Housing Wealth Allocation and Household Decisions: Evidence from China *

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May 5, 2023

Abstract

Among all economic resources, housing is often the largest component in the household asset portfolio. While a large and growing literature has studied the housing wealth effects on important household decisions, relatively little is known about the impacts of the allocation of housing wealth within the family. This study fills the gap by exploring a 2011 legal change in China that altered the property division rule upon divorce, from an equal-division regime to a title-based one. Using data from the China Family Panel Studies from 2010 to 2018, we adopted a difference-in-difference design and find that this change in property division rule decreased fertility rates by around 6% and household savings by 27%, respectively. Further results show that those effects are particularly evident in areas with high housing price appreciation. These results reveal the unexpected consequences of housing market dynamics and housing wealth allocation in explaining household decisions making, which are largely overlooked in the literature.

Keywords: Property Division, Divorce Law, Housing Market Dynamics, Fertility
JEL Codes: D13, J12, J13, R30

*We would like to thank Jeanne Lafortune, Xiaozhou Ding, and other participants at the Population Association of America 2022 Annual Meeting, the Society of Labor Economists 2022 Annual Meeting, and the Chinese Economics Association 2023 Annual Meeting.

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1 Introduction

Among all economic resources, housing is often the largest component in the household asset portfolio. While a large and growing literature has studied housing wealth has significant impacts on household financial decisions such as consumption and portfolio choices as well labor market decisions such as labor supply and retirement, [1] but relatively little is known about how the allocation of housing wealth within the family affects household decisions.

Theoretically, the allocation of housing wealth within the family can affect household decisions by affecting the commitment value of marriage. Marriage offers couples a way to share the costs of investments in public goods, such as children and household savings, by providing a contract that assures investing parties that both the gains and costs will be shared, even if the relationship dissolves in the future (Lundberg and Pollak, 1993; Matouschek and Rasul, 2008; Lundberg and Pollak, 2015; Lafortune and Low, 2020). Since the allocation of housing wealth can change the relative commitment value of the marriage contract, it can therefore affect household investment in those public goods. The paper employs a model of the household where investments in public goods incorporate housing wealth allocation to demonstrate this connection.

The challenge of estimating the impact of housing wealth allocation within a household is that this allocation is usually exogenous and correlated with other unobserved household characteristics. This paper addresses this challenge and fills the gap in the literature by examining a unique legal change in China that essentially changed property division laws for premarital property from an equal division to a title-based regime. To be more specific,

[1] In the context of developed countries, there is a large body of studies have found that house wealth has significant effects on household consumption and saving (Campbell and Cocco, 2007; Attanasio et al., 2009; Bostic, Gabriel and Painter, 2009; Disney, Gathergood and Henley, 2010; Aladangady, 2017), portfolio choices (Cocco, 2005; Chetty, Sandor and Szeidl, 2017), labor supply and retirement (Zhao and Burge, 2017), educational choices (Lovenheim, 2011; Lovenheim and Reynolds, 2013; Laeven and Popov, 2016), innovation and entrepreneurship (Adelino, Schoar and Severino, 2015; Corradin and Popov, 2015; Bernstein, McQuade and Townsend, 2017; Schmalz, Sraer and Thesmar, 2017), migration (Plantinga et al., 2013; Bloze and Skak, 2016), and marriage (Klein, 2017). Meanwhile, a growing number of studies have found housing wealth also plays an important role in developed countries such as China regarding household decisions (Li et al., 2020; Wrenn, Yi and Zhang, 2019; Sun and Zhang, 2020; Chu, Lin and Tsay, 2020; Painter, Yang and Zhong, 2022).

in 2011, the Chinese Supreme Court issued a new judicial interpretation of the standing Marriage Law. Before this ruling, premarital housing assets were brought into the marriage by one of the spouses, most often the husband was considered as joint property upon divorce, regardless of whose name was on the title and the timing of purchase relative to marriage. Since the 2011 interpretation switched the equal-division regime to a title-based one by affirming that in the case of divorce, the premarital housing assets would belong only to the registered owner after 2011.

Making use of this policy change to capture exogenous variations of housing wealth allocation within a household, we adopt a difference-in-difference estimation strategy and focus on two household decisions that are considered household public investments, one is childbirth, and the other is household saving. We use the China Family Panel Studies (CFPS) which has one wave in 2010, before the Supreme Court's ruling in 2011, and four waves (2012, 2014, 2016, and 2018) after the ruling. The CFPS also offers uniquely rich data on home titles and the time of home purchase, which allows us to define treated households by precisely identifying females who are potentially affected by the 2011 divorce law change. Particularly, our core sample includes households whose marital house is only under the husband's name.[2]

Based on this sample, we define the treatment group as families where the marital house is purchased before the marriage. This is because prior to 2011, the marital home was considered a joint asset and would be distributed equally upon divorce. After 2011, in contrast, that property is regarded as her husband's personal asset and would be awarded solely to him upon divorce. We define the control group as families who purchased their homes during the marriage and therefore are not affected by the 2011 divorce law change. The CFPS also provides comprehensive longitudinal data on childbirths, household savings and financial assets, and other demographic and economic variables. By adopting a difference-

[2]According to the CFPS, 61.51% of households are in this category. We focus on this core sample to make our treated and control group families comparable. Our robustness checks show similar results when we include households whose marital house is under the names of both the wife and the husband.

in-differences (DID) design, these features of the CFPS allow us to identify the effects of property law changes caused by the judicial interpretation on household public investment.

We find that the 2011 judicial interpretation has reduced birth rates and household financial assets, which is consistent with the theory that the title-based property division regime upon divorce can weaken the contract value of marriage, and therefore reduce household public investment. Particularly, title-based property division decreases birth rates by around 6 percentage points. Considering that the average fertility rate in our sample is 18.7 percentage points in 2011, the estimated effect translates into a 32 percent decrease. Meanwhile, we find that title-based property division decreased household savings and financial assets by 27.5 percent and 25.8 percent, respectively, suggesting the estimated effects on household savings are also substantial. The effects are particularly strong among families in areas with high housing prices appreciation.

This paper directly speaks to the literature that connects housing price, and housing wealth with fertility decisions in the context of China.[3] Most studies find that recent housing booms in China are negatively associated with fertility rates. For example, Yi and Zhang (2010) finds a 1% increase in house price is significantly related to a 0.45% decrease in total fertility rates in Hong Kong between 1971-2005. Liu, Xing and Zhang (2020) find that higher housing prices significantly reduce the fertility probability among renter families and those with self-built homes, but the response is not significant for homeowners using population census data from China. Making use of the CFPS, Tang and Coulson (2022) and Liu, Liu and Wang (2023) find no or even negative effect of housing value increases on fertility. One exception is Tan et al. (2023) which focuses only on the housing wealth effect and finds a positive effect of housing wealth on fertility outcomes using a regression discontinuity design based on a 2006 Chinese housing policy. This paper complements the literature by studying the allocation of housing wealth instead of the overall housing wealth effect.

[3]In the context of developed countries existing studies have found consistent evidence that housing wealth increases fertility rates in countries such as the United States (Dettling and Kearney, 2014; Lovenheim and Mumford, 2013), U.K.(Cumming and Dettling, 2020) Australia (Atalay, Li and Whelan, 2021), Japan(Mizutani et al., 2015), Canada (Clark and Ferrer, 2019), and Denmark(Daysal et al., 2021).

This paper is also closely related to studies that examine the consequences of divorce laws. There are two important types of changes in divorce laws: the first involves changes in the grounds for divorce (i.e., from mutual consent to unilateral), and the second relates to property division upon divorce, which involves switches between an equal-division regime and a title-based one. Previous studies in this field have mainly focused on the changes in grounds for divorce from mutual consent to unilateral divorce, especially the divorce reform that happened in the U.S. during the 1960s and 1980s. For example, Gruber (2004) finds that children exposed to unilateral divorce while growing up had worse outcomes later in life. Wolfers (2006) argues that unilateral divorce increased the divorce rates in the short run, but ultimately led to a slight decline in divorce rates in the long run. Stevenson and Wolfers (2006) finds that unilateral divorce was associated with a decline in female suicide rates and fewer cases of domestic violence. Rasul (2006) finds the change to unilateral divorce can cause married couples to be better matched than those previously married under mutual consent divorce laws. Alesina and Giuliano (2007) finds that unilateral divorce was associated with a decline in the fertility rate, while Drewianka (2008) finds that unilateral divorce led to an increase in the marital birth rate and a decrease in the nonmarital birth rate. Closely related to our study, several studies have discussed how the effects of unilateral divorce were affected by property division laws. For example, Stevenson (2008) finds that unilateral divorce led to an increase in married women's labor supply regardless of the underlying property division regime. Voena (2015) finds that in states that imposed an equal division of property, couples were more likely to respond to unilateral divorce by increasing savings and lowering the female labor supply than in states with the title-based system (i.e., assets are assigned to the spouse who holds the title to the property). Unlike those studies, our paper focuses on a change in property division upon divorce while keeping the rules that govern the grounds for divorce fixed.

More importantly, our paper tests alternative explanations of the effects of divorce laws. The existing literature mainly adopts the changes in relative bargaining positions as the

driving forces behind the effects of divorce laws (Gray, 1998; Stevenson, 2007, 2008; Chiappori, Fortin and Lacroix, 2002; Ligon, Hoddinott and Adam, 2003; Voena, 2015; Huang et al., 2021; Zang, 2020). For example, Huang et al. (2021) explores the same change in divorce law as in this paper and finds that shifting from an equitable distribution to a title-based regime causes reductions in wives' leisure and investment in children and increases in consumption that favors the husband. They claim the wives' weakened intrahousehold bargaining power is the underlying mechanism of those results. The weakened bargaining power among wives, however, cannot explain the decline in fertility. As described in Eswaran (2002), the mother carries a larger burden of childbearing through the damage done to her health. Hence, if her bargaining position weakens, then this damage will receive less attention in the couple's decision process, leading to a higher demand for children.[4] The prediction that a lower female bargaining power leads to higher fertility is supported by the recent work of Ashraf, Field and Lee (2014) based on an experimental study in Zambia. Thus, the weakened wives' intrahousehold bargaining power should increase fertility, and therefore cannot explain the declined fertility observed in our empirical analysis.[5]

To reconcile theory with empirical results, this paper provides an alternative explanation that changes in divorce laws can affect household behaviors by affecting the contract value of marriage. The contract value of marriage has been documented in the literature

[4]Similarly, Komura (2013) develops an intra-household bargaining model and shows the existence of equilibrium that yields sufficiently empowered women with low fertility rates. In their model, the household balance of power is endogenously determined to reflect social interactions, i.e., the fertility choices of the other couples in society.

[5]Besides the property division law upon divorce, previous studies have adopted other institutional changes as a "natural experiment" to measure changes in women's bargaining power. For example, Rangel (2006) considers a change in marriage law in Brazil. The new law extended alimony rights and obligations to couples living in consensual unions, which is treated as a redistribution of bargaining power in favor of women. This empowerment elevated the status of daughters with respect to the inheritance of family land, making their rights equal to those of sons. Deininger, Goyal and Nagarajan (2010) studies a change in inheritance law in two Indian states. Both studies demonstrate a causal relationship between a policy that increased women's bargaining power and their desired outcomes. Moreover, property-related income and assets are often adopted to measure women's bargaining power. For example, Schultz (1990) used transfers and income from property in Thailand, Beegle, Frankenberg and Thomas (2001) used the share of household assets owned by women in Indonesia, Quisumbing and Maluccio (2003) used current assets and assets at the time of marriage in Bangladesh, Ethiopia, Indonesia, and South Africa, Friedemann-Sánchez (2006) used ownership of assets in Colombia, Datta (2006) used property right in urban India, and Doss, Meinzen-Dick and Bomuhangi (2014) used the ownership of land in rural Ugandans.

showing that higher public good provision appears to occur in marriage as opposed to cohabitation. Children of married parents receive more investment than those of unmarried parents (Ginther and Pollak, 2004; McLanahan and Sandefur, 1994). In addition, Lafortune and Low (2020) shows that joint assets can affect the contract value of marriage. Our study adds to this literature by providing insights that the change in property division rules upon divorce can reduce public goods provision within households by lowering the contract value of marriage, an important but also neglected channel.

In addition, our paper adds to the existing literature on the 2011 judicial interpretation in China by exploring additional outcomes. Previous empirical studies examining this 2011 judicial interpretation have only focused on its impact on the marriage market, family dynamics between married couples from a household bargaining perspective, and children's outcomes. For example, Huang et al. (2021) finds that the 2011 judicial interpretation increased the employment probability of women, increased the alcohol consumption of men, and decreased family investment in children's education, suggesting that women's intrahousehold bargaining power decreased. Zang (2020) finds that the 2011 judicial interpretation decreased women's subjective well-being and confidence about the future, and increased housework hours and paid work hours in affected families. Zang, Hu and Wang (2021) finds that the 2011 interpretation increased the probability that the child's name is listed on the deed of the family home and decreased the child's undesirable behaviors such as quarreling with parents. In addition, Sun and Zhang (2020) finds that the judicial interpretation made it more difficult for women to obtain housing property by marrying up. As a result, the practice of assortative mating in the marriage market, in which women and men partner together based on socioeconomic status, has diminished after 2011. Our results on the impact of the 2011 interpretation on household public investments broaden the scope of this strand of literature by exploring the unexpected consequences of this policy change.

Finally, our study is related to the literature on demographic trends and their determinants in China. Previous literature mainly focuses on population planning policies such as

the one-child policy and its relaxation of fertility rates (Ebenstein, 2010; Li, Yi and Zhang, 2011; Liu, 2014). Results in this paper suggest that the changes in divorce laws can have an unexpected and profound impact on fertility in China. Those results suggest that the evaluation of population planning policies should also take into consideration the effects of changes in property-related divorce laws.

