970s to 2016.[22]

In 1970, China's population exceeded 820 million, and the total fertility rate was 6.1 births per woman.[23] To control rapid population growth and address concerns about overpopulation and the deterioration of living standards, the Chinese government launched a nationwide family planning campaign in the early 1970s (Chen and Fang, 2021).

In 1979, a stringent population control policy, the One-Child Policy, was introduced, under which households were generally restricted to have only one child[24], and births exceeding the quota were subject to penalties[25]. In the mid-1980s, due to practical difficulties in enforcing the One-Child Policy in rural areas, the central government relaxed the policy and allowed rural couples whose first child was a daughter to have a second child (Guo et al., 2025). In general, fertility restrictions were more stringent in urban areas than in rural areas and primarily targeted the Han population, the largest ethnic group in China, accounting for approximately 92% of the total population (Huang et al., 2021). Accordingly, in our main sample, we restrict attention to Han ethnicity and exclude rural households where the first child is a daughter.

[22]The evolution of China's birth control campaign is documented in Scharping (2003), and a review of the One-Child Policy can be found in Zhang (2017).

[23]Data Sources: Population in China: https://worldpopulationreview.com/countries/china; Fertility rate, total (births per woman) in China: https://data.worldbank.org/indicator/SP.DYN.TFRT.IN?locations=CN.

[24]The One-Child Policy was implemented at the couple level. Eligibility for additional births through remarriage was not uniformly defined at the national level but instead regulated by local governments, resulting in variation over time and across regions.

[25]For example, households with unauthorized births faced monetary fines calculated as multiples of local annual household income (Ebenstein, 2010). Urban residents employed in state-owned enterprises could lose their jobs or access to social welfare benefits (Zhang, 2017).

Entering the 21st century, China's total fertility rate fell below the replacement level. In response to persistently low fertility, the government gradually relaxed fertility restrictions. In 2011, a limited relaxation allowed couples in which both partners were only children to have two children. However, because such couples represented a very small share of the population, this policy had little impact on the overall fertility trend. In 2013, the government further expanded eligibility, permitting couples to have two children if at least one partner was an only child. Several empirical studies have documented positive effects of this reform on household fertility (Li, 2024, Wu, 2022). Therefore, in our sample, we exclude couples where at least one spouse is an only child and therefore eligible for a second child before 2016.

On October 29, 2015, the government announced the universal two-child policy, allowing all married couples to have two children starting January 1, 2016. This reform primarily affected couples in which both spouses had siblings (He, Li, and Han, 2023). Based on the 2010 National Population Census and the National Fertility Intention Survey, the population eligible under the universal two-child policy accounted for 46% of all married women of reproductive age (20-44), corresponding to more than 96 million families (Wang et al., 2016). Therefore, the policy change impacted a substantial share of married couples in China.

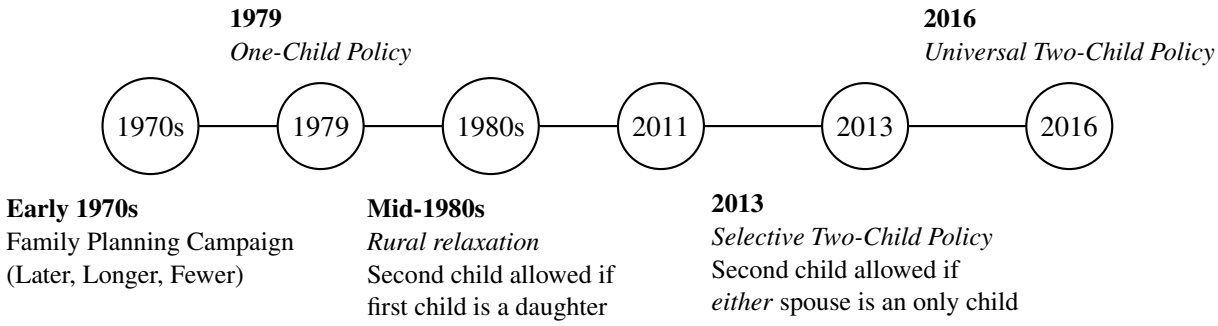


Figure A.6: Timeline of Major Changes in China's Fertility Policies

A.4 Divorce Law

Given that divorce responses play a central role in our analysis, this section summarizes the key institutional features related to divorce in China.

Quasi-Unilateral Divorce Regime China's modern divorce law, implemented in 2001, provides two primary pathways for marital dissolution: registered divorce and litigated divorce (Xia et al., 2021). Registered divorce is a consensual process that requires mutual agreement between both spouses.[26] Litigated divorce, by contrast, allows for unilateral initiation. Either spouse may petition the court to dissolve the marriage without the other's consent, particularly in cases involving domestic violence and extramarital relationships (Sun and Zhao, 2016).

[26]In January 2021, Article 1077 of the Civil Code of the People's Republic of China introduced a mandatory divorce "cooling-off" period (Zhang and Zhang, 2023), which increased the cost of registered divorce. This reform lies outside our sample period.

More importantly, either spouse can eventually obtain a divorce by asserting a lack of mutual affection following a two-year separation period (Huang et al., 2023). Therefore, China's legal framework can be characterized as a *quasi-unilateral divorce regime*.

Spousal Maintenance and Custody arrangements Post-divorce spousal maintenance (like alimony or spousal support) is generally not mandated in China unless explicitly agreed upon by both parties. Moreover, only a small fraction of single parents receive child maintenance payments. For these reasons, we abstract from alimony and maintenance payments in our analysis.

In terms of custody, for cases involving minor children, child custody is awarded to mothers when children are two years old or younger, prioritizing the child's need for maternal care during early development. For children older than two, divorce law custody is determined based on the "best interests of the child". There is no preference for custodial rights to be given to the mother. The custodial parent bears primary responsibility for child-related expenses. Empirically, custody outcomes are relatively balanced by gender. Using court decisions from 2014–2016, Zhang, Chen, and Wang (2024) document that mothers receive custody in 57.81% of cases, while fathers receive custody in 42.19%.[27]

B Reduced Form Appendix

B.1 Policy Effects Across Treatment and Control Groups

To assess whether the relaxation of the One-Child Policy is plausibly exogenous, I plot the fertility and divorce outcomes for both the treatment and control groups based on equation (1). Figure B.1 displays the estimated coefficients, where η_t captures the time path of the control group and $\eta_t + \gamma_t$ captures that of the treatment group.

