



The Gendered Division of Housework in China: Parenthood Effects and Heterogeneity Across Parenthood Stages

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Abstract

Research documents that the gender gap in housework is substantially larger among parents compared to couples without children. Because most evidence is from developed countries, it is unclear if a similar pattern exists in China, where couples have fewer children and the gendered division of household labor is more pronounced. Based on longitudinal survey data from the China Health and Nutrition Survey (1997–2015) and two-way person-based fixed effects models, the present study examined the effects of parenthood on spouses' housework time and share, as well as the heterogeneity across different parenthood stages within heterosexual marriages. The findings suggest that the birth of a child widens the gendered division of housework for Chinese families by substantially increasing housework time for mothers and reducing it for fathers. This gendered division of housework is most pronounced when the youngest child is a preschooler and remains unequal in subsequent parenthood stages. Overall, the study is among the first to demonstrate that parenthood is a highly gendered process in China that widens the gender divide of housework for married couples.

Keywords Parenthood · Gender division of housework · Housework time · Gender inequality · China · Life course

Introduction

The transition to parenthood is widely recognized as a gendered process that typically leads to a more conventional division of household labor among couples in different social contexts, as demonstrated by studies from the United States (Sanchez & Thomson, 1997; Yavorsky et al., 2015), Germany (Kühhirt, 2012; Grunow et al.,

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2012; Nitschea & Grunow, 2016), Sweden (Craig, 2016; Dribe & Stanfors, 2009), the United Kingdom (Schober, 2013), Australia (Baxter et al., 2008; Craig, 2016), and South Korea (Kim & Cheung, 2019). Though the impact of parenthood on the gendered division of household labor has been well-studied in North American and European societies, there is limited research on this topic in China. China's unique context, characterized by the changing mechanisms of the recent lowest-low fertility and the re-emergence of gender conservatism in the post-reform era, provides an interesting setting for investigation.

China has experienced a sharp decline in fertility rates over the past few decades, with its Total Fertility Rate (TFR) hitting an unprecedented historical low of 1.3 in the recent population census (National Bureau of Statistics 2021). Explanations for China's fertility decline have been the subject of extensive debate. Although external policy played a significant role in lowering China's fertility rate, there is growing recognition of the importance of more intricate internal mechanisms (Zheng et al. 2009; Cai, 2010; Whyte et al., 2015), among which women's role strain has received the most attention (Attané, 2016; Zhou, 2019).

Theoretically, the Gender Revolution Framework (GRF) provides a gender-based explanation for low fertility in developed countries. It argues that although women have made significant gains outside the family, they continue to experience a persistently gendered division of household labor within the family. This lagged transformation in the private sphere results in work-family incompatibility for women and consequently impedes the realization of fertility (McDonald, 2000a, 2000b; Goldscheider et al., 2015; Esping-Andersen et al. 2015). By highlighting the paradoxical nature of gender transformation in the public and private spheres, GRF attributes low fertility rates to the stalled gender revolution inside households and emphasizes the importance of men's domestic involvement in boosting fertility.

This paradox is also evident in post-reform China, where both the female labor force participation (FLFP) rate and women's share of unpaid housework are notably high. For most East Asian societies, family institutions are featured with highly divided gender roles, where mothers are attached to a range of caregiving roles while less positioned as earners (Brinton & Oh, 2019; Bumpass et al., 2009). Though China has a relatively high FLFP as a historical legacy from the socialist era, extensive evidence shows a persistent gender division of labor inside families (Asian Development Bank, 2015; Dong et al. 2015; Ji et al., 2017). According to China National Time Use Survey Bulletin in 2018, women spend an average of 126 min daily on household chores, nearly three times more than men (National Bureau of Statistics 2019).