2 Institutional Background

2.1 Housing and Marriage Norms in China

China's urban housing market has experienced substantial structural changes during the past three decades, transforming from a welfare housing system to a market-oriented system. Under the welfare housing system, most of the urban houses were publicly owned by the state. The majority of urban residents were employed in the state-owned work unit (Danwei) and lived in public housing units for free or at a highly subsidized price. Starting in the early 1990s, the government implemented a series of market-oriented reforms to privatize urban houses and encourage private homeownership (Wang and Murie, 2000; Lee and Zhu, 2006; Hu, 2013; Yang, Chen et al., 2014; Chen, Yang and Zhong, 2020). Since then, private-market housing transactions have dramatically increased and housing prices almost tripled between 2000 and 2020 with an annual growth rate of 5.6% according to the statistics published by NBS (Wu, Deng and Liu, 2014; Fang et al., 2016). Accompanied by the escalating housing price and booming real estate, urban homeownership has prevailed and housing has gradually become the most important component in the Chinese household wealth portfolios (Painter, Yang and Zhong, 2022; Chen, Li and Wu, 2021; Li and Zhang, 2021).[6]

The rising urban housing price and prevalence of homeownership had profound impacts on urban households including cultural norms such as marriage customs. Traditionally, the

[6]As shown in the China Household and Finance Survey, over ninety percent of urban households own housing assets which contribute 89.96% of the non-financial assets and about 82.47% of total assets in 2015 (You et al., 2021).

husband is considered the head of the household, and the wife becomes integrated into the husband's family upon marriage. As compensation to the bride's birth family for raising her, the groom is expected to pay a "bride price", which also accounts for the bride's reproductive and work abilities (Anderson, 2007). The "bride price" later transformed into expectations for the groom to own a house, which has been viewed as a necessity for marriages, providing a sense of security, financial insurance, and a stable place to live.[7] As housing prices continue to increase at a faster speed than wages (Wu, Deng and Liu, 2014; Fang et al., 2016), family members and relatives often need to pool their money to help a groom purchase a marital home.

2.2 Property Rights in Chinese Marriage Laws

In 1950, the Chinese Supreme Court announced its first Marriage Law, allowing for unilateral divorces. However, divorce was still incredibly difficult in reality due to various institutional factors (Wang, 2013). The subsequent Marriage Law in 1981 further simplified the procedure of divorces for couples without mutual affection, which led to a substantial increase in divorces (Platte, 1988). Most often, the disputes in divorces concerned homeownership (Conroy, 1987). To address this issue, the Chinese Supreme Court established a new clause in 1993 clarifying that housing purchased before marriage would become joint property upon divorce, conditional on common usage for at least eight years (Article 6). In 2001, a new amendment was passed that considered properties obtained during the marriage (e.g., income, profits from business and production, intellectual property, inherited property) as joint property after divorce (Article 17). There were two subsequent judicial interpretations of this Marriage Law: the first interpretation offered ownership or right of habitation to the party placed in a difficult living situation upon divorce (Article 27); the second interpretation states that housing obtained from one of the spouse's parents during the marriage would be considered joint property upon divorce (Article 22).

[7]The rental market in China has been relatively less regulated and renters often need to move frequently, which especially has negative implications for children's schooling options.

In 2011, a third judicial interpretation revoked the precedent set by the two prior interpretations and ruled that housing properties purchased by one party before marriage would be considered his/her personal assets, given that only his or her name is on the deed. Upon divorce, the new interpretation also expects the property owner to be assigned to the party that made the initial down payment prior to marriage, even when the other party contributed to paying the mortgages (Article 10). The party who helped pay the mortgages may receive some financial compensation in this case, however, the exact amount is not specified in the law, and in reality, the amount is typically less than the real housing values. In addition, the new interpretation stated that if the parents of either spouse purchased a family home during the marriage, the property would be a gift to the spouse whose parents paid for the property and would be returned to him/her after divorce (Article 7). Furthermore, if the married couple purchased a housing unit from the work unit of one spouse's parents before the housing reform, in which case the housing unit would be registered under the name of the spouse's parents, the property would then belong to the spouse's parents after divorce (Article 12). In theory, the 2011 judicial interpretation pre-assigned a share of the family home to each couple based on their proportion of the down payment contributed. In reality, however, even if the wife and her natal family contributed to purchasing a home, only the husband's name would be typically listed on the deed and the wife would not share the housing property upon divorce because they often did not have a proof for their financial contributions of the purchase (Fincher, 2016).

The 2011 interpretation can be seen as an effort to decrease the number of property disputes and protect the private property of the husband's birth family. In other words, due to the soaring housing prices since the 2000s, the husband typically requires financial support from his birth family to purchase a family home (Wei and Zhang, 2011), which means that his divorce often comes as a tremendous financial loss to his birth family.

2.3 Fertility Rates and Population Planning Policies in China

As the world's largest population, fertility in China, however, is declining at an accelerating rate in recent decades, making fertility in China one of the lowest in the world (Guo, Gietel-Basten and Gu, 2019). According to China's National Bureau of Statistics, there were 10.62 million births in 2021 (equalling 7.52 births per 1,000 people) and the natural growth rate of the population was only 0.034%, which is the lowest since 1949 (Figure B1).

The literature has explored three major explanations for the decline of fertility rates in China. First, starting in 1971, the "National One-child Policy" significantly reduced fertility rates since its implementation (García, 2022; Huang, Lei and Sun, 2021; Li et al., 2005). Moreover, as a consequence of the one-child policy, the distorted sex ratio and normalized one-child family structure can also reduce the willingness of having more children in the long-term (Li et al., 2016). Second, with the remarkable social and economic transition since the 1980s, childcare, education, and housing costs of having additional children were rising dramatically, placing heavy financial burdens on young parents and preventing them from having more children (Zang et al., 2021; Liu, Liu and Wang, 2021; Wang, 2021). Third, the gender inequality in the Chinese labor market, such as the absence of paternity leave and discriminatory hiring practices makes it impossible for women to balance work and motherhood, which creates additional hindrances of child-bearing (Zhou, 2019).

Declining fertility can lead to negative consequences such as accelerating population aging, skewed sex ratios, and declines in the working-age population, which would threaten economic growth. To combat the looming demographic crisis, Chinese policymakers have thought about overturning the decades-long family planning policy. With the fear that completely lifting the policy would lead to a baby boom, policymakers have been cautious with a series of gradually introduced exemptions. By 2007, all provinces (except Henan, which followed in 2011) had started to permit couples who were both only children to have two children. In November 2013, couples in which at least one of the marital partners was an only child were allowed to have two children. In October 2015, China's one-child policy was

replaced by a universal two-child policy (Zhang, 2017; Tatum, 2021; Wu, 2022). However, despite the national relaxation of the one-child policy, the birth rate is still decreasing and keeps reaching a historic low in recent years. This study contributes to the broad literature that explores the underline mechanisms of declining fertility in China by providing a novel insight, connecting changes in marriage laws with declining fertility.

3 Model: Public Goods Investment within Household

In this section, we present a model of marriage with children as public goods in which only the wife can invest, at the cost of her future earning potential. Assuming household decisions while married are made collectively, we first develop the full commitment baseline, where properties are divided equally upon divorce and the resulting allocations are efficient. We then introduce the fact that couples cannot commit to resource allocation in divorce, where the property is divided based on the title. We show that this title-based regime leads to an inefficient reduction in household investment in public goods.[8]

3.1 Setup

Following Lafortune and Low (2020), we assume a couple lives for two periods and cares about private consumption (c), over which they have concave utility, and a public good (Q). Utility for partner k in period t is thus of the form

$$U_{kt} = u(c_{kt}) + Q.$$

Let Ω_w and Ω_h represent the earnings of the wife and husband. In this model, we assume $\Omega_w = \Omega_h$.[9]

[8]The model can be extended to discuss more general public goods where both wife and husband can invest, at a cost to their future earning potential.

[9]This assumption can be relaxed if we want to discuss household specialization.

In the first period, the wife selects the level of time investment, $\tau_w \in [0, 1]$, for the public good such as children. These investments come at the cost of future earnings. We assume workers are restricted to spending a unit of time investing in either work or the public good investment.[10] Thus, the wife's second-period earnings will be $\Omega_w(1 - \tau_w)$. As a result, the higher the level of investment, the higher the utility partners derive from the public goods, but also the lower the consumption possibilities in the second period. The function $Q(\tau_w)$ is increasing and a concave function of mother's time τ_w. Here, we assume only the wife can invest in public goods. The couple is married in the first period and their income and utility are certain. We assume couples earn only a fraction μ of their income Ω, representing income growth over time.

In the second period, there is a probability $p \in [0, 1]$ that the couple will get divorced. Individuals may receive different consumption when divorced than when married, so the second-period consumption utility will be given by

$$E(u(c_{2k})) = (1 - p)u(c_{2k}^m) + pu(c_{2k}^d),$$

where $k = w$ or h, and c_{2k}^m denotes the consumption of individual k when married and c_{2k}^d denotes the consumption when divorced. Individual k's utility is thus:

$$U_k = u(c_{1k}) + E(u(c_{2k})) + 2Q(\tau_w).$$

The public good function Q is multiplied by 2 since parents enjoy the public good in both periods.

To incorporate the impact of the property division upon divorce, we assume that the husband owns a house before marriage and this property can be capitalized and valued A in period 2.[11] The capitalized housing asset is equally divided among wife and husband if

[10] Unlike Voena (2015) and Chiappori and Oreffice (2008), our model does not feature leisure.

[11] This assumption is consistent with our data sample where the majority of the houses are titled under the name of the husband.

the couple stays married or if the couple gets divorced and the divorce law requires equal distribution upon divorce; otherwise, the capitalized housing asset will be assigned to the husband if the couple gets divorced and the divorce law requires a title-based distribution.

3.2 Couple's problem

We assume that a couple maximizes the sum of their utilities, or joint household production, over the choice variables of the wife's investments in the public good. Then, the couple's problem can be summarized as:

$$max_{\tau_w} u(c_{1w}) + u(c_{1h}) + E(u(c_{2w})) + E(u(c_{2h})) + 4Q(\tau_w) \tag{1}$$

subject to the following constraints:

$$c_{1w} + c_{1h} = 2\mu\Omega$$

$$c_{2w}^d + c_{2h}^d = c_{2w}^m + c_{2h}^m = (1 - \tau_w)\Omega + \Omega + A$$

$$\tau_w \in [0, 1]$$

When there is an interior solution, investments in the public good will be made until:

$$-\frac{\partial E(u(c_{2w})) + E(u(c_{2h}))}{\partial \tau_w} = 4\frac{\partial Q(\tau_w)}{\partial \tau_w} \tag{2}$$

Since investing in τ_w increases child quality or quantity while decreasing second-period consumption through the budget constraint, this condition simply requires that the marginal benefit of investing in public goods in terms of utility derived from them be equated to the expected marginal cost.

3.3 Equal distribution vs. title-based distribution upon divorce

To first establish the full commitment or equal distribution benchmark, we assume individuals can reliably commit to how to share resources when divorced. Since they behave cooperatively (or collectively with equal Pareto weights), the optimum will be equal sharing of resources in all periods and states of the world such that consumption of both partners in the first period will be given by $c_1 = \mu\Omega$ and consumption of both partners in either marriage or separation in the second period will be given by

$$c_2 = \frac{1}{2} * ((1 - \tau_w)\Omega + \Omega + A).$$

Using the fact that we will have equal sharing and perfect commitment, and that divorce does not affect income, the second-period consumption will be the same no matter whether the divorce shock is received.

Let us now assume a title-based divorce law where the husband maintains property A in the second period while the wife gets no housing asset. Second-period consumption will stay the same as in the last section if the couple stays married, but if the couple gets divorced, then their consumption is no longer equally divided and becomes

$$c_{2w}^d = \frac{1}{2} * ((1 - \tau_w)\Omega + \Omega)$$

$$c_{2h}^d = \frac{1}{2} * ((1 - \tau_w)\Omega + \Omega) + A$$

By affecting second-period consumption, divorce laws regarding the division of premarital properties can affect household public investments such as the number of children. We summarize this effect in the proposition 1.

Proposition 1 *Suppose τ_w^t and τ_w^e denote the time the household investment in public goods*

under equal distribution and title-based distribution upon divorce, separately, we then have

$$\tau_w^t < \tau_w^e, \quad \textit{and} \quad Q(\tau_w^t) < Q(\tau_w^e).$$

Proof: See Appendix.

Proposition 1 suggests that the title-based distribution upon divorce increases the marginal cost and thus reduces public good investment. In the case of fertility, this proposition implies that title-based distribution upon divorce leads to a lower fertility rate.[12] This provides testable predictions that motivate our analysis in the empirical section.

4 Data and Measures

4.1 Data

We use data from the 2010-2018 waves of the China Family Panel Studies (CFPS). CFPS is a nationally representative longitudinal survey with high-quality information at the individual (both adult and youth), family, and community levels. It was officially launched in 2010 and was followed up every two years thereafter, that is in 2012, 2014, 2016, and 2018 (Xie and Hu, 2014). The 2010 baseline wave covered 14,960 families with 33,600 adults and 8,990 children in 25 out of 34 provinces,[13] representing approximately 95% of the mainland Chinese population (Xie, 2012).

The CFPS offers several unique features that enable our difference-in-difference (DID) design to examine the effects of the 2011 change in divorce law on household public goods investments. First, it records detailed information on a family's housing properties including names on the title and the year of purchase. This information allows us to define treated households by precisely identifying females who are potentially affected by the 2011 divorce

[12] This proposition also implies that title-based distribution upon divorce leads to a fewer number of children.

[13] The excluded regions include Hong Kong, Macao, Taiwan, Xinjiang, Tibet, Qinghai, Inner Mongolia, Ningxia, and Hainan.

law change. For example, we consider a wife in a family whose house was bought before her marriage and registered solely in her husband's name to be in the treated group. This is because prior to 2011, the marital home was considered a joint asset and would be distributed equally upon divorce. After 2011, however, that property is regarded as her husband's personal asset and would be awarded solely to him upon divorce. Second, the CFPS contains one wave before and four waves after 2011. This longitudinal nature not only allows the comparison of household behaviors before and after the 2011 divorce law change for the same households but also allows us to explore the changes in household behaviors over time. Finally, the CFPS collects detailed information on key measures of household public goods, including fertility and household saving, and financial investments, as well as rich sociodemographic information at individual and family levels.

We focus on married women who stayed in the same marriage in the 2010-2018 waves to avoid potential confounding effects of changes in marital status. Based on the names on the title of the martial home, we categorize all families into four categories: 1) house registered only under the husband's name (61.51%),[14] 2) house registered only under the wife's name (10.90%), 3) registered under the names of both the wife and the husband (1.45%), and 4) registered under the name of neither the wife nor the husband (22.7% individual).[15] We keep families whose family home was titled only under the husband's name to make our treatment and control groups more comparable. We further restrict the sample to females who were born after 1954 (i.e., age 55 or younger in 2010) because they were still reproductive in our sample period. Our core sample consists of an unbalanced panel of 5,652 married women with 25,208 person-year observations.[16]

[14] In China, it is common for parents and/or grandparents to provide financial support purchasing the marital home. Therefore, this category also includes families whose marital home is under the names of the parents and/or grandparents of the husband. The same applies to the house titled under the wife's name.