Several patterns emerge. First, fertility and divorce rates increase for both groups following the reform, and the pre-reform trends are similar across groups, supporting the parallel trends assumption. Second, the pre-reform upward trend in fertility reflects a natural life cycle pattern: women's number of children increases as they age through their reproductive years. After the policy relaxation, however, the slope steepens, indicating that previously constrained households were able to adjust their family size in response. The fertility response is larger in households where both spouses desire a second child.[28] Although there was broad public awareness that the One-Child Policy might eventually be relaxed, the precise timing and scope of the reform were unanticipated (He, Li, and Han, 2023). Therefore, deviations from the pre-policy trend after 2016 can be interpreted as causal effects of the policy relaxation.

[27] These statistics are based on 10,093 first-instance divorce rulings from China Judgements Online, an official judicial database established by the Supreme People's Court.

[28] Removing the pre-policy time trend does not change the conclusion: a positive fertility response remains for both groups.

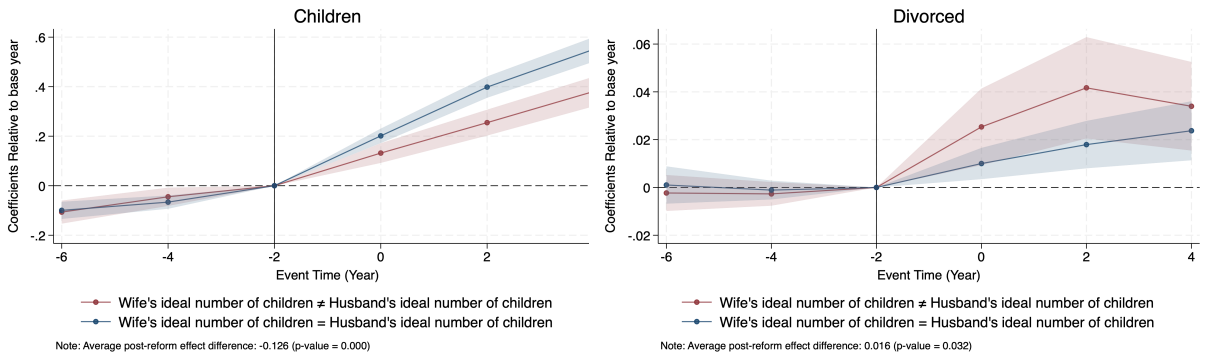


Figure B.1

B.2 Policy Effects on Remarriage Rates

In this section, we analyze the impact of the relaxation of the One-Child Policy on remarriage rates. As shown in Figure B.2, remarriage rates do not differ significantly following the policy for couples with misaligned preferences compared to the control group, in both the male and female samples.

Additionally, 28% of divorced individuals in our sample remarry, indicating that the proportion of remarried individuals is relatively small. Therefore, we do not regard remarriage as a primary factor influencing our divorce outcomes and therefore exclude it from the main empirical analysis. We also do not include remarriage decisions in our model.

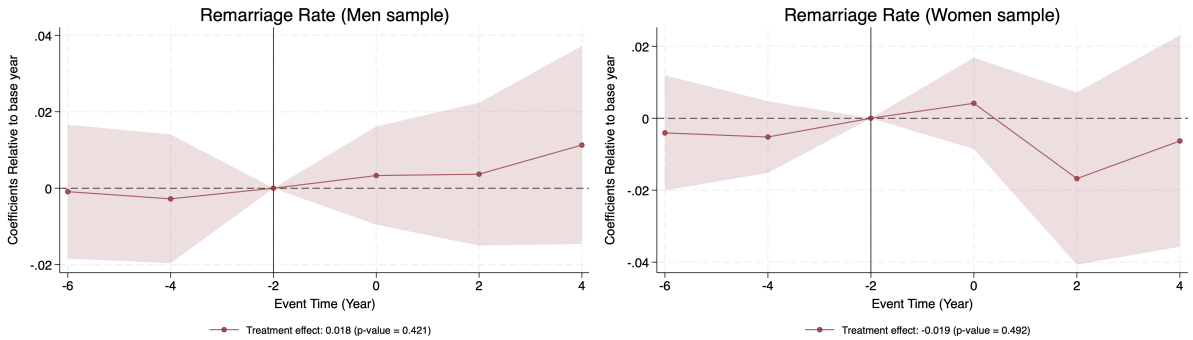


Figure B.2

B.3 Heterogeneous Policy Effects by Wife's Bargaining Power

In this section, I present fertility outcomes across households with different women's bargaining positions. The results are presented in Table B.1.

In households where the husband desires more children than the wife, stronger women's bargaining power is associated with a smaller fertility response relative to the control group. This pattern can be explained by husbands' attempts to compensate their wives by transferring household resources to incentivize additional births. In households where the wife desires more children than the husband, greater bargaining power enables wives to implement their preferred

fertility choices, leading to a larger fertility response.

	Dependent variable: Children					
	By Wife's Education		By Wife's Hourly Wage		By Wife-Husband Income Ratio	
	(1) Low	(2) High	(3) Low	(4) High	(5) Low	(6) High
(1) Post-Policy × (Wife ideal = 1, Husband ideal = 2)	-0.166***	-0.101*	-0.180***	-0.023	-0.102**	-0.081
	(0.046)	(0.053)	(0.053)	(0.052)	(0.049)	(0.066)
(2) Post-Policy × (Wife ideal = 2, Husband ideal = 1)	-0.204***	-0.162***	-0.238***	-0.122***	-0.182***	-0.127**
	(0.041)	(0.046)	(0.051)	(0.045)	(0.045)	(0.056)
(3) Post-Policy × (Both ideal = 1)	-0.249***	-0.098*	-0.246***	-0.119**	-0.190***	-0.120**
	(0.039)	(0.051)	(0.050)	(0.048)	(0.037)	(0.053)
Household fixed effects	✓	✓	✓	✓	✓	✓
Wife's Age Group fixed effects	✓	✓	✓	✓	✓	✓
Year fixed effects	✓	✓	✓	✓	✓	✓
Pre-policy mean	0.651	0.405	0.573	0.506	0.814	0.804
p-value: (1)-(2)	0.468	0.321	0.365	0.091	0.175	0.543
Observations	3618	2985	2894	2352	3686	1570
R-Square	0.640	0.669	0.640	0.633	0.643	0.680

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table B.1: Heterogeneous Effects on Children by Wife's Bargaining Power