Moreover, the rapid pace of economic privatization in post-reform China has eroded the gender equality it once achieved in the socialist period and widened the gender gap in both paid and unpaid work (Attané, 2016; Ji et al., 2017; Liu et al., 2009; Song, 2012; Zuo & Bian, 2001). With the erosion of state provision and public goods, most care responsibilities have been shifted back to family, which has substantially intensified women's role strain and undermined their labor market outcomes (Connelly et al., 2018). Evidence shows the near-universal FLFP has been declining since the 1990s and the gender wage gap keeps increasing (Liu et al., 2009; Shen et al., 2012), especially among those married and with

children (Zhang & Hannum, 2015; Zhang et al., 2008a, 2008b). Working mothers face growing wage penalties and risks of career downward mobility (He & Wu, 2021; Jia & Dong, 2013; Xu, 2023), and become more reliant on grandparental support to stay attached to the labor market (Du et al., 2019; Shen et al., 2016). Moreover, post-reform China has also witnessed a resurgence of traditional gender norms (Kong, 2021; Pittman & Blanchard, 1996; Xu, 2016; Zhang, 2017). Specifically, public attitudes toward gender roles became increasingly conservative between 2000 and 2010 (National Bureau of Statistics 2011; Sun & Chen, 2017).

Given rapidly declining fertility and the resurgence of traditional gender roles in China, growing attention has been paid to motherhood penalties in the labor market (He & Wu, 2021; Jia & Dong, 2013; Xu, 2023). However, the ways in which parenthood, as a pivotal turning point over the life course, shapes the gender division of domestic chores remain inadequately understood. The continuous decline in fertility and intensified conflict in women's roles in post-reform China, coupled with the theoretical significance of gender equality in the family as a fundamental determinant of fertility realization, underscore the necessity for a systematic examination of how parenthood influences gender equality in the distribution of household labor.

Another crucial yet understudied question pertains to the long-term effects of childbirth and how the gendered division of housework evolves throughout different stages of parenthood. Existing studies have yielded inconclusive findings on this issue, with some studies showing a widening of the gender division of labor over time (Grunow & Schulz 2012; Luo 2018), while others indicating a trend towards convergence in later parenthood stages (Kühhirt, 2012; Leopold et al., 2018; Rexroat & Shehan, 1987). Furthermore, the long-term patterns may vary across social contexts (Zabel & Heintz-Martin, 2013). The present study addresses this knowledge gap focusing on contemporary China, where maternal employment rates remain uniquely high despite an asymmetrical division of labor at home.

With nationally representative longitudinal data on matched spouses from the China Health and Nutrition Survey (CHNS), this work presents an examination of how parenthood affects the gender division of housework for married couples in the rarely studied context of China. The study addresses two central questions: (1) How does parenthood affect the gendered division of housework among heterosexual married couples in China? (2) How does the gendered division of housework change across different parenthood stages?

The study contributes to the existing literature in several ways. First, it expands knowledge of parenthood and its gendered outcomes relevant to the division of domestic work by including China as a unique case, adding to the existing cross-national evidence. Second, it extends previous studies by considering how the gendered division of housework may change across parenthood stages, offering a more comprehensive understanding of the topic from a life-course perspective. Third, the study improves previous research by using longitudinal data and employing two-way fixed effects models, allowing for a more nuanced assessment of causal relationships compared to previous cross-sectional analyses. Lastly, by using couple-matched data, the study investigates both absolute time and relative share of housework, offering more detailed insights into within-couple dynamics.

Literature Review

Theoretical Perspectives and Cross-National Evidence

Several theoretical perspectives have been applied to account for the gender division of household labor. The *gender specialization theory* posits that males specialize in market labor due to their relative advantage in the labor market, while females focus on domestic work to maximize overall family well-being (Becker, 1991). This theory can be extended to understand how gender specialization evolves when couples become parents (Dribe & Stanfors, 2009). Because children increase care investment and living expenses, spouses specialize in different types of work based on their comparative advantages to maximize the overall utility, which often leads to a deepened gender division of labor. The *resource bargaining perspective* challenges the idea of a shared goal within couples and highlights women's economic dependency on their male partners as a crucial attribute to their lower bargaining power in household negotiation (Brines, 1993). According to this perspective, parenthood intensifies the traditional household division of labor because it undermines women's relative economic power. In contrast, the *gender role perspective* emphasizes the role of gendered social norms attached to motherhood and fatherhood in widening the gendered division of labor when couples become parents (Bittman et al., 2003; Greenstein, 2000).