[15] In this category, 88% of households lived in a rental house and the rest live in the house freely provided by the third party such as government, working unit, friends, etc.

[16] A sample construction flow chat is presented in Table B1. The attrition rates are 7.47%, 1.91%, 8.01%, and 5.13% in 2012, 2014, 2016, and 2018, respectively.

4.2 Construction of Treatment and Control Groups

Our core sample includes households whose family house is only under the husband's name. Among this core sample, we define our treatment and control groups based on the timing of marriage and home purchase.[17] Specifically, the treatment group consists of families whose family home was purchased before the marriage, while the control group consists of families whose family home was purchased during the marriage.[18] For wives in the treatment group, the family home was considered joint property upon divorce before 2011; However, the same family home was considered as the husband's personal property upon divorce after 2011. For wives in the control group, the family home was considered as joint property upon divorce before and after 2011, so they are not affected by the 2011 judicial interpretation. There are 1,680 married women in the treatment group and 3,972 married women in the control group.

4.3 Dependent Variables

We measure two types of household public goods investments: children and financial assets. Children are considered a type of household public goods because both parents could enjoy the benefits of having children, which are non-rival and non-excludable (e.g., Folbre, 1994; Weiss and Willis, 1985). The mother tends to bear most of the costs related to childbearing and childrearing, whereas both parents comparably share the benefits of children. Hence, we create two binary variables indicating fertility decision: $BirthNextYr$ (1 = having children born in the next year) and $BirthNext2Yr$ (1 = having children born in the next two years) considering that the couple usually makes a fertility decision one or two years before the birth of the child. We calculated those fertility outcomes backwardly by comparing the interview year of couples and the birth year of children covered in five available later waves.

[17] Huang et al. (2021) defined treatment and control groups in a similar way.

[18] For robustness checks, we further add families whose homes were purchased under both names of the spouses or were rented in our control group, as those families were also arguably not affected by the 2011 judicial interpretation. Results are shown in Table 11 and Table 12, and are highly consistent with our main results.

Specifically, the female interviewed in year t was deemed to give birth the next year (or in the next two years) if her children were born between t and $t+1$ ($t+2$). To validate these fertility measures, we compare the fertility rates calculated using the CFPS and the National Sample Survey on Population Changes published by NBS as a further check. Results in Table B2 show that fertility rates calculated based on the two data sources are comparable across age groups.

Financial assets are also considered public goods within a family. We construct two continuous variables with the first one measuring the values of household savings and the other measuring the total values of financial products such as bonds, mutual funds, and stocks. Both variables are adjusted to the 2010 level by CPI published in the National Bureau of Statistics and are trimmed at the 5th and 95th percentiles to avoid the effects of outliers.

Additionally, we examine the effects of the 2011 judicial interpretation on other behavioral outcomes for the wife, including labor force participation, working hours per week, personal income, housework hours per day, sleeping hours per day, and the attitude towards the importance of being rich. Details of variable construction can be found in Table B3. Those variables are not included as key outcomes but they can be theoretically affected by the legal change, in ways that are consistent with the results found in the literature (Huang et al., 2021; Zang, 2020).

4.4 Pre-treatment Characteristics

We consider a set of pre-treatment characteristics, including age, the length of the marriage, the number of children, household size, urban residential status, and household registration status (hukou). Among these characteristics, age, the length of the marriage, the number of children, and household size are time-variant variables while the others are time-invariant variables. Specifically, the length of the marriage is calculated by subtracting the year of marriage from the interview year. The number of children is defined as the count of children

based on the family member questionnaires. Household size is defined as the number of co-resident family members. Urban residential status is entered as a dummy variable indicating residing in urban areas. The household registration status is a dummy variable with one indicating agricultural hukou and zeroes indicating urban hukou. We examine both urban residential status and hukou status because a large proportion of households (44.19% in CFPS 2010) may live in urban areas but hold an agricultural hukou due to the massive internal migration in China (Song, 2014).

4.5 Summary Statistics

Table 1 presents summary statistics for households in control and treatment groups. Columns (1) and (2) report the mean values of corresponding variables for the control and treatment groups, respectively. Independent T-tests are applied to examine group differences and these results are displayed in column (3). As shown in Table 1, females in the treatment group were more likely to have children in the next year or next two years and owned more savings and financial assets than the control group[19]. In terms of sociodemographic characteristics, on average, wives in the treatment group were younger (mean age 33 v.s.43),[20] had shorter marriages, fewer children, larger family sizes, were less likely to live in urban areas, and were more likely to have a rural hukou. It is worth noting that the pre-reform differences in predetermined characteristics between C-T groups would not threaten the validity of our identification as DID estimator only requires the paralleled trends assumption which will be further elaborated in Section 7.1. Besides, we also displayed the summary statistics of supplementary outcomes in Table A1. Overall, wives in the treatment group performed poorer in the labor market, had less income and fewer working hours, and were more likely to be out of the labor force. They also spent less time on housework and sleeping and were less likely to believe being rich is important.

[19] As mentioned below, the pre-reform differences in household public goods investment can be largely attributed to the age difference between C-T groups.

[20] To examine the potential confounding effects of age on our results, we conducted a robustness check by focusing on wives who are between 35 and 40, see section 7.3.

Figure B3 presents the change in fertility rates by control and treatment groups in our core sample. Consistent with the national trend presented in Figure B1, the birth rate decreased continually over the five waves in CFPS and hit the lowest point (0.49 %) in 2018. It is also worth noting that the birth rate of the treatment group is higher compared with the control group and decreased significantly after the 2011 judicial interpretation.[21]

5 Empirical Strategy

We adopt a DID strategy to examine the effect of the 2011 judicial interpretation on household public goods investments, by comparing the behaviors between the treatment and control groups before and after this legal change. With the potential risks of losing the marital home upon divorce, wives in the treatment group may become more self-interested and more reluctant to invest in household public goods after this legal change. Considering that it takes time for households to understand and react, we expect that the behavioral changes would emerge gradually, and the magnitudes would be greater over time. We estimate two sets of models with the following specifications:

$$Y_{it} = \beta_1 \left(Treat_i \cdot Post_t\right) + X'_{it} \cdot \gamma + \eta_i + \delta_t + \epsilon_{it} \tag{3}$$

$$\begin{aligned} Y_{it} = \theta_1 \left(Treat_i \cdot Year2012_t\right) + \theta_2 \left(Treat_i \cdot Year2014_t\right) + \theta_3 \left(Treat_i \cdot Year2016_t\right) \\ + \theta_4 \left(Treat_i \cdot Year2018_t\right) + X'_{it} \cdot \gamma + \eta_i + \delta_t + \epsilon_{it} \end{aligned} \tag{4}$$

where Y_{it} measures investments in household public goods for household i in year t. The key explanatory variable, $Treat_i$, is a dummy variable indicating whether household i is in the treatment group. $Post_t$ is an indicator for the post-reform period. $Year2012_t$, $Year2014_t$, $Year2016_t$, and $Year2018_t$ are indicators for the years 2012, 2014, 2016, and 2018, respectively. In line with Huang et al. (2021), X_{it} contains a vector of time-varying control variables that may predict the outcome, which includes age, the length of the marriage, the number of

[21] We observe similar trends for the sample of females aged between 35 and 40 in Appendix Figure B3.

children, and household sizes. η_i and δ_t denote individual and year-fixed effects, respectively. ϵ_{it} is an error term. We clustered standard errors at the household level for both models. The coefficients of the interactions, β_1 and $\theta_1 - \theta_4$, are the parameters of interest that capture the aggregate effect and year-specific effects of the legal change, respectively.

6 Estimation Results

6.1 Main Results

Results estimating Equations 3 and 4 are presented in Panels A and B in Table 2, respectively. We find that the 2011 judicial interpretation decreased households' investments in household public goods in terms of childbirth and joint financial assets. As reported in Columns (1) and (2) of Panel A, the estimated coefficients are -0.059 and -0.056, suggesting that the fertility rate in the treated group decreased by about 5.9 percentage points in the next year and 5.6 percentage points in the next two years compared to those in the control group. Given that the average fertility rate was 18.7 percent in 2011 and 22.2 percent in 2012, those coefficients suggest that the judicial interpretation decreased the probabilities of having children in the next year and the next two years by 31.55 % and 25.23%, respectively. These effects on fertility are substantial. For example, the 5.9 percentage points drop in column (1) is accumulated in seven years and can be translated into about a 0.84 percentage point drop annually. Based on the number of affected females calculated in Census 2010, our estimate suggests that the 2011 judicial interpretation could lead to approximately 0.4 million fewer children being born each year. According to Huang, Lei and Sun (2021), China's one-child policy reduced 1.6 million newborns per year between 2005 and 2015. Hence, by rough calculation, the unintended effect of the 2011 judicial interpretation in reducing fertility is sizeable, equivalent to nearly one-quarter as large as that of the one-child policy.

Panel B presents year-specific effects, showing similar magnitudes as in Panel A. Moreover, the effect of the legal change increases over the years, which is consistent with our

hypothesis of potential cumulative effects. Another explanation of larger effects after 2014 might be related to the gradual relaxation of the one-child policy since 2013, which makes it possible for families to change their fertility decisions in reaction to the legal change of marriage law.

The 2011 judicial interpretation also led to a decrease in financial investments. Specifically, the coefficients in Columns (3) and (4) of Panel A are -0.275 and -0.258, respectively, indicating decreased investments in savings and other financial products among the treated households after the legal change. Considering that the mean value of logged savings and financial assets were 3.26 and 3.38 in 2010 in our sample, the magnitudes of the effects translate to 31.7% and 29.4% decreases in the mean logged savings and other financial products. Meanwhile, in Panel B, we do not observe increasing trends over the years in the effect of financial investments as we observed for fertility. Although all the year-specific coefficients are negative, only the 2012 and 2016 effects are significant. https://www.overleaf.com/project/618e8bc8cd92593d7874c2b1

For supplementary analyses, we also explore the effects of the 2011 judicial interpretation on other behavioral outcomes among wives, including labor force participation, work hours, income, housework hours, sleep hours, and attitudes towards being rich. These outcomes are not household public goods but may have implications for our theoretical predictions. Results are presented in Table A2. For labor market outcomes, the 2011 judicial interpretation led to increases in labor force participation, work hours, and personal income among wives in the treatment group. These findings are consistent with those in previous works (Huang et al., 2021; Zang, 2020). We find that the 2011 judicial interpretation increased wives' sleep hours, decreased their housework hours, and made them more likely to think being rich is important. These results provided some evidence supporting our hypotheses: wives in treated households became more self-centered and deviated their attention away from family responsibilities.

6.2 Heterogeneous Results

6.2.1 Heterogeneous Effects by Housing Value

With the progress of urbanization and economic development, housing prices hit a record high in the majority of Chinese cities since the early 2000s (Ren, Xiong and Yuan, 2012), making housing a dominant asset among homeowners (Li et al., 2020; Chen, Yang and Zhong, 2020).[22] Meanwhile, the appreciation of housing prices experienced substantial heterogeneity with an almost 10 percent annual increase in most large cities and a much more moderate increase in smaller cities and rural areas. This can lead to heterogeneous effects of the 2011 judicial interpretation. Specifically, wives whose marital home is appreciated more could be more responsive to this legal change because they face larger financial losses upon divorce.

To test this hypothesis, we make use of the self-reported value of the marital home in the CFPS and split our sample by its median. Results are presented in Table 4. We find that the effects of the 2011 judicial interpretation are stronger and more robust among households whose marital homes were more expensive. The between-group comparison shows that the magnitudes for all four outcome variables are significantly larger among households with greater home value appreciation compared to households with smaller home value appreciation.[23]

6.2.2 Heterogeneous Effects by hukou Status

Rural-urban disparities are substantial in China (Park, 2008). Much of China's urban-rural inequality can be attributed to the hukou system.[24] Therefore, hukou status can play an

[22] Recent studies in the context of China show that housing price affects a large set of household behaviors such as consumption, saving, and labor supply (e.g., Dong, Hui and Jia, 2017; Liu, Liu and Wang, 2021; Painter, Yang and Zhong, 2022).

[23] Mortgage status may also matter for the effects of the 2011 judicial interpretation as it clarified that the jointly paid loan during marriage and its added values are deemed as the couple's marital property which will be further divided upon divorce. However, further analysis in Appendix table B5 shows that only 5% of households report they owe a mortgage in our sample and the effects of the 2011 judicial interpretation are not significant among them.

[24] A detailed description of China's hukou system and its relationship with the urban-rural inequality can be found in Liu (2005) and Afridi, Li and Ren (2015)

important role in determining the behavioral responses to the judicial interpretation. On the one hand, the impact of judicial interpretation could be more profound among wives with rural hukou because housing wealth accounts for a larger proportion of household assets in rural areas, and thus, losing the marital home may have a larger impact on them. On the other hand, due to their inferior economic status, wives with rural hukou tend to be more dependent on their husbands and are less likely to initiate divorces compared with wives with urban hukou. From this perspective, they are less likely to be affected by this legal change.

Moreover, there is a large rural-urban variation in terms of the strictness of the one-child policy. The one-child rule was strictly enforced for urban residents. In rural areas, this rule was particularly unpopular and deemed virtually unenforceable. As a result, from 1984, rural couples in most provinces were allowed to have a second child if their first was a girl, the so-called 1·5-child policy. In the six northwestern provinces, all rural couples were allowed a second child, irrespective of the sex of the first child.[25] These variations created a substantial difference in the total fertility rate between rural and urban regions. This policy difference may lead to the rural-urban heterogeneous effects of the 2011 legal changes on fertility.

Results of subgroup analyses by hukou status are reported in Table 3. The results for families with rural hukou are consistent with the results in Table 2. The legal change decreased fertility both immediately and in the long run and decreased their financial investments, especially in 2012 and 2016. By contrast, the effects among families with urban hukou are weaker, with significant effects only for fertility in later years. We also examined the heterogeneous effects between households living in urban and rural areas(Table B4). We observe a similar disparity, where the effects in rural areas are larger and more robust compared to households in urban areas. The differences in these two sets of results are likely due to the massive expansion of urbanization and the large-scale rural-to-urban migration (Chan and Zhang, 1999; Fan, 2007). Overall, these results suggest that wives in rural areas or with rural

[25]Ethnic minorities are allowed to have two or more children and they account for around 9% of the total population (8% of our analysis sample).

hukou were strongly affected by the 2011 judicial interpretation, possibly because housing accounts for an especially larger share of household wealth.