B.4 Labor Market Performances Around Childbirth

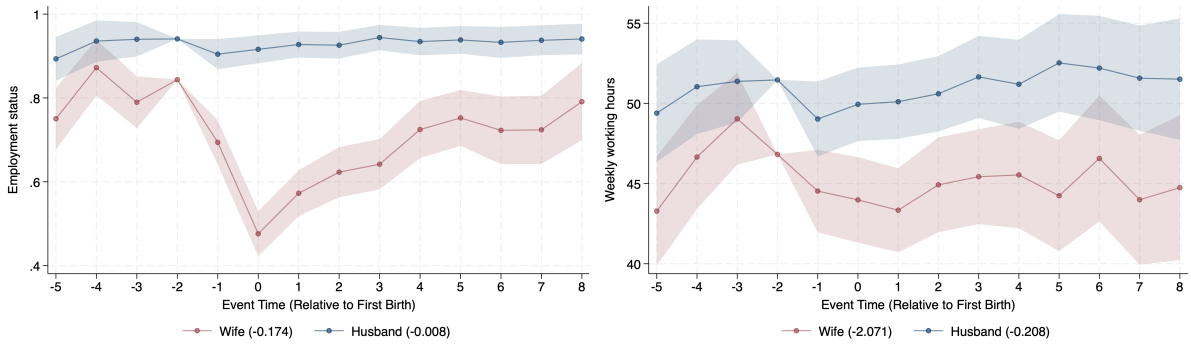
In this section, using the event study approach (Kleven et al., 2019), we analyze the effects of the first birth on the labor market performances of women and men. The child-penalty sample focuses on women from the birth cohort of 1972 to 1992, who were aged 24 to 44 in 2016. These women were observed for at least one year during the five years before their first birth and for at least one year during the eight years following it. For individual i with gender g in age a and year t at the the event time j, the outcomes Y_{ijt}^g is determined by

$$Y_{ijt}^g = \sum_{\substack{j=-5 \\ j\neq -2}}^{8} \alpha_j^g \cdot \mathbf{1}[j = t - e^i] + \sum_a \beta_a^g \cdot \mathbf{1}\left[a = age_{it}\right] + \sum_y \gamma_y^g \cdot \mathbf{1}[y = t] + \nu_{ijt}^g$$

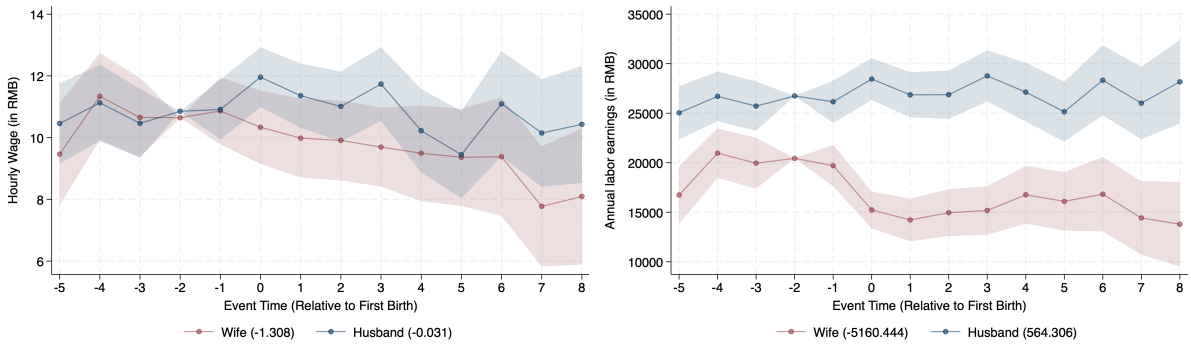
To compare the gender gap in the labor market, we further normalized the coefficients using the average outcome levels at period $t = -2$ following Foerster (2024).

Labor Market Performances of Men and Women The results are reported in Figure B.3. First, women experience a substantial decline in employment following their first birth. At the time of childbirth, the employment rate falls from 80% at baseline ($t = -2$) to 40%. Second, women's hourly wages decline gradually, though the effect is modest. Therefore, the reduction in women's labor earnings is largely driven by the employment margin rather than reductions in hours or wages.

Labor Market Performances of Women by Educational Attainment Since education is a key determinant of women's returns to human capital and labor supply, we investigate the heterogeneous effects of childbirth across educational backgrounds. The results are shown in Figure B.4. First, more-educated women exhibit higher employment rates prior to childbirth



(a) Employment Status (b) Working Hours

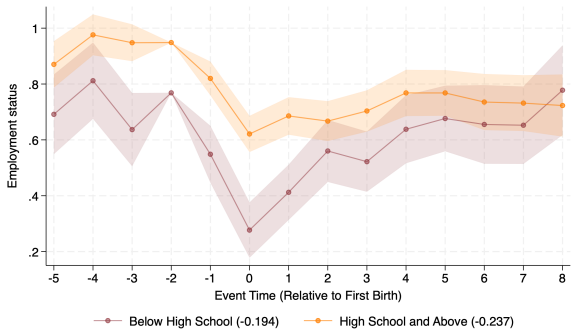


(a) Hourly Wages (b) Labor Earnings

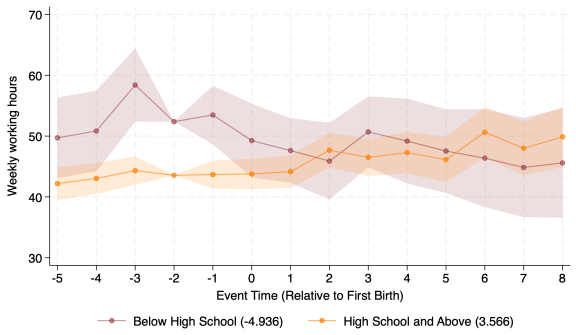
Figure B.3: Labor Market Performances of Men and Women

and experience a relatively smaller decline afterward. Nevertheless, their post-birth employment rates do not fully recover to pre-birth levels. In contrast, less-educated women face a larger employment decline around childbirth, but their employment recovers more rapidly. Second, the working hours of highly educated women who remain employed change little before and after childbirth, whereas less-educated women reduce their working hours. Finally, both highly and less-educated women experience declines in wages and earnings following childbirth; however, highly educated women maintain higher average wages and earnings.

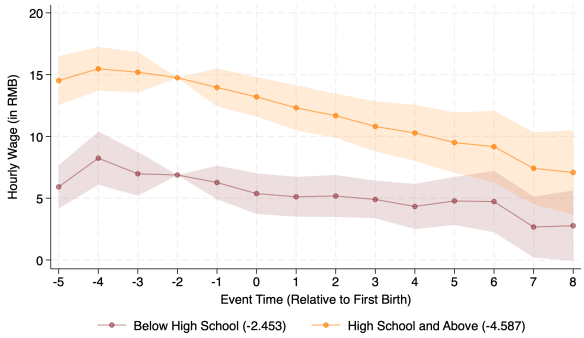
Second Child Penalties We examine whether the impact of children on labor supply is amplified when women have a second child. As shown in Figure B.5, women's employment declines further upon the birth of their second child, whereas men do not exhibit any significant change in employment. These findings are consistent with Zhou et al. (2022).