Despite ongoing debate about the relative importance of each theory, substantial evidence suggests that the gender division of household labor widens over the transition to parenthood, regardless of spouses' economic dependency or broader social contexts (Grunow et al., 2012; Schober, 2013; Yavorsky et al. 2015). However, cross-national studies suggest that the size of this parenthood effect varies by social contexts. For example, Tsuya et al. (2000) compared the time use patterns of couples with and without children in South Korea, Japan, and the United States and found wives in East Asian countries tend to bear greater domestic responsibility than their American counterparts when they have children. These differences highlight the necessity of expanding research to include China, where the family system is similarly rooted in Confucian patriarchal tradition and where the gender norms have become more conservative in the post-reform era.

Existing Findings of Parenthood Effect in China

To my knowledge, no studies to date have directly examined how parenthood shapes the gendered division of household labor in China. Moreover, research considering how the gender disparity in housework changes over the life course or varies by family structure can provide only indirect evidence on this question.

Research from a life-course perspective investigates the gender disparity in housework time over the course of marriage. Employing longitudinal data from the Chinese Nutrition and Health Survey, Niu (2020) reported a decline in husbands' housework time over the course of marriage, which may offset the general trend of men's growing participation in domestic labor. Luo's (2018) age-period-cohort analysis of

the same data found a widening gender gap in housework across the life course, reflecting increases among women and decreases among men. While these studies provide important insights from the life-course perspective, they did not identify the factors contributing to the widening gender disparity in housework patterns. Instead, the present study considers childbirth as a crucial turning point that contributes to a more traditional pattern of housework division.

Approaching from a family-structure perspective, few studies have considered the role of children in shaping the gender division of housework in China and most of them used only cross-sectional data, yielding inconclusive findings. Most studies reported that wives' housework time increases with the presence of children (Qi & Dong, 2016; Yang, 2014), but evidence for husbands' housework time is mixed. Using data from the China Time Use Survey in 2008, Qi and Dong (2016) found fathers perform 4.3 more hours of housework and childcare per week than childless men, while Yang (2014), based on data from SCWSS 2010, reported a negative association between husbands' housework and the number of children. These discrepancies in findings may partly reflect the inconsistency of housework measurement in these studies. More importantly, the cross-sectional data used in these studies may introduce bias due to the inability to establish causal relationships and to minimize sources of unobserved heterogeneity in estimating the parenthood effect. One of the contributions of this study is that I used longitudinal data and within-person variance to reduce bias in estimates of the effect of parenthood on housework.

In sum, there is a lack of comprehensive research on the parenthood effect on the gendered division of household labor in China. Previous studies have either failed to identify childbirth as a crucial turning point or have been limited by the use of cross-sectional data. This study seeks to improve previous studies by focusing on parenthood as a fundamental driver of gender inequality in housework and by employing longitudinal analyses to better estimate the effect of childbirth.

Long-Term Effect Across Different Parenthood Stages

Despite extensive discussions on this question, less attention has been paid to how this parenthood effect varies across different stages. Existing evidence suggests that having young children at home increases the overall demand for housework, which is often disproportionately borne by mothers, leading to a deeper gendered division of labor (Kühhirt, 2012; Leopold et al., 2018; Rexroat & Shehan, 1987). However, it is less clear how this pattern changes as children grow older.