6.2.3 Heterogeneous Effects by Age

The 2011 judicial interpretation can have different effects on younger and older women. For example, the life-cycle model predicts that older individuals respond more strongly to unanticipated wealth shocks because they are less likely to smooth current consumption with future incomes (Heckman, 1976; Attanasio and Browning, 1995; Browning and Crossley, 2001). Also, losing the marital home upon divorce could be a greater financial loss for older women because they are less likely to get remarried after divorce. Hence, we hypothesize that judicial interpretation has a stronger effect among older women.

To test this hypothesis, we divide the sample into wives aged 35 years or older[26] and wives aged younger than 35. We choose age 35 as the cutoff to make the sample sizes more comparable between the two subgroups.[27] Table 5 presents the results and shows that the negative impacts on household public goods investments are mainly driven by older women, consistent with our hypothesis. No significant results are observed among women under age 35.

6.2.4 Heterogeneous Effects by Divorce Propensity

In China, the divorce rate has been climbing in recent decades, and people are well-informed of the potential risks of divorce with respect to changes in divorce-related legislation (Zang, 2020). Compared with women in stable marriages, women who were considering divorce or about to divorce at the time of the legal change faced a more credible threat of losing the marital home and thus could be more responsive to the 2011 judicial interpretation. Therefore, we hypothesize that the effect is larger among wives with a high propensity for divorce.

[26] The lower and upper bond of wives' age in our sample is 16 and 56.

[27] Results using 30 or 40 as the cut-off show similar patterns and are available upon request.

We estimate each individual's divorce propensity score based on marital status in the 2012-2018 waves.[28] We then split our sample by whether the divorce propensity is above or below the median. As shown in Table 6, we find that the effect of the 2011 judicial interpretation is particularly large and robust among wives with a higher divorce propensity score both immediately and in the longer term. The between-group comparison shows that the magnitudes of the coefficients for having children next year are significantly larger among wives with higher divorce propensity scores compared to those with lower divorce propensity scores.

Taken together, the effects of the 2011 judicial interpretation appeared to be stronger and more robust among wives who are more likely to bear greater financial losses because of this legal change and in areas or time periods when fertility decisions are less restricted by the family-planing policies. In particular, the effects are driven by females with rural hukou, at least 35 years old, with a higher divorce propensity score, and with greater home appreciation.[29]

7 Robustness Checks

7.1 Pre-reform Placebo Tests

A key assumption of the DID design is the parallel trends assumption, which requires the treatment and control groups to display parallel trends in the absence of legal change. Though it is difficult to test this assumption directly, we provide some supporting evidence of this assumption by a placebo test using CFPS pilot surveys in 2008 and 2009.

[28] Explanatory variables included in the propensity score model include all control variables in Table 1 as well as a series of variables measuring whether the couple has a healthy marriage. These variables include an index of life satisfaction, whether the individual thinks a happy family or a close spouse is important, and a set of dummy variables indicating whether the individual is most likely to talk with her spouse about daily life, when she feels worried, in trouble, feels sick, and needs to be taken care of or needs to borrow a large amount of money.

[29] According to Wei and Zhang (2011), household financial investment behaviors may be affected by local sex ratios. Therefore, we also explored the potential heterogeneous effects of provincial sex ratios. However, as shown in Table B6, no significant differences were found in this subgroup analysis.

Prior to the baseline survey launched in 2010, CFPS conducted pilot surveys in Beijing, Shanghai, and Guangdong. The pilot surveys contain a baseline survey in 2008 and a follow-up survey in 2009. Using the pilot survey, we construct a short panel data set with the same sample selection procedures presented in Table B1. This sample consists of 291 individuals with 582 person-year observations across 2008-2009. We construct treatment and control groups for this pilot sample the same way we construct them in the core sample. We then assume a placebo judicial interpretation occurred between 2008 and 2009. We compared the behaviors of families in treatment and control groups in 2008 and 2009 to estimate the effect of this "placebo law" on women's investments in household public goods and other outcomes. Since the placebo law precedes the actual judicial interpretation in 2011, the estimates should be indistinguishable from zero if there exist no other pre-reform factors driving our main results.

The results of this placebo test are presented in Table 7. We find all coefficients of the interaction terms are indistinguishable from zero. These results provide suggestive evidence that our outcome variables would have followed the parallel trends for the treatment and control groups without the 2011 judicial interpretation. Unfortunately, the CFPS pilot survey contains limited information on family relationships, and therefore we could not precisely match individuals with their children in this data set, which prevents us from examining fertility behaviors in this placebo test.

7.2 Family Planning Policies

Fertility decisions in China are subject to strict government regulations such as the "National One-child Policy." Initiated in the late 1970s and early 1980s by the central government of China, the purpose of this policy was to limit the great majority of families in China to one child each. The program was intended to be applied universally, although exceptions were made.[30] Several studies find that areas with stricter family planning policies are faced with

[30]Parents within some ethnic minority groups or those whose firstborn was handicapped was allowed to have more than one child. It was implemented more effectively in urban environments, where much of the

lower fertility in the long term (Li et al., 2005; Huang, Lei and Sun, 2021). The variation of the policy intensity across different regions could confound our results to some extent.[31] In particular, we may overestimate the effect of the 2011 judicial interpretation if the females in our treatment group are subject to severer penalties for excess birth. To alleviate this concern, following Liu, Liu and Wang (2021), we keep the sample with at least one child and further interact $Treat_i \cdot Post_t$ and $Treat_i \cdot Year_t$ with a dummy that indicates whether the province's provincial fines on excess births were greater than four times of the local average annual income in 2000.[32] The estimation results of the robustness check are displayed in Table 9. To our relief, we find that most of the triple interactions with the penalty dummy are insignificant, showing no evidence of heterogeneity in fertility responses across households in high-fine and low-fine provinces. Those results suggest that policy intensity of the one-child policy across regions is not driving our main results.

Moreover, the one-child policy is changing over time and has been relaxed in 2016 which overlapped with our treatment period (2012-2018). As the negative fertility effect in Table 2 intensified over time, one may concern that the relaxation of China's one-child policy might account for, or partly contribute to this effect. Since the construction of C-T groups only relied on the timing of marriage and home purchase, we argue that there is no reason to believe that our C-T groups reacted differently to the relaxation of the one-child policy. Hence, the DID estimates could rule out the effect caused by the relaxation of the one-child policy and that the negative effects on fertility we observe in Table 2 are more likely to be driven by the 2011 judicial interpretation instead of the relaxation of the one-child policy.

Nevertheless, considering that wives in the treatment group are younger and might be

population consisted of small nuclear families who were more willing to comply with the policy, than in rural areas, with their traditional agrarian extended families that resisted the one-child restriction. In addition, enforcement of the policy was somewhat uneven over time, generally being strongest in cities and more lenient in the countryside.

[31]Most of the families in our main sample have at least one child. A subgroup analysis was performed across women without children (203 individuals, 3.6%) and with children (5449 individuals, 96.4%). As shown in Table B8, we find that the group with children accounts for most of the impacts on household public goods supply detected in our main sample.

[32]The data of the fines levied for excess births in 2000 comes from Ebenstein (2010).

more likely to give birth in response to the relaxation of the one-child policy, which implies that we underestimate the effects of divorce law on fertility. Thus, we adopt another robustness check to further rule out the effect of the relaxation of the one-child policy. In this robustness check, we restrict the analytic sample to the rural hukou holders whose first child is a girl (2066 of 5652 individuals, 36.6% of the main sample). The rationale behind this test lies that the women in this subsample are allowed to have a second child since the 1980s (the so-called "one-and-a-half children policy"). Thus, it is reasonable to believe that these females were less affected by the recent relaxation of the one-child policy. The results for the robustness check are displayed in Table 10. Again, we find that the 2011 judicial interpretation lowered the household public goods supply in this subsample, though the magnitude and significance become weaker compared with our main results. This result confirms that the negative effect on fertility is main driving by the 2011 judicial interpretation instead of the relaxation of the one-child policy.

7.3 Age as a Confounder Factor

As shown in table 1, wives in the treatment group were about 10.76 years younger on average than wives in the control group. Hence, a potential concern is that our main results can be confounded by the age gap between the treatment and control groups. Fertility rates can decline faster over time among older women compared to younger ones. Therefore, the negative effects on fertility can be driven by the faster decline in fertility rates among older women in the control group as they age. Our main analyses have included age and the length of marriage as time-variant factors to control for these confounding effects. Also, when comparing the age distributions between the treatment and control groups in Figure B4. It shows that the age distributions in the two groups largely overlap, suggesting that this concern may not be severe.

Nevertheless, to further mitigate this concern and to make our treatment and control groups more comparable, we restrict our sample to only include women aged 35-40 in 2010

and re-estimate Equations 3 and 4. Results from this restricted sample are presented in Table 8. They are highly consistent with our main results in Table 2. It is worth noting that the magnitudes are smaller and the significance of the coefficients is weaker in terms of fertility, whereas the magnitudes are larger and the significance of the coefficients is stronger for financial investment outcomes. A possible explanation is that compared to their younger counterparts, the willingness, and ability to give birth are relatively low for this age group, but their economic status is relatively high, so they are more willing to adjust their financial decisions instead of childbirth decisions. Overall, these results confirm our main findings that the decreases in household public goods investments were due to behavioral adjustments towards the judicial interpretation instead of age effects.

7.4 More Robustness Checks

7.4.1 Adding Wives' Name to the Property Title

Our main results suggest that the 2011 judicial interpretation reduces wives' willingness to have children because their name is not on the title of their marital home. One concern with this interpretation is that families can add the wife's name to the title to ensure they get a fair share in case of divorce in reaction to the 2011 legal change. However, according to the CFPS, adding wives' names is rare. The majority of families (about 91 %, 5126 out of 5652 families) in our sample did not change names on the title of their houses, and when they did, most of them transferred the home to their children (Zang, Hu and Wang, 2021). It is possible that parents prefer to transfer the home to their children to balance the costs of divorce for both parents and therefore to reduce divorce risks. At the same time, doing so also signals their commitment to investing in the children. It is also possible that in some cities, doing so allows parents to purchase another home under their names. Nevertheless, we conduct a robustness check restricting the sample to families whose houses have kept the same names on the title over the sample period. The estimation results are displayed in Table B7, which are similar to those in the main results presented in Table 2.

7.4.2 Alternative Control Groups

In the main analysis, we focused on families whose marital home was registered under the name of the husband. As a robustness check, we expand our control group to include families whose marital home was titled under the names of both couples and families who were renters. The 2011 judicial interpretation should not affect these families' property ownership upon divorce. We re-estimate Equations 3 and 4 and report results in Table 11 with a control group including wives whose marital home was titled under the couple's names. Table 12 reports the results based on the control group including families who were renters. In general, we find consistently negative effects on fertility and financial investments as in our main results. The effect of the judicial interpretation was nearly unchanged for the fertility outcomes, but the magnitude and significance of financial investments weakened.

7.4.3 Sample Attrition

We examined whether our main results were driven by sample attrition. If families that dropped out from the sample, including wives whose marital union was dissolved and those who did not respond in waves 2012-2018, are systematically different from those who stayed, then our results can be biased. To address this concern, we examine whether wives who were not included in our sample take up disproportionate representation in our treatment or the control group, by estimating the following models:

$$Attrition_{ip} = \alpha + \beta \cdot Treat_{ip} + X'_{ip} \cdot \gamma + \sigma_p + \epsilon_{ip} \tag{5}$$

$Attrition_{ip}$ is a set of dummy variables indicating whether a household i in province p was excluded from our main sample in 2012, 2014, 2016, and 2018 [33]; $Treat_{ip}$ is the indicator for our treatment group illustrated in the section 4.2; X_{ip} is our set of control variables; σ_p includes province fixed effects; ϵ_{ip} is the error term. β is of our interest, capturing the mean

[33]The sample means of this outcome in 2012-2018 are 7.47%, 9.24%, 16.51%, and 20.79%, respectively.

differences in the attrition rates between our treatment and control groups.

Results are presented in Table B9. The coefficients of the treatment indicator are indistinguishable from zero after controlling for province-fixed effects and other characteristics, suggesting no systematic biases caused by sample attrition in our assignment of treatment. We also constructed a balanced panel consisting of individuals staying in the same marriage and followed up in all waves from 2012 to 2018. Compared with our main sample, the balanced panel excludes individuals who stayed in the same marriage but were not tracked in at least one of the followed-up waves. The balanced panel includes 3,667 individuals out of 18,335 observations. Results based on this balanced panel are shown in Table 13 and are similar to our main results.

8 Conclusion

The 2011 judicial interpretation shifted the property division rule upon divorce from an equal division to a title-based regime. This legal change provides a unique opportunity to examine how housing property division upon divorce affected investments in household public goods. We extend the model in Lafortune and Low (2020) and demonstrate that the title-based property division rule reduces the commitment value of marriage and therefore reduces women's investments in public goods. The model predicts that the families who were affected by the judicial interpretation experienced lower fertility and reduced investment in financial assets. We examine these theoretical predictions employing a difference-in-differences design, comparing those who purchased the marital home before marriage (the treatment group) with those who purchased it after marriage (the control group) before and after this legal change.

Indeed, we find that the legal change led to a large decline in fertility rates and financial investments. These findings are consistent with our theoretical predictions. Moreover, our analyses of heterogeneous effects indicate that the negative effects on household public goods

appeared to be particularly strong and robust among wives who were more likely to bear more severe financial losses, such as wives with rural hukou, 35 years or older, with a higher divorce propensity, and those whose marital home was more expensive.

Our findings have important policy implications in China. The first is closely related to gender inequality within the household. According to Chinese social norms, most marital houses were purchased and registered in the name of the groom prior to marriage. The reverse of the title-based division of housing property upon divorce puts most Chinese wives who married before 2011 in a vulnerable financial position upon divorce. Second, our findings highlight the large decline in fertility rates due to the legal change. Given that up to 55 million of China's families were potentially affected by the reform in 2011, our study provides a new explanation of the ever-decreasing fertility rate despite the relaxation of the birth-control policy, and thus, a valuable implication for Chinese policymakers who aim to reverse fertility decline and promote future economic development.

To the best of our knowledge, this study is among the first to explore the consequences of the 2011 judicial interpretation on household public goods supply. Inevitably, such a significant judicial reform will generate spillovers of various outcomes in the long term (such as the change of preference in the marriage market). How to evaluate the other aspects of the reform is an important topic and we will leave it for future research.