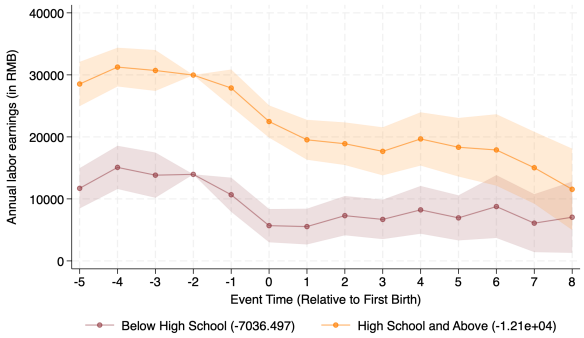
(a) Employment status



(b) Weekly Working Hours

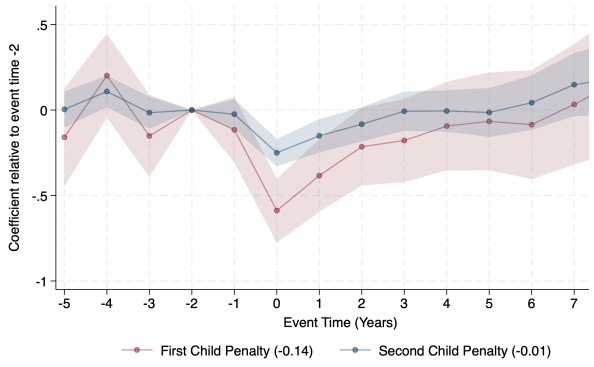


(a) Hourly Wages

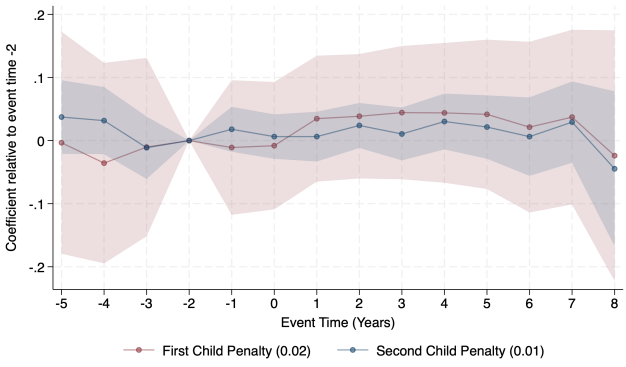


(b) Labor Earnings

Figure B.4: Labor Market Performances of Women: by Education type



(a) Women



(b) Men

Figure B.5: Second Child Penalties in Employment

C Model Appendix

C.1 Problem of Retirement

In this section, I formalize the value functions of retirement for both married and divorced individuals. Retirement is exogenous at T_R. The retirement problems differ from those in the working age phase in the following aspects: first, individual labor supply is constrained to be zero in retirement, $h_{jt} = 0$. Time is allocated between leisure and home production. there is no idiosyncratic wage shock ϵ_{jt} any more. Second, Income in retirement is estimated based on the potential earnings an individual would make with their pre-retirement wages w_{jt} and full-time employment $\bar{h}$. Third, While unlikely, following Jakobsen, Jørgensen, and Low (2024), individuals can have dependent children who require time and financial resources to raise, unless they have moved out.

Problem of the Divorced Retiree Consider a divorced individual $j \in \{w, m\}$ who has entered retirement. In the retriement phase, the individual chooses consumption c_t, leisure ℓ_{jt}, and home production time q_{jt} and their working hours h_{jt} is fixed at zero. The choice set is given by

$$C_t^{d,ret} = \{c_{jt}, \ell_{jt}, q_{jt}, h_{jt}\}$$

The state variables of a divorced individual j at period t are

$$S_t^{d,ret} = \{K_{jt}, n_{jt}, \kappa_{jt}, e_j, I_j\}$$

where K_{jt} denotes human capital, n_{jt} the number of children, κ_{jt} is the youngest child at home, e_j education, I_j an individual ideal number of children.

The value function of a divorced retiree j at time $t = T_R$ is defined as

$$\begin{aligned} V_{j,T_R}^{d,\text{ret}}(S_{T_R}^{d,ret}) = \max_{C_t^{d,ret}} \quad & u^j(c_{jt}, \ell_{jt}, Q_{jt}, n_{jt}) + \beta \mathbb{E}_t[V_{j,T_R+1}^{d,\text{ret}}(S_{T_R+1}^{d,ret})] \\ \text{s.t.} \quad & T = \ell_{jt} + q_{jt} \\ & Q_t = \pi_j q_{jt} \\ & c_{jt} = w_{jt}\bar{h} + y_{jt}(e_j) - CC_t(n_{jt}, \kappa_{jt}, e_j) \end{aligned}$$

In the terminal period of life, the continuation value is normalized to zero:

$$V_{j,T_R+1}^{d,\text{ret}} = 0$$

Problem of Married Couples Retiree Entering retirement, a married couple would not face divorce choice and thus the bargaining power remain at $\mu_t = \mu_{t-1}$. The household choice vector is given by

$$C_t^{m,ret} = \{h_{wt}, h_{mt}, \ell_{wt}, \ell_{mt}, q_{wt}, q_{mt}, p_t, c_t\},$$

where both partners working hours h_{wt}, h_{mt} are fixed at zero.

The state variables of a married household are

$$S_t^{m,ret} = \{K_{wt}, K_{mt}, n_t, \kappa_t, e_w, e_m, I_w, I_m, \psi_t, \mu_{t-1}\},$$

where K_{jt} denotes individual human capital, n_t the number of children, κ_t the age of the youngest child living at home, e_j education, I_j the individual ideal number of children, ψ_t a marriage-quality shock, and μ_{t-1} the bargaining weight of the wife carried over from the previous period.