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Tables

Table 1: Summary Statistics

	Control	Treatment	Difference
	(1)	(2)	(3)
Panel A: Outcome Variable			
BirthNextYr	0.025	0.187	-0.162***
BirthNext2Yr	0.030	0.222	-0.192***
Savings	3.137	3.471	-0.334***
Investment	3.273	3.551	-0.278**
Panel B: Control Variable			
Age	43.972	33.214	10.758***
MarridLength	22.169	10.299	11.870***
NumChild	1.872	1.423	0.450***
FamilySize	4.282	5.049	-0.767***
Urban	0.389	0.342	0.047***
Ruralhukou	0.794	0.831	-0.037***
N	3972	1680	

Note: Data comes from the CFPS 2010 wave. The sample includes all families in which: (i) the wife was married in or before 2010 and remained in the same marriage in 2012, 2014, 2016, and 2018 waves; (ii) the family home was titled under the name of the husband; (iii) the wife is younger than 55 in 2010. The treatment group consists of wives whose family home was purchased before their marriage, whereas the control group consists of wives whose family home was purchased during their marriage. Details of variable constructions are summarized in Table B3. Independent T-tests are applied for the group comparison. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 2: Main Regression Results

Dependent Variables:	BirthNextYr	BirthNext2Yr	Savings	Investment
	(1)	(2)	(3)	(4)
Panel A: Equation (1)				
Treat*Post	-0.059***	-0.056***	-0.275**	-0.258*
	(0.009)	(0.009)	(0.133)	(0.132)
R^2	0.045	0.100	0.054	0.038
Panel B: Equation (2)				
Treat*Year12	-0.046***	-0.029***	-0.325**	-0.302**
	(0.011)	(0.010)	(0.134)	(0.134)
Treat*Year14	-0.054***	-0.047***	-0.158	-0.139
	(0.010)	(0.011)	(0.176)	(0.176)
Treat*Year16	-0.059***	-0.063***	-0.460***	-0.460***
	(0.010)	(0.011)	(0.178)	(0.176)
Treat*Year18	-0.089***	-0.102***	-0.151	-0.123
	(0.009)	(0.010)	(0.178)	(0.177)
# observations	25132	25132	25073	25131
# individuals	5652	5652	5652	5652
R^2	0.046	0.101	0.056	0.039

Note: Data comes from the CFPS 2010-2018 waves. Controls include age, number of children, the length of the marriage, and family size. Standard errors in parentheses are clustered at the household level. Individual fixed effect and year fixed effect are included in all regressions. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 3: Subsample Analysis by hukou Type

	Group 1: Urban hukou				**Group 2: Rural hukou**			
Dependent Variables:	BirthNextYr	BirthNext2Yr	Savings	Investment	BirthNextYr	BirthNext2Yr	Savings	Investment
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: Equation (1)								
Treat*Post	-0.032	-0.039*	-0.148	-0.124	-0.063***	-0.057***	-0.316**	-0.320**
	(0.021)	(0.021)	(0.343)	(0.336)	(0.010)	(0.010)	(0.144)	(0.144)
R^2	0.054	0.069	0.027	0.014	0.050	0.117	0.066	0.047
Panel B: Equation (2)								
Treat*Year12	-0.021	-0.011	-0.248	-0.188	-0.049***	-0.030***	-0.385***	-0.393***
	(0.026)	(0.024)	(0.339)	(0.332)	(0.012)	(0.012)	(0.147)	(0.147)
Treat*Year14	-0.029	-0.041	0.151	0.165	-0.057***	-0.045***	-0.225	-0.222
	(0.024)	(0.025)	(0.449)	(0.439)	(0.012)	(0.012)	(0.191)	(0.191)
Treat*Year16	-0.033	-0.048*	-0.285	-0.337	-0.062***	-0.063***	-0.498**	-0.506***
	(0.026)	(0.027)	(0.438)	(0.431)	(0.011)	(0.012)	(0.194)	(0.194)
Treat*Year18	-0.058***	-0.073***	-0.289	-0.217	-0.092***	-0.103***	-0.132	-0.134
	(0.021)	(0.023)	(0.451)	(0.441)	(0.010)	(0.011)	(0.195)	(0.194)
# observations	4676	4676	4655	4675	20451	20451	20413	20451
# individuals	1100	1100	1100	1100	4551	4551	4551	4551
R^2	0.053	0.065	0.028	0.014	0.052	0.118	0.068	0.049

Note: Data comes from the CFPS 2010-2018 waves. Controls include age, number of children, the length of the marriage, and family size. Standard errors in parentheses are clustered at the household level. Individual fixed effect and year fixed effect are included in all regressions. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. † indicates a significant ($p < 0.1$) subgroup difference.

Table 4: Subsample Analysis by House Price

Dependent Variables:	**Group 1: Lower House Price (< Median)**				**Group 2: Higher House Price (≥ Median)**			
	BirthNextYr	BirthNext2Yr	Savings	Investment	BirthNextYr	BirthNext2Yr	Savings	Investment
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: Equation (1)								
Treat*Post	-0.045***	-0.036***	-0.094	-0.095	-0.077***†	-0.080***†	-0.577***†	-0.561***†
	(0.011)	(0.011)	(0.168)	(0.167)	(0.015)	(0.015)	(0.219)	(0.217)
R^2	0.008	0.106	0.031	0.033	0.072	0.097	0.096	0.049
Panel B: Equation (2)								
Treat*Year12	-0.043***	-0.016	-0.212	-0.219	-0.047**	-0.042**	-0.668***†	-0.644***
	(0.014)	(0.013)	(0.173)	(0.173)	(0.019)	(0.017)	(0.214)	(0.212)
Treat*Year14	-0.033**	-0.027*	-0.118	-0.117	-0.084***†	-0.072***†	-0.257	-0.230
	(0.013)	(0.014)	(0.223)	(0.223)	(0.017)	(0.018)	(0.292)	(0.290)
Treat*Year16	-0.047***	-0.042***	-0.100	-0.102	-0.072***	-0.090***†	-0.882***†	-0.894***†
	(0.013)	(0.013)	(0.228)	(0.228)	(0.018)	(0.019)	(0.286)	(0.281)
Treat*Year18	-0.064***	-0.070***	0.116	0.123	-0.123***†	-0.146***†	-0.540*†	-0.521*†
	(0.011)	(0.012)	(0.229)	(0.229)	(0.016)	(0.017)	(0.288)	(0.284)
# observations	13026	13026	13016	13026	12095	12095	12046	12094
# individuals	2897	2897	2897	2897	2752	2752	2752	2752
R^2	0.010	0.108	0.031	0.033	0.073	0.096	0.104	0.054

Note: Data comes from the CFPS 2010-2018 waves. Controls include age, number of children, the length of the marriage, and family size. Standard errors in parentheses are clustered at the household level. Individual fixed effect and year fixed effect are included in all regressions. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. † indicates a significant ($p < 0.1$) subgroup difference.

Table 5: Subsample Analysis by Age

Dependent Variables:	**Group 1: Age $<$ 35**				**Group 2: Age $\geq$ 35**			
	BirthNextYr	BirthNext2Yr	Savings	Investment	BirthNextYr	BirthNext2Yr	Savings	Investment
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: Equation (1)								
Treat*Post	-0.015	-0.009	-0.123	-0.086	-0.013**	-0.013**	-0.413**	-0.448**
	(0.024)	(0.024)	(0.279)	(0.275)	(0.006)	(0.006)	(0.190)	(0.190)
R^2	0.060	0.093	0.069	0.038	0.002	0.001	0.095	0.082
Panel B: Equation (2)								
Treat*Year12	-0.017	-0.003	-0.251	-0.191	-0.014**	-0.014**	-0.379**	-0.410**
	(0.029)	(0.026)	(0.285)	(0.283)	(0.006)	(0.006)	(0.192)	(0.194)
Treat*Year14	-0.026	-0.021	0.024	0.080	-0.014**	-0.012*	-0.316	-0.350
	(0.029)	(0.030)	(0.377)	(0.371)	(0.006)	(0.007)	(0.253)	(0.252)
Treat*Year16	0.007	0.013	-0.138	-0.136	-0.011*	-0.012*	-0.761***	-0.800***
	(0.028)	(0.028)	(0.364)	(0.360)	(0.007)	(0.007)	(0.260)	(0.260)
Treat*Year18	-0.025	-0.026	-0.114	-0.095	-0.014**	-0.015**	-0.210	-0.249
	(0.025)	(0.026)	(0.365)	(0.361)	(0.006)	(0.007)	(0.256)	(0.255)
# observations	5983	5983	5962	5983	19149	19149	19111	19148
# individuals	1372	1372	1372	1372	4280	4280	4280	4280
R^2	0.062	0.093	0.070	0.039	0.002	0.001	0.093	0.080

Note: Data comes from the CFPS 2010-2018 waves. Controls include age, number of children, the length of the marriage, and family size. Standard errors in parentheses are clustered at the household level. Individual fixed effect and year fixed effect are included in all regressions. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. † indicates a significant ($p < 0.1$) subgroup difference.

Table 6: Subsample Analysis by Propensity of Divorce

	Group 1: Lower Divorce Propensity (< Median)				**Group 2: Higher Divorce Propensity (≥ Median)**			
Dependent Variables:	BirthNextYr	BirthNext2Yr	Savings	Investment	BirthNextYr	BirthNext2Yr	Savings	Investment
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: Equation (1)								
Treat*Post	-0.017*	-0.026***	-0.134	-0.113	-0.048***†	-0.035***	-0.355**	-0.325*
	(0.009)	(0.010)	(0.236)	(0.236)	(0.013)	(0.013)	(0.179)	(0.178)
R^2	0.020	0.005	0.107	0.094	0.069	0.107	0.036	0.016
Panel B: Equation (2)								
Treat*Year12	-0.006	-0.007	-0.131	-0.096	-0.041***†	-0.016	-0.322*	-0.258
	(0.012)	(0.010)	(0.248)	(0.248)	(0.015)	(0.014)	(0.181)	(0.180)
Treat*Year14	-0.011	-0.023**	-0.177	-0.118	-0.047***†	-0.031**	-0.191	-0.206
	(0.011)	(0.012)	(0.317)	(0.316)	(0.015)	(0.015)	(0.238)	(0.237)
Treat*Year16	-0.025**	-0.038***	-0.282	-0.310	-0.040***	-0.034**	-0.570**	-0.546**
	(0.011)	(0.011)	(0.319)	(0.317)	(0.015)	(0.015)	(0.240)	(0.237)
Treat*Year18	-0.029***	-0.039***	0.076	0.084	-0.070***†	-0.074***†	-0.393*	-0.345
	(0.010)	(0.011)	(0.323)	(0.324)	(0.013)	(0.014)	(0.238)	(0.235)
# observations	12545	12545	12528	12545	12365	12365	12326	12364
# individuals	2801	2801	2801	2801	2801	2801	2801	2801
R^2	0.018	0.002	0.107	0.093	0.071	0.107	0.038	0.017

Note: Data comes from the CFPS 2010-2018 waves. Controls include age, number of children, the length of the marriage, and family size. Standard errors in parentheses are clustered at the household level. Individual fixed effect and year fixed effect are included in all regressions. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. † indicates a significant ($p < 0.1$) subgroup difference.

Table 7: Pre-reform Placebo Regressions

Dependent Variables:	Savings	Investment	OutLaborForce	WorkTime	Income	HouseworkTime	SleepTime
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Treat*Year09	-0.862	-0.425	0.043	-2.641	0.478	-0.162	0.270
	(0.865)	(0.837)	(0.050)	(3.498)	(0.566)	(0.207)	(0.235)
# observations	555	577	581	565	544	576	571
# individuals	291	291	291	291	283	291	291
R^2	0.000	0.000	0.049	0.014	0.002	0.016	0.026

Note: Data comes from the CFPS 2008 and 2009 pilot surveys. Controls include age, number of children, the length of the marriage, and family size. Standard errors in parentheses are clustered at the household level. Individual fixed effect and year fixed effect are included in all regressions. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 8: Subsample Analysis for Individuals Aged between 35 and 40

Dependent Variables:	BirthNextYr	BirthNext2Yr	Savings	Investment
	(1)	(2)	(3)	(4)
Panel A: Equation (1)				
Treat*Post	-0.025*	-0.023*	-1.134***	-1.162***
	(0.013)	(0.013)	(0.327)	(0.327)
R^2	0.000	0.000	0.143	0.135
Panel B: Equation (2)				
Treat*Year12	-0.028*	-0.032**	-0.850**	-0.915***
	(0.015)	(0.013)	(0.335)	(0.342)
Treat*Year14	-0.028*	-0.021	-1.319***	-1.312***
	(0.015)	(0.016)	(0.437)	(0.432)
Treat*Year16	-0.019	-0.016	-1.668***	-1.674***
	(0.014)	(0.013)	(0.455)	(0.456)
Treat*Year18	-0.024*	-0.023	-0.717	-0.757*
	(0.014)	(0.015)	(0.438)	(0.434)
# observations	4002	4002	3991	4002
# individuals	895	895	895	895
R^2	0.000	0.000	0.146	0.139

Note: Data comes from the CFPS 2010-2018 waves. Controls include age, number of children, the length of the marriage, and family size. Standard errors in parentheses are clustered at the household level. Individual fixed effect and year fixed effect are included in all regressions. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 9: Mediation Effects of Fines Levied for Excess Births in 2000

Dependent Variables:	BirthNextYr	BirthNext2Yr	Savings	Investment
	(1)	(2)	(3)	(4)
Panel A: Equation (1)				
Treat*Post	-0.037***	-0.033***	-0.237	-0.219
	(0.009)	(0.010)	(0.148)	(0.147)
Treat*Post*Penalty	-0.019	-0.004	0.050	0.121
	(0.024)	(0.024)	(0.352)	(0.351)
R^2	0.030	0.061	0.070	0.049
Panel B: Equation (2)				
Treat*Year12	-0.022*	-0.008	-0.249*	-0.228
	(0.011)	(0.011)	(0.148)	(0.148)
Treat*Year14	-0.031***	-0.025**	-0.164	-0.137
	(0.011)	(0.012)	(0.195)	(0.194)
Treat*Year16	-0.035***	-0.037***	-0.391**	-0.401**
	(0.011)	(0.012)	(0.196)	(0.194)
Treat*Year18	-0.067***	-0.078***	-0.139	-0.111
	(0.010)	(0.011)	(0.196)	(0.194)
Treat*Year12*Penalty	-0.030	-0.016	-0.401	-0.288
	(0.028)	(0.028)	(0.363)	(0.361)
Treat*Year14*Penalty	-0.017	0.005	0.782*	0.812*
	(0.029)	(0.029)	(0.454)	(0.458)
Treat*Year16*Penalty	-0.016	-0.007	-0.414	-0.339
	(0.029)	(0.029)	(0.462)	(0.456)
Treat*Year18*Penalty	-0.013	0.002	0.250	0.315
	(0.026)	(0.027)	(0.428)	(0.428)
# observations	23800	23800	23741	23799
# individuals	5614	5614	5614	5614
R^2	0.030	0.062	0.072	0.050

Note: Data comes from the CFPS 2010-2018 waves. Controls include age, number of children, the length of the marriage, and family size. Standard errors in parentheses are clustered at the household level. Individual fixed effect and year fixed effect are included in all regressions. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 10: Restricting Sample to Rural hukou Holders Whose First Child is A Girl

Dependent Variables:	BirthNextYr	BirthNext2Yr	Savings	Investment
	(1)	(2)	(3)	(4)
Panel A: Equation (1)				
Treat*Post	-0.033**	-0.032**	-0.353	-0.314
	(0.014)	(0.014)	(0.220)	(0.220)
R^2	0.067	0.101	0.052	0.029
Panel B: Equation (2)				
Treat*Year12	-0.007	0.009	-0.230	-0.208
	(0.017)	(0.016)	(0.223)	(0.223)
Treat*Year14	-0.032*	-0.026	-0.292	-0.246
	(0.017)	(0.018)	(0.300)	(0.300)
Treat*Year16	-0.041**	-0.052***	-0.715**	-0.692**
	(0.016)	(0.017)	(0.301)	(0.300)
Treat*Year18	-0.061***	-0.077***	-0.207	-0.138
	(0.015)	(0.016)	(0.285)	(0.284)
# observations	9266	9266	9247	9266
# individuals	2060	2060	2060	2060
R^2	0.066	0.100	0.054	0.030

Note: Data comes from the CFPS 2010-2018 waves. Controls include age, number of children, the length of marriage, and family size. Standard errors in parentheses are clustered at the household level. Individual fixed effect and year fixed effect are included in all regressions. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 11: Adding Individuals Whose House Is Titled with the Couple's Names

Dependent Variables:	BirthNextYr	BirthNext2Yr	Savings	Investment
	(1)	(2)	(3)	(4)
Panel A: Equation (1)				
Treat*Post	-0.059***	-0.056***	-0.235*	-0.222*
	(0.009)	(0.009)	(0.132)	(0.132)
R^2	0.039	0.096	0.064	0.040
Panel B: Equation (2)				
Treat*Year12	-0.046***	-0.029***	-0.271**	-0.245*
	(0.011)	(0.010)	(0.134)	(0.134)
Treat*Year14	-0.054***	-0.046***	-0.126	-0.118
	(0.010)	(0.011)	(0.175)	(0.175)
Treat*Year16	-0.059***	-0.063***	-0.426**	-0.432**
	(0.010)	(0.011)	(0.177)	(0.176)
Treat*Year18	-0.089***	-0.102***	-0.112	-0.092
	(0.009)	(0.010)	(0.178)	(0.176)
# observations	25638	25638	25574	25636
# individuals	5776	5776	5776	5776
R^2	0.040	0.097	0.066	0.042

Note: Data comes from the CFPS 2010-2018 waves. Controls include age, number of children, the length of the marriage, and family size. Standard errors in parentheses are clustered at the household level. Individual fixed effect and year fixed effect are included in all regressions. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 12: Adding Individuals Whose House Is Titled with the Couple's Names or Rented

Dependent Variables:	BirthNextYr	BirthNext2Yr	Savings	Investment
	(1)	(2)	(3)	(4)
Panel A: Equation (1)				
Treat*Post	-0.056***	-0.052***	-0.162	-0.142
	(0.009)	(0.009)	(0.129)	(0.128)
R^2	0.055	0.093	0.088	0.055
Panel B: Equation (2)				
Treat*Year12	-0.044***	-0.027***	-0.186	-0.153
	(0.011)	(0.010)	(0.130)	(0.130)
Treat*Year14	-0.050***	-0.042***	-0.034	-0.018
	(0.010)	(0.011)	(0.172)	(0.171)
Treat*Year16	-0.055***	-0.058***	-0.376**	-0.373**
	(0.011)	(0.011)	(0.173)	(0.172)
Treat*Year18	-0.084***	-0.096***	-0.061	-0.036
	(0.009)	(0.010)	(0.173)	(0.172)
# observations	29194	29194	29126	29192
# individuals	6647	6647	6647	6647
R^2	0.056	0.093	0.090	0.056

Note: Data comes from the CFPS 2010-2018 waves. Controls include age, number of children, the length of the marriage, and family size. Standard errors in parentheses are clustered at the household level. Individual fixed effect and year fixed effect are included in all regressions. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 13: Balanced Panel

Dependent Variables:	BirthNextYr	BirthNext2Yr	Savings	Investment
	(1)	(2)	(3)	(4)
Panel A: Equation (1)				
Treat*Post	-0.045***	-0.036***	-0.226	-0.254
	(0.011)	(0.011)	(0.162)	(0.161)
R^2	0.052	0.109	0.035	0.030
Panel B: Equation (2)				
Treat*Year12	-0.029**	-0.007	-0.173	-0.203
	(0.013)	(0.013)	(0.163)	(0.163)
Treat*Year14	-0.040***	-0.026*	-0.129	-0.160
	(0.012)	(0.013)	(0.211)	(0.210)
Treat*Year16	-0.040***	-0.038***	-0.470**	-0.519**
	(0.012)	(0.013)	(0.208)	(0.206)
Treat*Year18	-0.073***	-0.081***	-0.134	-0.134
	(0.011)	(0.011)	(0.207)	(0.205)
# observations	18295	18295	18261	18295
# individuals	3667	3667	3667	3667
R^2	0.055	0.112	0.036	0.031

Note: Data comes from the CFPS 2010-2018 waves. The main sample includes all families in which: (i) the wife was married in or before 2010, remained in the same marriage and were followed in all waves from 2010 to 2018; (ii) the family home was titled under the name of husband; (iii) the wife was born after 1954. Controls include age, number of children, the length of the marriage, and family size. Standard errors in parentheses are clustered at the household level. Individual fixed effect and year fixed effect are included in all regressions. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Appendix A. Other Outcomes

Table A1: Summary Statistics of Other Outcomes

	Control	Treatment	Difference
	(1)	(2)	(3)
OutLaborForce	0.358	0.394	-0.036**
WorkTime	25.672	23.685	1.987**
Income	5.938	5.745	0.194*
HouseworkTime	5.594	5.462	0.133***
SleepTime	5.356	5.213	0.142***
RichImportant	0.056	0.013	0.043
N	3972	1680	

Note: Data comes from the CFPS 2010 wave. Details of variable constructions are in Table B3. Independent T-tests are applied for the group comparison. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A2: Other Outcome Variables

Dependent Variables:	OutLaborForce	WorkTime	Income	HouseworkTime	SleepTime	RichImportant
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Equation (1)						
Treat*Post	-0.063***	5.853***	0.779***	-0.266***	0.315***	0.092**
	(0.015)	(0.993)	(0.142)	(0.052)	(0.044)	(0.047)
R^2	0.006	0.001	0.004	0.107	0.176	0.004
Panel A: Equation (2)						
Treat*Year12	-0.026	1.837	0.547***	-	-	-
	(0.017)	(1.260)	(0.160)	-	-	-
Treat*Year14	-0.045***	5.967***	1.108***	-0.314***	0.359***	-
	(0.017)	(1.204)	(0.183)	(0.067)	(0.054)	-
Treat*Year16	-0.092***	10.402***	1.143***	-0.202***	0.294***	-
	(0.017)	(1.912)	(0.317)	(0.066)	(0.053)	-
Treat*Year18	-0.106***	10.011***	0.753***	-0.274***	0.276***	0.092**
	(0.018)	(1.447)	(0.185)	(0.068)	(0.056)	(0.047)
# observations	24437	21435	16178	19358	19361	9924
# individuals	5651	5651	5652	5651	5652	5651
R^2	0.006	0.001	0.004	0.103	0.174	0.004

Note: Data comes from the CFPS 2010-2018 waves. Controls include age, number of children, the length of the marriage, and family size. Standard errors in parentheses are clustered at the household level. Individual fixed effect and year fixed effect are included in all regressions. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Appendix B. Additional Tables and Figures

Table B1: Sample Selection and Database Construction

	Sample selection	Num of individuals excluded	Num of individuals remained
0	Total CFPS 2010 female participates		17314
1	Keep individuals who married in or before 2010 and remained in the same marriage in follow-up waves	6553	10761
2	Keep families whose current house is titled under the name of husband family	3407	7354
3	Keep individuals born after 1954	1702	5652
4	Core sample		5652
5	Core sample-treatment group		1680
6	Core sample-control group		3972

Table B2: Fertility Comparison Across Different Data Sources

Age of women	2011 Fertility Rate (1)	2011 Fertility Rate (2)	2012 Fertility Rate (3)	2012 Fertility Rate (4)
15-19	0.804%	0.616%	2.826%	0.672%
20-24	12.151%	6.651%	8.027%	7.280%
25-29	10.932%	7.723%	12.035%	9.682%
30-34	4.112%	4.085%	4.371%	5.081%
35-39	2.109%	1.256%	1.989%	1.715%
40-44	0.274%	0.340%	0.237%	0.547%
45-49	0.009%	0.125%	0.092%	0.156%
Source	CFPS	Yearbook	CFPS	Yearbook

Note: Data comes from the CFPS 2010-2018 waves and the National Sample Survey on Population Changes 2011-2012. 2011 and 2012 fertility rates are calculated based on the birth window from 2010.11-2011.10 and 2011.11-2012.10, respectively. The individual weights in CFPS 2010 are applied to the statistics in columns (1) and (3). To make the fertility rate comparable in CFPS and yearbook, the first column is calculated based on the age category from 14-18, 19-23, ..., 44-48 in 2010 CFPS, and the third column is calculated based on the age category from 13-17, 18-22, ..., 43-47 in 2010 CFPS.

Table B3: Variable Descriptions

Variable	Description	Source
Panel A: Outcome Variable		
BirthNextYr	Dummy variable which equals one if the individual has children in the next year.	CFPS 2010, 2012, 2014, 2016, 2018
BirthNext2Yr	Dummy variable which equals one if the individual has children in the next two years.	CFPS 2010, 2012, 2014, 2016, 2018
Savings	Log of annual deposit, winsorized at tail 5 percent and adjusted to 2010 price level by CPI published in NBS.	CFPS 2008, 2009, 2010, 2012, 2014, 2016, 2018
Investment	Log of annual financial assets including bonds, funds, and stock, winsorized at tail 0.5 percent and adjusted to 2010 price level by CPI published in NBS.	CFPS 2008, 2009, 2010, 2012, 2014, 2016, 2018
OutLaborForce	Dummy variable which equals one if the individual was out of the labor force.	CFPS 2008, 2009, 2010, 2012, 2014, 2016, 2018
WorkTime	Working time (hours/week).	CFPS 2008, 2009, 2010, 2012, 2014, 2016, 2018
Income	Log of annual income, winsorized at tail 5 percent and adjusted to 2010 price level by CPI published in NBS.	CFPS 2008, 2009, 2010, 2012, 2014, 2016, 2018
HouseworkTime	Housework time (hours/week).	CFPS 2008, 2009, 2010, 2014, 2016, 2018
SleepTime	Sleeping time (hours/week).	CFPS 2008, 2009, 2010, 2014, 2016, 2018
RichImportance	Standardized self-reported scale measuring the importance of being rich in the whole life.	CFPS 2010, 2018
Panel B: Control Variable		
Age	Age (years).	CFPS 2008, 2009, 2010, 2012, 2014, 2016, 2018
MarridLength	Length of marriage (years).	CFPS 2008, 2009, 2010, 2012, 2014, 2016, 2018
NumChild	Number of children alive.	CFPS 2010, 2012, 2014, 2016, 2018
FamilySize	Family size	CFPS 2008, 2009, 2010, 2012, 2014, 2016, 2018
Urban	Dummy variable which equals one if the individual lived in the urban area.	CFPS 2010
AgricuturalHukou	Dummy variable which equals one if the individual had an agricultural hukou.	CFPS 2010

Table B4: Subsample Analysis by Residence Area

	Group 1: Urban Area				**Group 2: Rural Area**			
Dependent Variables:	BirthNextYr	BirthNext2Yr	Savings	Investment	BirthNextYr	BirthNext2Yr	Savings	Investment
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: Equation (1)								
Treat*Post	-0.058***	-0.053***	-0.310	-0.264	-0.059***	-0.055***	-0.311*	-0.318**
	(0.015)	(0.015)	(0.235)	(0.231)	(0.011)	(0.011)	(0.160)	(0.160)
R^2	0.065	0.075	0.021	0.014	0.014	0.128	0.102	0.105
Panel B: Equation (2)								
Treat*Year12	-0.045**	-0.028*	-0.359	-0.295	-0.045***	-0.028**	-0.387**	-0.400**
	(0.018)	(0.017)	(0.230)	(0.229)	(0.014)	(0.013)	(0.164)	(0.164)
Treat*Year14	-0.059***	-0.050***	-0.023	0.021	-0.051***	-0.044***	-0.274	-0.273
	(0.016)	(0.018)	(0.311)	(0.308)	(0.013)	(0.014)	(0.213)	(0.213)
Treat*Year16	-0.050***	-0.056***	-0.676**	-0.653**	-0.062***	-0.065***	-0.392*	-0.415*
	(0.019)	(0.019)	(0.312)	(0.306)	(0.013)	(0.013)	(0.215)	(0.215)
Treat*Year18	-0.087***	-0.096***	-0.217	-0.168	-0.088***	-0.102***	-0.158	-0.148
	(0.016)	(0.017)	(0.309)	(0.302)	(0.011)	(0.012)	(0.218)	(0.218)
# observations	9199	9199	9162	9198	15933	15933	15911	15933
# individuals	2122	2122	2122	2122	3530	3530	3530	3530
R^2	0.065	0.075	0.022	0.014	0.015	0.130	0.104	0.108

Note: Data comes from the CFPS 2010-2018 waves. Controls include age, number of children, the length of the marriage, and family size. Standard errors in parentheses are clustered at the household level. Individual fixed effect and year fixed effect are included in all regressions. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. † indicates a significant ($p < 0.1$) subgroup difference.