The value function of married couples at time $t = T_R$ is defined as

$$\begin{aligned} V_{T_R}^{m,\text{ret}}(S_{T_R}^{m,ret}) = \max_{C_t^{m,ret}} \quad & \mu_t \, u^w(c_t, \ell_{wt}, Q_t, n_t) + (1-\mu_t) \, u^m(c_t, \ell_{mt}, Q_t, n_t) \\ & + \beta \mathbb{E}_t[V_{T_R+1}^{m,ret}(S_{T_R+1}^{m,ret})] \\ \text{s.t.} \quad & T = \ell_{jt} + q_{jt} \quad j \in \{w, m\} \\ & Q_t = (\pi q_{wt}^{\rho} + (1-\pi) q_{mt}^{\rho})^{\frac{1}{\rho}} \\ & c_t = \sum_{j \in \{w,m\}} w_{jt} h_{jt} + y_t(e_w, e_m) - CC_t(n_t, \kappa_t, e_w) \end{aligned}$$

In the terminal period of life, the continuation value is normalized to zero:

$$V_{T_R+1}^{m,ret}(S_{T_R+1}^{m,ret}) = 0$$

C.2 Age of the Youngest Child and Children Moving Out

Age of the Youngest Child The age of the youngest child, denoted by κ_t, is discretized into four categories:

$$\kappa_t \in \{NC,\ 0\text{–}6,\ 7\text{–}12,\ 13+\},$$

corresponding to no children, early childhood, middle childhood, and adolescence or older, respectively.

To reduce the state space, child aging is modeled probabilistically. Conditional on no new birth occurring in period $t+1$ (i.e., $b_{t+1} = 0$) and no children moving out (i.e., $x_{t+1} = 0$), the age category of the youngest child increases with probability $1/6$ and remains unchanged otherwise. If a new child is born ($b_{t+1} = 1$), the age of the youngest child resets to the 0–6 category. If children move out ($x_{t+1} = 1$), the household transitions to the no-children state.

The moving out process is described below. Formally, the law of motion for κ_t is given by

$$\kappa_{t+1} = \begin{cases} \text{0–6}, & \text{if } b_{t+1} = 1, \\ \kappa_t^+, & \text{if } b_{t+1} = 0,\ x_{t+1} = 0, \kappa_t \in \{\text{0–6},\ \text{7–12}\} \text{ with probability } \frac{1}{6}, \\ \kappa_t, & \text{if } b_{t+1} = 0,\ x_{t+1} = 0, \kappa_t \in \{\text{0–6},\ \text{7–12}\} \text{ with probability } \frac{5}{6}, \\ \text{13+}, & \text{if } b_{t+1} = 0,\ x_{t+1} = 0, \kappa_t \in \{\text{13+}\}, \\ NC, & \text{if } b_{t+1} = 0,\ x_{t+1} = 1, \kappa_t \in \{\text{13+}\}, \\ NC, & \text{if } \kappa_t = NC. \end{cases} \tag{C.1}$$

where κ_t^+ denotes the next higher age category.

Children Moving Out We allow children to leave the household after the fertile period T_f has ended. Let $x_{t+1} \in \{0, 1\}$ denote an indicator for a moving-out event at the beginning of period $t + 1$, where $x_{t+1} = 1$ indicates that children leave the household.

The moving-out process is stochastic and follows

$$x_{t+1} = \begin{cases} 1 & \text{with probability } q_t(n_t, \kappa_t), \\ 0 & \text{with probability } 1 - q_t(n_t, \kappa_t), \end{cases} \tag{C.2}$$

where the probability of a moving-out event depends on the number of children residing at home, n_t, and the age category of the youngest child, κ_t.

We impose the restriction that children are eligible to leave only if the youngest child is aged 13 or older and the household is past the fertile period. Formally,

$$q_t(n_t, \kappa_t) = \begin{cases} P & \text{if } n_t > 0,\ t > T_f,\ \kappa_t \in \{\text{13+}\}, \\ 0 & \text{otherwise}, \end{cases} \tag{C.3}$$

where $P = \frac{1}{12}$ following Bronson, Haanwinckel, and Mazzocco (2024).

For simplicity, we assume that when a moving-out event occurs ($x_{t+1} = 1$), all children residing in the household leave simultaneously. Consequently, after the fertile period T_f has ended, the number of children at home evolves according to

$$n_{t+1} = \begin{cases} 0 & \text{if } x_{t+1} = 1, t > T_f \\ n_t & \text{if } x_{t+1} = 0, t > T_f. \end{cases} \tag{C.4}$$

C.3 Problem of the Unmarried

Unmarried individuals face a marriage decision. In period t, a single woman meets a potential partner with probability λ_t, which captures search frictions and reflects the time required to

encounter potential partners. Each potential partner is characterized by his human capital K_{pt}, education level e_p, desired number of children I_p, and a temporary wage shock ϵ_{pt}, which is realized before the marriage decision. Thus, the state of a potential partner is $S_t^p = \{K_{pt}, n_{pt} = 0, \kappa_{pt} = NC, e_p, I_p, \epsilon_{pt}\}$.

The expected value of entering period t as a single Upon meeting, the pair draws an initial match quality ψ_0 and jointly decides whether to marry as follows. First, we define the value of individual j entering a period t as single and remaining single until the next period as $V_{jt}^{s\to s}$. Similarly, we define the value of individual j entering a period t as single and choose marry as $V_{jt}^{s\to m}(S_t^s, S_t^p)$, which depends on the state variables of both the individual and the potential partner S_t^p.

The expected value of entering period t as a single is:

$$EV_{j,t}^s(S_t^s) = \mathbb{E}\{\lambda_t[M_{j,t}^* V_{j,t}^{s\to m}(S_t^s, S_t^p) + (1 - M_{j,t}^*)V_{j,t}^{s\to s}(S_t^s)] + (1 - \lambda_t)V_{j,t}^{s\to s}(S_t^s)\}$$

where $M_{j,t}^* \in \{0, 1\}$ is the binary optimal marriage decision at t.

The value of remaining unmarried If $M_{j,t}^* = 0$, the individual remains unmarried in period t and waits until the next period to meet an alternative partner. The value function for remaining unmarried is

$$V_{j,t}^{s\to s}(S_t^s) = \max_{C_t^s} U_{jt}(c_{jt}, \ell_{jt}, Q_{jt}, n_t) + \beta \mathbb{E}_t[EV_{j,t+1}^s(S_{t+1}^s)]$$

s.t. time constraint (4), individual budget constraint (8),

home production (3), wage process (5), human capital evolution (6).

The value of entering marriage If $M_{j,t}^* = 1$, the individual enters marriage with a partner of state S_t^p. The value of transitioning into marriage, $V_{j,t}^{s\to m}(S_t^s, S_t^p)$, is determined in two steps.

First, the initial Pareto weight μ_t^0 is determined by the symmetric Nash bargaining game between the potential partners:

$$\mu_t^0(S_t^s, S_t^p) = \arg\max_{\mu} G_{w,t}^0(S_t^s, S_t^p, \mu)\, G_{m,t}^0(S_t^s, S_t^p, \mu),$$

where the initial marital surplus for individual j is

$$G_{j,t}^0(S_t^s, S_t^p, \mu) = V_{j,t}^{s\to m}(S_t^s, S_t^p, \mu) - V_{j,t}^{s\to s}(S_t^s).$$

Marriage occurs only if $G_{j,t}^0 > 0$ for both partners.

Second, given the optimal μ_t^{0*}, the household solves the joint decision problem:

$$\max_{C_t^m} \quad \mu_t^0(S_t^s, S_t^p)V_{wt}^{s\to m} + [1 - \mu_t^0(S_t^s, S_t^p)]V_{mt}^{s\to m}$$

s.t. time constraint (4), household budget constraint (7), home production (2), wage process (5), human capital evolution (6), children evolution (9).

The value of entering marriage for individual j is therefore

$$V_{j,t}^{s\to m}(S_t^s, S_t^p) = U_{jt}(c_t, \ell_{jt}, Q_t, n_t) + \psi_t + \beta\mathbb{E}_t[V_{j,t+1}^m(S_{t+1}^m, \mu_t^0)].$$

D Estimation Appendix

D.1 Husband earnings

Following Low, Meghir, Pistaferri, and Voena (2025), we estimate the husband's wage equation outside the structural model. Specifically, we use the pre-2016 CFPS sample of men aged 20–50 to capture the curvature of the life-cycle wage profile.

Because complete employment histories are not observed in the data, we cannot directly construct individual human capital stocks. Moreover, we assume that men always participate in the labor market regardless of marital status, so labor supply is not a choice variable. To maintain symmetry between the male and female wage processes, we normalize human capital such that its minimum corresponds to the starting age and its maximum corresponds to the retirement age.

Under these assumptions, log hourly wages are estimated as a function of age, age squared, and education, with age proxying for potential labor market experience. The standard deviation of the wage shock of the husband $\sigma_{\epsilon m}^2$ is directly estimated using the variance of residual wages after running an OLS regression.

Table D.1 reports estimates of log hourly wage equations. The estimated education effects are similar with and without year fixed effects. Therefore, we use the coefficients from the specification reported in the second column in the estimation. Figure D.1 presents the fitted life-cycle wage profiles for men implied by the estimated individual wage equation. The fitted curves closely track observed wages over the life cycle, indicating that the wage specification provides a very good fit to the male age-wage relationship.

D.2 Non-Labor Income

In the model, non-labor income captures heterogeneity in income composition across education groups. For example, less-educated individuals tend to rely more on agricultural or self-employment income, whereas higher-educated individuals derive a larger share from wage earnings. This also reflects differences in economic activity between urban and rural areas.

In the CFPS, total family income comprises five components: wage income, business income (gross and net), property income, transfer income, and other income. We define non-labor

Table D.1: Individual log hourly wage rates (CFPS 2010-2014)

	Log hourly wage	
	(1)	(2)
	Men	Men
Age	0.0740***	0.0727***
	(0.0116)	(0.0115)
Age Squared	-0.0010***	-0.0010***
	(0.0002)	(0.0002)
High School and Above	-1.7272***	-1.7084***
	(0.3161)	(0.3154)
High School and Above × Age	0.1186***	0.1170***
	(0.0187)	(0.0187)
High School and Above × Age Squared	-0.0015***	-0.0015***
	(0.0003)	(0.0003)
Constant	0.6570***	0.6791***
	(0.1963)	(0.1952)
Year FE		✓
Observations	12378	12378
R-Square	0.070	0.077

Note: Individuals aged 20-50. Before 2016. Whole Sample.. Standard errors are shown in parentheses.
* $p < 0.10$ ** $p < 0.05$ *** $p < 0.01$

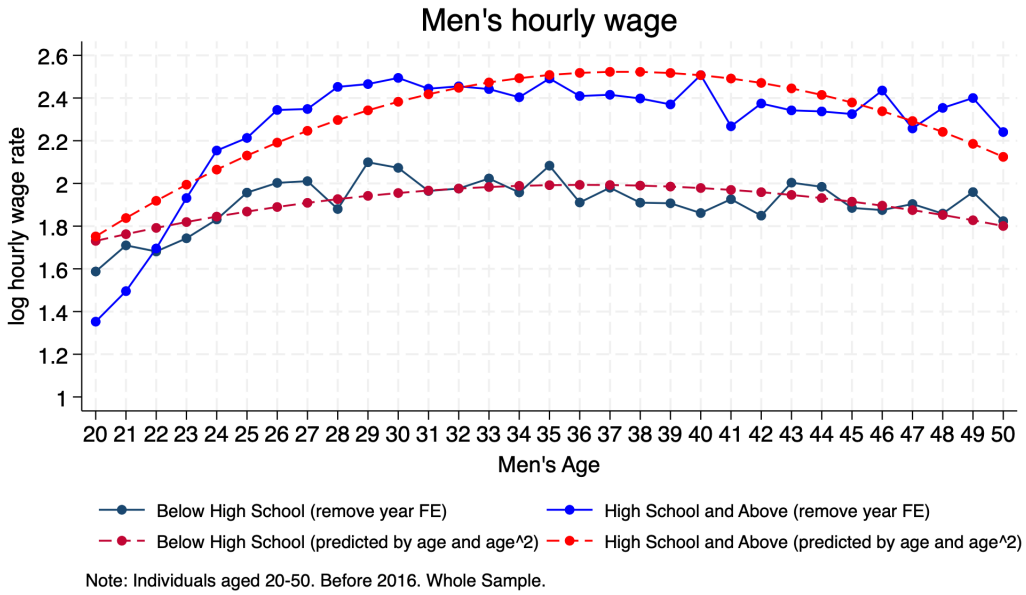


Figure D.1: Husband's wage profiles

income as total family income net of primary wage income. We compute average non-labor income by marital status and educational attainment. Education is categorized as low (below high school) or high (high school and above).

The results of married couples are reported in Tables D.2. Among married couple, non-labor income increases systematically with household educational attainment, ranging from 34,721 RMB in households where both spouses have below-high school education to 49,868 RMB in households where both spouses have high school education or above. Mixed-education households exhibit intermediate levels of non-labor income.

A similar gradient emerges among single individuals, as shown in Table D.3. Those with higher educational attainment receive substantially higher non-labor income, for both women and men. Moreover, single men with below-high school education exhibit the lowest levels of non-labor income.