Table B5: Subsample Analysis by House Mortgage

Dependent Variables:	**Group 1: Without Mortgage**				**Group 2: With Mortgage**			
	BirthNextYr	BirthNext2Yr	Savings	Investment	BirthNextYr	BirthNext2Yr	Savings	Investment
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: Equation (1)								
Treat*Post	-0.058***	-0.055***	-0.301**	-0.298**†	-0.083	-0.077	0.611	1.045
	(0.009)	(0.009)	(0.135)	(0.135)	(0.065)	(0.063)	(0.720)	(0.697)
R^2	0.032	0.087	0.051	0.036	0.032	0.087	0.051	0.036
Panel B: Equation (2)								
Treat*Year12	-0.045***	-0.027***	-0.348**	-0.338**	-0.036	-0.047	0.423	0.866
	(0.011)	(0.011)	(0.136)	(0.136)	(0.082)	(0.067)	(0.823)	(0.796)
Treat*Year14	-0.052***	-0.046***	-0.181	-0.179	-0.101	-0.072	0.551	1.050
	(0.011)	(0.011)	(0.180)	(0.179)	(0.068)	(0.077)	(0.892)	(0.915)
Treat*Year16	-0.057***	-0.061***	-0.483***	-0.498***	-0.078	-0.081	0.476	0.885
	(0.010)	(0.011)	(0.181)	(0.180)	(0.085)	(0.083)	(0.979)	(0.939)
Treat*Year18	-0.087***	-0.100***	-0.187	-0.173†	-0.138*	-0.128*	1.180	1.529*
	(0.009)	(0.010)	(0.181)	(0.180)	(0.070)	(0.070)	(0.952)	(0.914)
# observations	24425	24425	24368	24424	672	672	671	672
# individuals	5487	5487	5487	5487	157	157	157	157
R^2	0.032	0.087	0.052	0.037	0.022	0.085	0.069	0.050

Note: Data comes from the CFPS 2010-2018 waves. Controls include age, number of children, the length of the marriage, and family size. Standard errors in parentheses are clustered at the household level. Individual fixed effect and year fixed effect are included in all regressions. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. † indicates a significant ($p < 0.1$) subgroup difference.

Table B6: Subsample Analysis by Sex Ratios of Provinces

	Group 1: Lower Sex Ratio (<Median)				**Group 2: Higher Sex Ratio (≥ Median)**			
Dependent Variables:	BirthNextYr	BirthNext2Yr	Savings	Investment	BirthNextYr	BirthNext2Yr	Savings	Investment
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: Equation (1)								
Treat*Post	-0.060***	-0.058***	-0.274*	-0.321**	-0.059***	-0.052***	-0.274	-0.078
	(0.011)	(0.011)	(0.157)	(0.156)	(0.016)	(0.016)	(0.248)	(0.246)
R^2	0.040	0.111	0.074	0.063	0.060	0.084	0.022	0.015
Panel B: Equation (2)								
Treat*Year12	-0.045***	-0.030**	-0.370**	-0.430***	-0.049**	-0.027	-0.179	0.065
	(0.013)	(0.012)	(0.158)	(0.158)	(0.020)	(0.019)	(0.254)	(0.252)
Treat*Year14	-0.056***	-0.049***	-0.130	-0.176	-0.051***	-0.043**	-0.232	-0.033
	(0.012)	(0.013)	(0.209)	(0.209)	(0.020)	(0.020)	(0.326)	(0.326)
Treat*Year16	-0.062***	-0.068***	-0.493**	-0.553***	-0.050**	-0.051**	-0.355	-0.205
	(0.012)	(0.013)	(0.209)	(0.208)	(0.020)	(0.020)	(0.337)	(0.333)
Treat*Year18	-0.086***	-0.101***	-0.068	-0.086	-0.097***	-0.106***	-0.398	-0.235
	(0.011)	(0.012)	(0.212)	(0.210)	(0.016)	(0.018)	(0.327)	(0.323)
# observations	18403	18403	18365	18402	6729	6729	6708	6729
# individuals	4088	4088	4088	4088	1564	1564	1564	1564
R^2	0.043	0.114	0.075	0.064	0.061	0.082	0.023	0.015

Note: Data comes from the CFPS 2010-2018 waves. Controls include age, number of children, the length of the marriage, and family size. Standard errors in parentheses are clustered at the household level. Individual fixed effect and year fixed effect are included in all regressions. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. † indicates a significant ($p < 0.1$) subgroup difference.

Table B7: Keeping Individual Not Changing Home Ownership

Dependent Variables:	BirthNextYr	BirthNext2Yr	Savings	Investment
	(1)	(2)	(3)	(4)
Panel A: Equation (1)				
Treat*Post	-0.059***	-0.053***	-0.276**	-0.273**
	(0.009)	(0.009)	(0.138)	(0.138)
R^2	0.049	0.106	0.077	0.046
Panel B: Equation (2)				
Treat*Year12	-0.046***	-0.025**	-0.309**	-0.307**
	(0.011)	(0.011)	(0.140)	(0.140)
Treat*Year14	-0.053***	-0.044***	-0.146	-0.140
	(0.011)	(0.011)	(0.183)	(0.183)
Treat*Year16	-0.058***	-0.061***	-0.444**	-0.458**
	(0.011)	(0.011)	(0.184)	(0.183)
Treat*Year18	-0.088***	-0.098***	-0.211	-0.191
	(0.010)	(0.010)	(0.184)	(0.183)
# observations	23069	23069	23021	23068
# individuals	5126	5126	5126	5126
R^2	0.049	0.106	0.079	0.047

Note: Data comes from the CFPS 2010-2018 waves. Controls include age, number of children, the length of the marriage, and family size. Standard errors in parentheses are clustered at the household level. Individual fixed effect and year fixed effect are included in all regressions. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table B8: Subsample Analysis by Whether Having Children

	Group 1: Without Children				**Group 2: With Children**			
Dependent Variables:	BirthNextYr	BirthNext2Yr	Savings	Investment	BirthNextYr	BirthNext2Yr	Savings	Investment
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: Equation (1)								
Treat*Post	-0.030	-0.046	-0.897	-0.560	-0.043***	-0.041***	-0.249*	-0.235*
	(0.085)	(0.079)	(0.781)	(0.750)	(0.009)	(0.009)	(0.138)	(0.137)
R^2	0.106	0.132	0.019	0.014	0.023	0.050	0.070	0.049
Panel B: Equation (2)								
Treat*Year12	-0.020	-0.014	-0.765	-0.420	-0.030***	-0.017*	-0.294**	-0.277**
	(0.111)	(0.106)	(0.840)	(0.820)	(0.010)	(0.010)	(0.140)	(0.139)
Treat*Year14	-0.035	-0.030	-0.864	-0.578	-0.041***	-0.036***	-0.100	-0.078
	(0.117)	(0.108)	(1.069)	(1.033)	(0.010)	(0.011)	(0.184)	(0.183)
Treat*Year16	-0.023	-0.041	-1.741*	-1.324	-0.041***	-0.046***	-0.447**	-0.458**
	(0.092)	(0.096)	(0.997)	(0.974)	(0.010)	(0.011)	(0.185)	(0.183)
Treat*Year18	-0.046	-0.115	-0.264	0.051	-0.070***	-0.079***	-0.160	-0.134
	(0.096)	(0.091)	(1.050)	(1.030)	(0.009)	(0.010)	(0.183)	(0.182)
# observations	865	865	865	865	24267	24267	24208	24266
# individuals	203	203	203	203	5449	5449	5449	5449
R^2	0.106	0.132	0.019	0.014	0.023	0.050	0.072	0.051

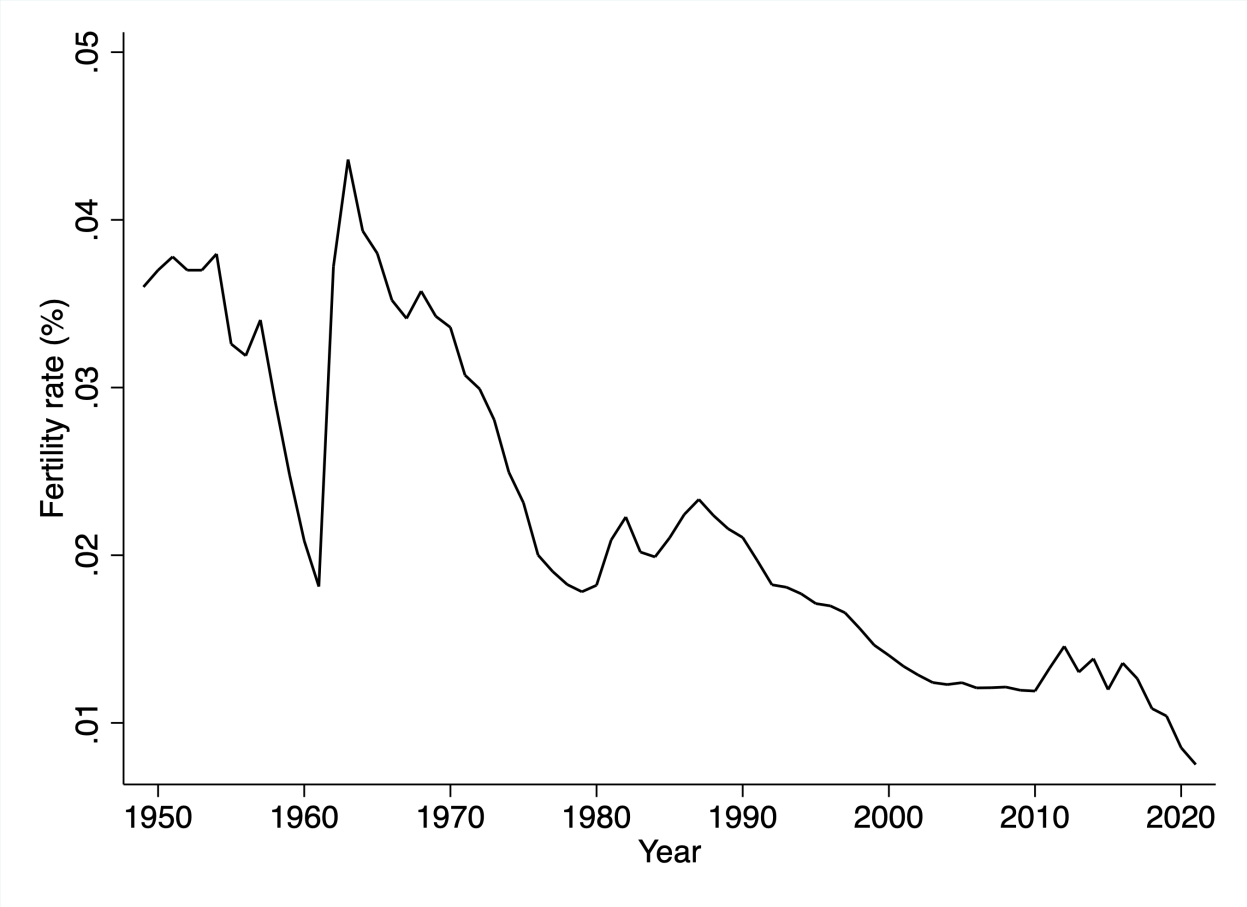
Note: Data comes from the CFPS 2010-2018 waves. Controls include age, number of children, the length of the marriage, and family size. Standard errors in parentheses are clustered at the household level. Individual fixed effect and year fixed effect are included in all regressions. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. † indicates a significant ($p < 0.1$) subgroup difference.

Table B9: Attrition Analysis

Dependent Variables:	Attrition in 2012	Attrition in 2014	Attrition in 2016	Attrition in 2018
	(1)	(2)	(3)	(4)
Treat	0.008	-0.013	0.007	0.009
	(0.010)	(0.010)	(0.014)	(0.015)
# observations	5652	5652	5652	5652
R^2	0.009	0.023	0.016	0.017

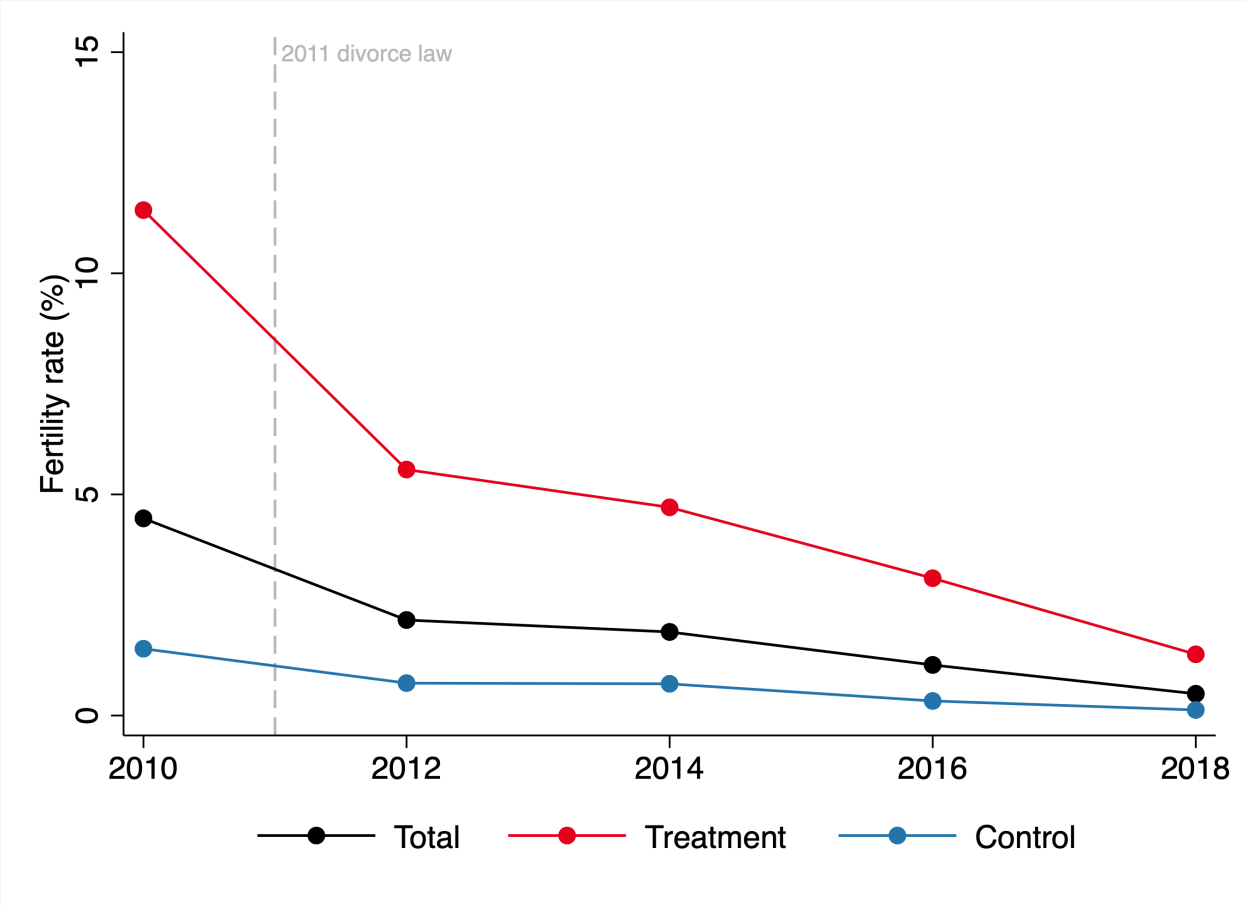
Note: Data comes from the CFPS 2010 wave. Attrition in 2012, 2014, 2016, and 2018 are a set of dummy variables indicating if a woman was not included in our final sample. Controls include age, number of children, the length of the marriage, and family size. Standard errors in parentheses are clustered at the household level. Province fixed effects are included in all regressions. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Figure B1: Fertility rates from 1949 to 2021