Table D.2: Non-Labor Income of Married Couples by Education (CFPS 2010–2014)

	(1) Both Low educated	(2) Wife low educated Husband high educated	(3) Wife high educated Husband low educated	(4) Both high educated
Non Labor Income (RMB)	34720.519	39964.393	40460.123	49868.470
Observations	5789	714	1114	1750

Note: Individuals aged 20-50. Before 2016. Whole Sample.

Table D.3: Non-Labor Income of Singles by Education (CFPS 2010–2014)

	(1) Single Women Low educated	(2) Single Women High educated	(3) Single Men Low educated	(4) Single Men High educated
Non Labor Income (RMB)	31508.809	39172.085	27760.074	38226.708
Observations	773	1020	1596	1181

Note: Individuals aged 20-50. Before 2016. Whole Sample.

D.3 Biological fecundity

Biological fecundity, denoted f_t, declines with age. The probability of a child being born conditional on a couple attempting to conceive is based on the medical evidence reported in Leridon (2004). The estimated age-specific probability of fecundity is presented in Figure D.2. Women are infertile after age 45 and cannot have additional children.

D.4 Childcare Costs

We estimate the average monetary cost of childcare, denoted $CC_t(n_t, \kappa_t, e_j)$, allowing for variation by the number of children in the household (n_t), the age of the youngest child (κ_t), and the individual's highest education level (e_j). In China, the largest component of monetary expenditures related to children is education-related costs (Hu, Li, Li, Meng, and Nguyen, 2023). Therefore, we use these costs as a proxy for the overall monetary cost of childcare.

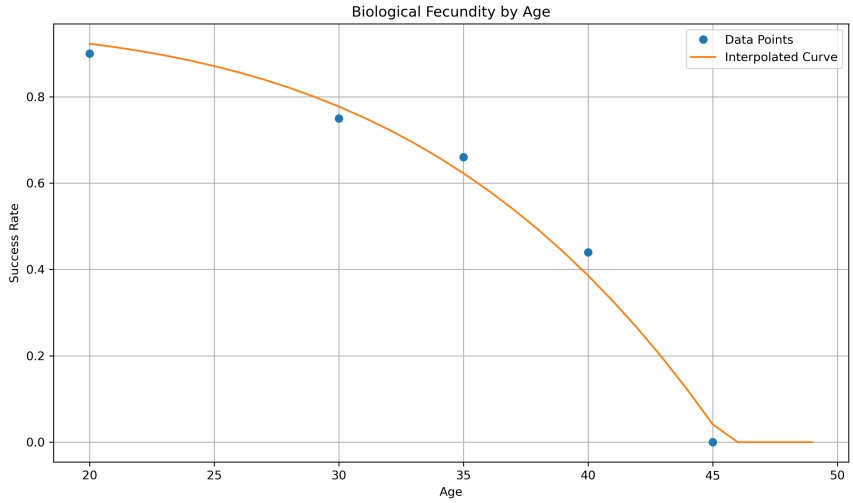


Figure D.2: Biological Fecundity by Women's Age

Table D.4 presents the childcare costs used in the estimation. Childcare costs increase with both the number of children and the age of the youngest child. Additionally, households with higher educational attainment incur substantially higher childcare costs at each child age category. For example, for a single child aged 0–6, the average annual childcare cost is 1,429 RMB for households where the mother has below high school education, compared with 2,807 RMB for households where the mother has high school education or above. Similar patterns are observed for households with two children and for older children, reflecting both the intensity and quality of childcare investments associated with higher-educated families.

Table D.4: Education Cost by Education Level, Number of Children, and Age of Youngest Child

Characteristics			Education Cost
Number of Children	Education Level	Age of Youngest Child	(10000 RMB)
1	Below High School	0–6	0.1429
1	High School and Above	0–6	0.2807
1	Below High School	7–12	0.2255
1	High School and Above	7–12	0.3803
1	Below High School	13–18	0.4136
1	High School and Above	13–18	0.6233
2	Below High School	0–6	0.2196
2	High School and Above	0–6	0.3843
2	Below High School	7–12	0.3252
2	High School and Above	7–12	0.4486
2	Below High School	13–18	0.4646
2	High School and Above	13–18	0.6922

D.5 Education-Specific Fertility Constraints

Between ages 22 and 45, the maximum number of children a woman can have, denoted by $n_{\max} = \{1, 2\}$, depends on her education level. This specification allows the model to match the observed shares of one- and two-child families in the data and captures institutional differences under the one-child policy. Specifically, rural women, who on average have lower educational attainment, faced less stringent fertility restrictions than urban women.

To discipline the mapping from education to $n_{\max}$, I use completed fertility outcomes of women aged 40–49 prior to 2016, who have largely completed childbearing under the one-child policy regime. Table D.5 documents substantial differences in completed fertility by education.

Permanent infertility is not modeled. As shown in Table D.5, childlessness among women aged 40–49 prior to 2016 is rare, with rates below 3% across all education groups. This indicates that fertility decisions in this cohort are largely characterized by variation in the number of children rather than by the extensive margin of having any children.

Table D.5: Completed fertility for women (age 40-49)

	(1) Women	(2) Women (Below High School)	(3) Women (High School and Above)
Childlessness Rate	0.028	0.028	0.032
Prop (Child Ever Born = 1)	0.448	0.377	0.760
Prop (Child Ever Born = 2)	0.523	0.595	0.208
Observations	5513	4494	1019

Note: Female aged 40-49. Before 2016. Whole Sample.

Let $\pi_e(n = 1)$ and $\pi_e(n = 2)$ denote the empirical shares of women with education level e who report having exactly one or two children, respectively. For each education group, the probability that a woman is assigned a maximum number of children equal to one is given by

$$\Pr(n_{\max} = 1 \mid e) = \frac{\pi_e(n = 1)}{\pi_e(n = 1) + \pi_e(n = 2)}, \tag{D.1}$$

and the probability of being assigned $n_{\max} = 2$ is

$$\Pr(n_{\max} = 2 \mid e) = \frac{\pi_e(n = 2)}{\pi_e(n = 1) + \pi_e(n = 2)}. \tag{D.2}$$

For women with less than a high school education, this implies

$$\Pr(n_{\max} = 1) = \frac{0.377}{0.377 + 0.595} = 0.388, \qquad \Pr(n_{\max} = 2) = \frac{0.595}{0.377 + 0.595} = 0.612.$$

For women with a high school education or above, this implies

$$\Pr(n_{\max} = 1) = \frac{0.760}{0.760 + 0.208} = 0.785, \qquad \Pr(n_{\max} = 2) = \frac{0.208}{0.760 + 0.208} = 0.215.$$

Among women with less than a high school education, the majority have two children (61.2%), compared with 38.8% with one child. In contrast, women with a high school education or higher are more likely to have only one child: 78.5% have exactly one child and 21.5% have two children.

The model introduces heterogeneity in fertility constraints via education-specific upper bounds on children. At the initial condition, women are probabilistically assigned a maximum fertility level $n_{\max} \in \{1, 2\}$, with assignment probabilities calculated above. Women assigned $n_{\max} = 1$ are restricted to having at most one child over the life cycle, whereas women assigned $n_{\max} = 2$ may have up to two children. When the two-child policy is removed, all couples are restricted to $n_{\max} = 2$, and no additional birth decisions are permitted once this threshold is reached.

D.6 Distribution of Characteristics among Single Men and Women

In the model, we assume that the husband's age $Age_H = Age_W + 2$, reflecting the average age gap observed in the CFPS data. Therefore, individuals form expectations about potential partners based on the distribution of two key characteristics: educational attainment and the ideal number of children. In each period, a potential partner is randomly assigned a type according to these distributions.

We estimate the probabilities of encountering a partner with a given characteristic using CFPS data, and the results are reported in Table D.6. The results show that the majority of individuals have below a high school education, with 69.8% of women and 67.2% of men falling into this category. Regarding fertility preferences, most individuals prefer two or more children, with 80.4% of women and 79.6% of men indicating an ideal number of children greater than or equal to two.

Table D.6: Distribution of Education and Fertility Preferences

	(1) Women	(2) Men
Below High School	0.698	0.672
High School and Above	0.302	0.328
Ideal Number of Children = 1	0.196	0.204
Ideal Number of Children ≥ 2	0.804	0.796
Observations	8009	7684

Note: Individuals aged 20-50. Before 2016. Whole Sample.

E Conterfactural Appendix

E.1 Women with High Fertility Preferences

This section presents counterfactual analyses for women with high fertility preferences. By construction, these women already achieve fertility outcomes close to their ideal number of children, leaving little scope for policy-induced fertility increases.

Table E.1 reports comparisons between the limited-commitment model and two counterfactual scenarios: full commitment and full maternal child custody in the event of divorce.

Table E.1: Alternative Commitment Assumptions: Women with High Fertility Preferences

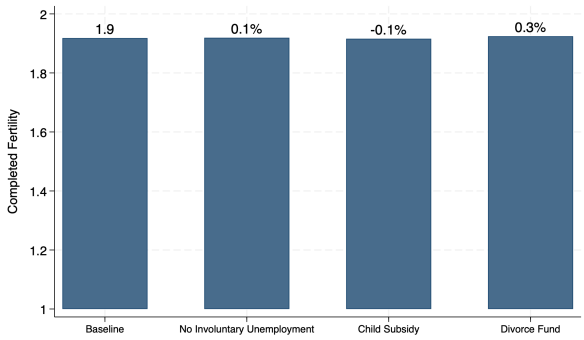
	Completed Fertility Rate (% Change)	Marriage Rate (% Change)
Full Commitment	$+0.87$	$+4.50$
Full Child Custody to Mothers	-0.93	-20.64

Notes: Changes are expressed as percentage deviations relative to the limited-commitment baseline.

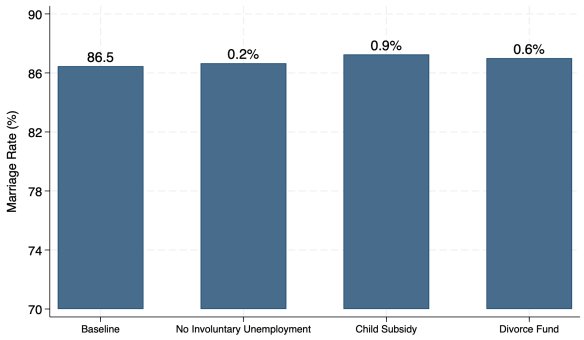
Figure E.1 analyzes the long-run effects of three policy experiments, including a job protection policy, a universal childcare subsidy, and a divorce-targeted childcare transfer.

First, the number of children remains largely unchanged across all policy scenarios relative to the benchmark.[29] Second, the policies operate primarily through other margins of adjustment. Removing unemployment frictions strengthens women's average working hours by 6.4%, improving their labor market outcomes and bargaining positions. Providing universal childcare subsidies, by contrast, reduces women's average working hours by 2.4%, and they spend more time on home production due to the income effects. Finally, the divorce-targeted transfer has two opposing effects on women's behavior. On one hand, by insuring women against the financial consequences of divorce, it reduces their incentive to work as a precaution against divorce risk, leading to an increase in their home production hours. On the other hand, it strengthens their post-divorce outside options, which improves their bargaining positions within marriage and reduces their share of home production relative to their husbands by 0.4%.

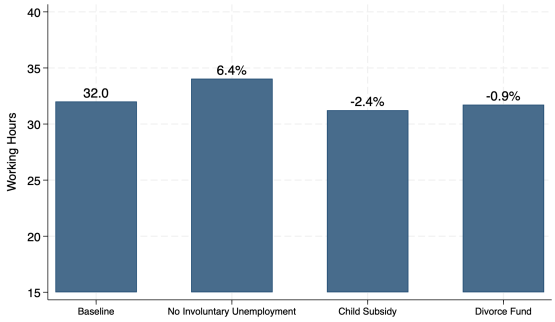
[29]The slight fertility decline under the universal subsidy arises because the transfer induces some women to enter marriage less selectively in order to capture the childcare payment at young ages, leading them to match with partners with lower fertility preferences and thus have fewer children. However, this effect is quantitatively small.



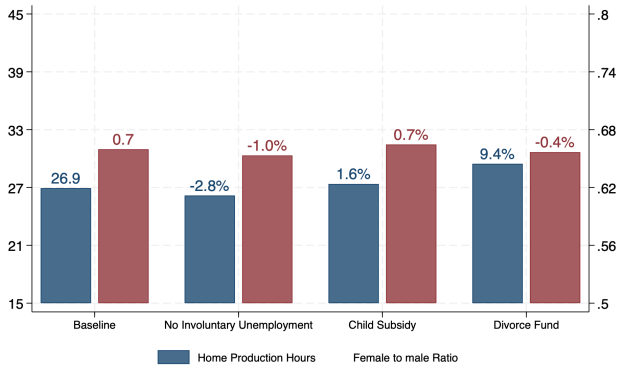
(a) Completed Fertility



(d) Marriage Rate (%)



(b) Working Hours



(c) Home Production

Figure E.1

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