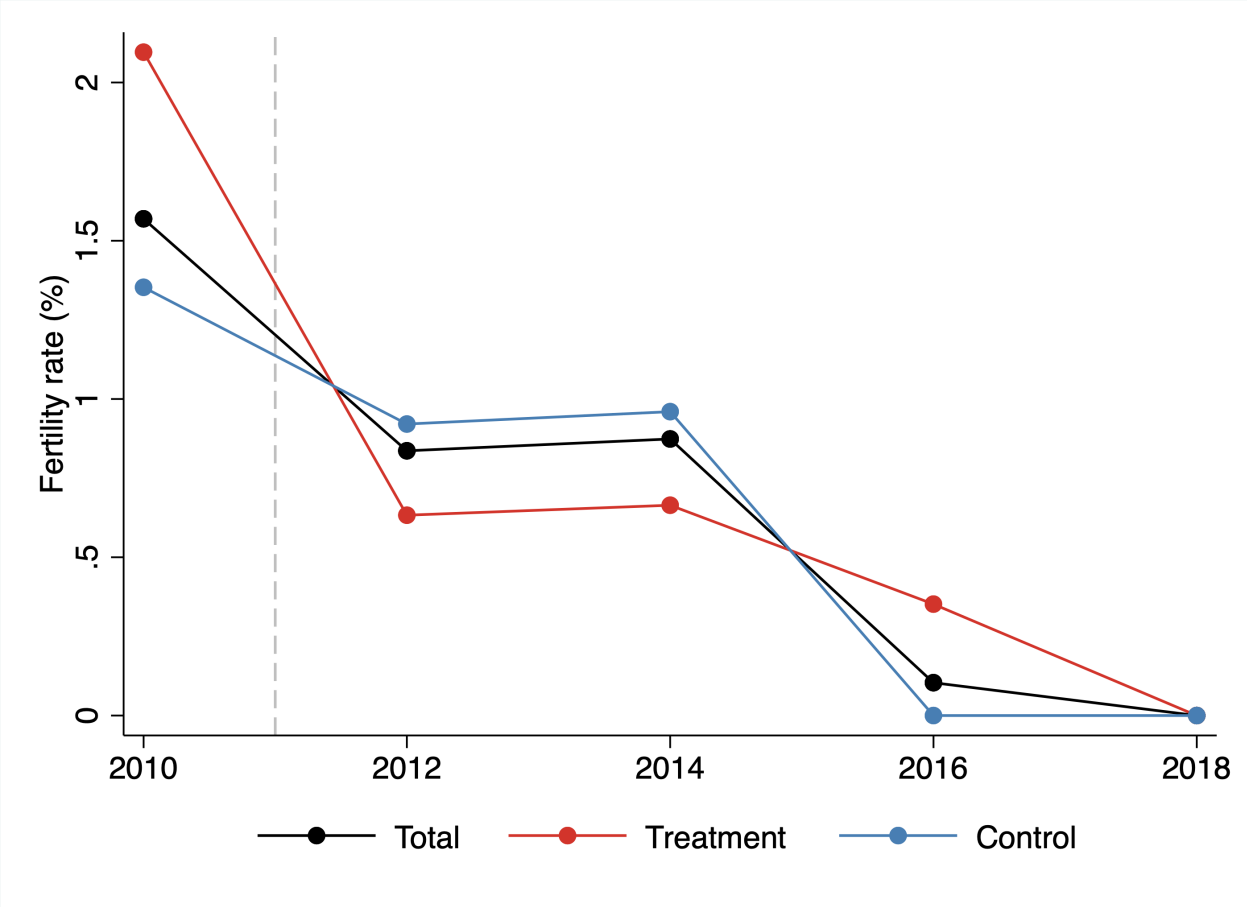
Note: Data comes from China's National Bureau of Statistics.

Figure B2: Fertility rates of the Core Sample (T and C)



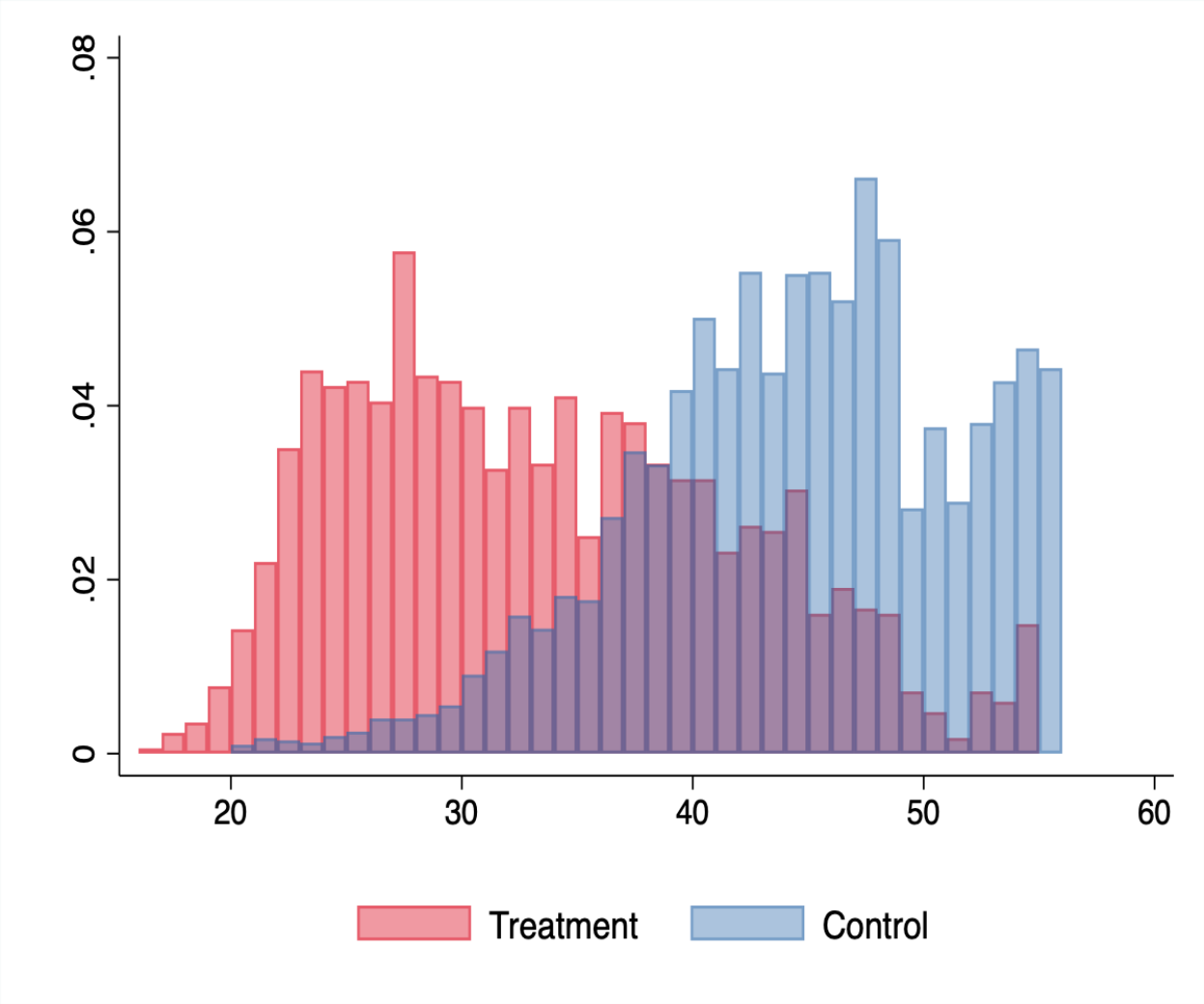
Note: Data comes from the CFPS 2010-2018 wave. The sample includes all families in which: (i) the wife was married in or before 2010 and remained in the same marriage in 2012, 2014, 2016, and 2018 waves; (ii) the family home was titled under the name of the husband; (iii) the wife younger than 55 in 2010. The treatment group consists of wives whose family home was purchased before their marriage, whereas the control group consists of wives whose family home was purchased during their marriage.

Figure B3: Fertility rates of the Sample Aged 35-40 (T and C)



Note: Data comes from the CFPS 2010-2018 wave. The sample includes all families in which: (i) the wife was married in or before 2010 and remained in the same marriage in 2012, 2014, 2016, and 2018 waves; (ii) the family home was titled under the name of the husband; (iii) the wife aged between 35 and 40 in 2010. The treatment group consists of wives whose family home was purchased before their marriage, whereas the control group consists of wives whose family home was purchased during their marriage.

Figure B4: Age Distribution of the Core Sample (T and C)



Note: Data comes from the CFPS 2010 wave. The sample includes all families in which: (i) the wife was married in or before 2010 and remained in the same marriage in 2012, 2014, 2016, and 2018 waves; (ii) the family home was titled under the name of the husband; (iii) the wife younger than 55 in 2010. The treatment group consists of wives whose family home was purchased before their marriage, whereas the control group consists of wives whose family home was purchased during their marriage.

Appendix C: Theory Proof

Proposition 1 *Suppose τ_w^t and τ_w^e denote the time the household investment in public goods under equal distribution and title-based distribution upon divorce, separately, we then have*

$$\tau_w^t < \tau_w^e, \quad \textit{and} \quad Q(\tau_w^t) < Q(\tau_w^e).$$

Proof. When the property is divided equally upon divorce, the left-hand side of equation 2 becomes

$$\begin{aligned} -\frac{\partial E(u(c_{2w})) + E(u(c_{2h}))}{\partial \tau_w} &= -(1-p)\frac{\partial[u(c_{2w}^m) + u(c_{2h}^m)]}{\partial \tau_w} - p\frac{\partial[u(c_{2w}^d) + u(c_{2h}^d)]}{\partial \tau_w} \\ &= (1-p)[\frac{1}{2}\Omega u'(c_2) + \frac{1}{2}\Omega u'(c_2)] + p[\frac{1}{2}\Omega u'(c_2) + \frac{1}{2}\Omega u'(c_2)] \\ &= \Omega u'(c_2) \end{aligned}$$

Yielding the following condition for optimal investment τ_w^e of mother:

$$\Omega u'(c_2) = 4\frac{\partial Q(\tau_w^e)}{\partial \tau_w^e}$$

$$\Omega u'(\frac{1}{2} * ((1-\tau_w^e)\Omega + \Omega + A)) = 4\frac{\partial Q(\tau_w^e)}{\partial \tau_w^e} \tag{6}$$

meanwhile, when the property is divided base on title upon divorce, the left-hand side of equation 2 becomes

$$\begin{aligned} -\frac{\partial E(u(c_{2w})) + E(u(c_{2h}))}{\partial \tau_w} &= -(1-p)\frac{\partial[u(c_{2w}^m) + u(c_{2h}^m)]}{\partial \tau_w} - p\frac{\partial[u(c_{2w}^d) + u(c_{2h}^d)]}{\partial \tau_w} \\ &= (1-p)[\frac{1}{2}\Omega u'(c_2) + \frac{1}{2}\Omega u'(c_2)] + p[\frac{1}{2}\Omega u'(c_{2w}^d) + \frac{1}{2}\Omega u'(c_{2h}^d)] \\ &= (1-p)\Omega u'(c_2) + p\frac{1}{2}\Omega[u'(c_{2w}^d) + u'(c_{2h}^d] \end{aligned}$$

Yielding the following condition for optimal investment τ_w^t of wife:

$$(1-p)\Omega u'(c_2) + p\frac{1}{2}\Omega[u'(c_{2w}^d) + u'(c_{2h}^d] = 4\frac{\partial Q(\tau_w^t)}{\partial \tau_w^t}$$

$$(1-p)\Omega u'(\frac{1}{2} * ((1-\tau_w^t)\Omega + \Omega + A)) + p\frac{1}{2}\Omega[u'(c_{2w}^d) + u'(c_{2h}^d)] = 4\frac{\partial Q(\tau_w^t)}{\partial \tau_w^t} \tag{7}$$

Now suppose instead we have $\tau_w^t > \tau_w^e$ and Q is concave, which implies that

$$4\frac{\partial Q(\tau_w^t)}{\partial \tau_w^t} < 4\frac{\partial Q(\tau_w^e)}{\partial \tau_w^e}.$$

At the same time, since $\tau_w^t > \tau_w^e$ and u is concave, we have

$$(1-p)\Omega u'(\frac{1}{2} * ((1-\tau_w^t)\Omega + \Omega + A)) > (1-p)\Omega u'(\frac{1}{2} * ((1-\tau_w^e)\Omega + \Omega + A)).$$

In addition, we have

$$\begin{aligned} p\frac{1}{2}\Omega[u'(c_{2w}^d) + u'(c_{2h}^d)] &= p\frac{1}{2}\Omega[u'(\frac{1}{2} * ((1-\tau_w^t)\Omega + \Omega)) + u'(\frac{1}{2} * ((1-\tau_w^t)\Omega + \Omega) + A)] \\ &> p\frac{1}{2}\Omega[u'(\frac{1}{2} * ((1-\tau_w^e)\Omega + \Omega)) + u'(\frac{1}{2} * ((1-\tau_w^e)\Omega + \Omega) + A)] \\ &> p\frac{1}{2}\Omega[u'(\frac{1}{2} * ((1-\tau_w^e)\Omega + \Omega + \frac{1}{2}A)) + u'(\frac{1}{2} * ((1-\tau_w^e)\Omega + \Omega) + \frac{1}{2}A)] \end{aligned}$$

The last inequality holds because u' is convex ($u''' > 0$). According equations 6 and 7 , we have

$$4\frac{\partial Q(\tau_w^t)}{\partial \tau_w^t} > 4\frac{\partial Q(\tau_w^e)}{\partial \tau_w^e}$$

which is a conflict. Thus, we must have $\tau_w^t < \tau_w^e$. ■