One hypothesis posits that the impact of childbirth is a short-term effect and predicts a convergence in couples' housework participation as children get older (Kühhirt, 2012; Leopold et al., 2018; Rexroat & Shehan, 1987). For instance, Kühhirt's (2012) study of West Germany suggests that couples' housework participation gradually converges after their children reach secondary school. Leopold et al. (2018) also found a decline in women's housework time in their later life stages, indicating that the pattern of housework division is plastic rather than sticky over the life course. In contrast, another hypothesis argues that the traditionalization effect of childbirth is a long-term normalization of parenthood roles for spouses, leading to a

continuous deepening of the division of housework (Zabel & Heintz-Martin, 2013). Zabel and Heintz-Martin's (2013) cross-national study found the division of housework becomes continuously less egalitarian throughout all stages of parenthood for couples in East Germany and France.

Two points are noteworthy. First, it is crucial to examine changes in both relative shares and absolute housework time to accurately assess the source of gender convergence. Relying solely on changes in housework share may potentially lead to misattribution of the observed convergence. If men continue to neglect their domestic duties while the overall demand for housework decreases in later family stages, the convergence in the housework share may still be captured but is mostly driven by women's decrease rather than men's increase, which does not necessarily indicate greater gender equality. Secondly, it is important to recognize that cultural and institutional settings play a role in shaping the long-term evolution of housework division. For example, Zabel and Heintz-Martin (2013) found that the division of housework becomes less egalitarian throughout all stages of parenthood in East Germany and France, while it becomes more egalitarian in West Germany as the youngest child grows into adulthood.

Under the context of China, with an erosion of public goods and a resurgence of conservative gender norms in the post-reform era, couples may face greater economic constraints and stricter gender norms as they become parents, which, according to both the gender specialization theory and gender role perspective, will lead to a widened gender gap in housework. Meanwhile, the economic reform in China has substantially reduced the preschool childcare support provided by the state and employers, leading to a shift towards market-run kindergartens (Cook & Dong, 2011; Liu et al., 2009). This transformation has reduced the accessibility and affordability of preschool services in post-reform China, creating extra economic strains and domestic needs for families with preschoolers. Existing studies on maternal employment in China found the presence of preschool children significantly lowers the likelihood of women's participation in market work (Maurer-Fazio et al. 2011; Zhao, 2018), indicating a greater family responsibility faced by mothers with preschoolers. In light of this distinct context, the gender gap in the division of housework is expected to be greatest among parents when their youngest child is at preschool age, compared to other parenthood stages. Although limited evidence is available regarding Chinese fathers' involvement in household chores, taking into account the prevailing social norms that prioritize men's role as breadwinners, it is expected that fathers' housework participation will remain consistently low across different stages of parenthood.

Methods

Data and Study Sample

This study utilized longitudinal data from the China Health and Nutrition Survey (CHNS, <https://www.cpc.unc.edu/projects/china>), a collaborative project between the University of North Carolina at Chapel Hill and the Chinese Center for Disease

Control and Prevention (CCDC) since 1989. The survey used a multistage, random clustered sampling process and gradually expanded its sampling regions since 1997, with new communities added to replace communities no longer participating. Over all the waves, CHNS collected information from over 7,000 households in 15 provinces and municipal cities that vary substantially in geography, economic development, and public resources (Fig. 1). Up to the latest released version, CHNS provides unbalanced panel data spanning 26 years across 10 waves from 1989 to 2015, making it a valuable resource for investigating long-term trends in family dynamics. This study used data from 7 waves (1997, 2000, 2004, 2006, 2009, 2011, and 2015). Respondents from the 1989 wave only were excluded because that wave did not collect information on women's fertility history, which is a core variable in this study. The 1991 and 1993 waves were also excluded due to unclarified units of measurement of housework time, which resulted in low data quality.

In comparison to other datasets, CHNS provides two key advantages for this study. Firstly, it is one of the limited longitudinal datasets available in China, enabling a more in-depth analysis of changes in housework time over the transition to parenthood. This strengthens the reliability of previous findings derived from

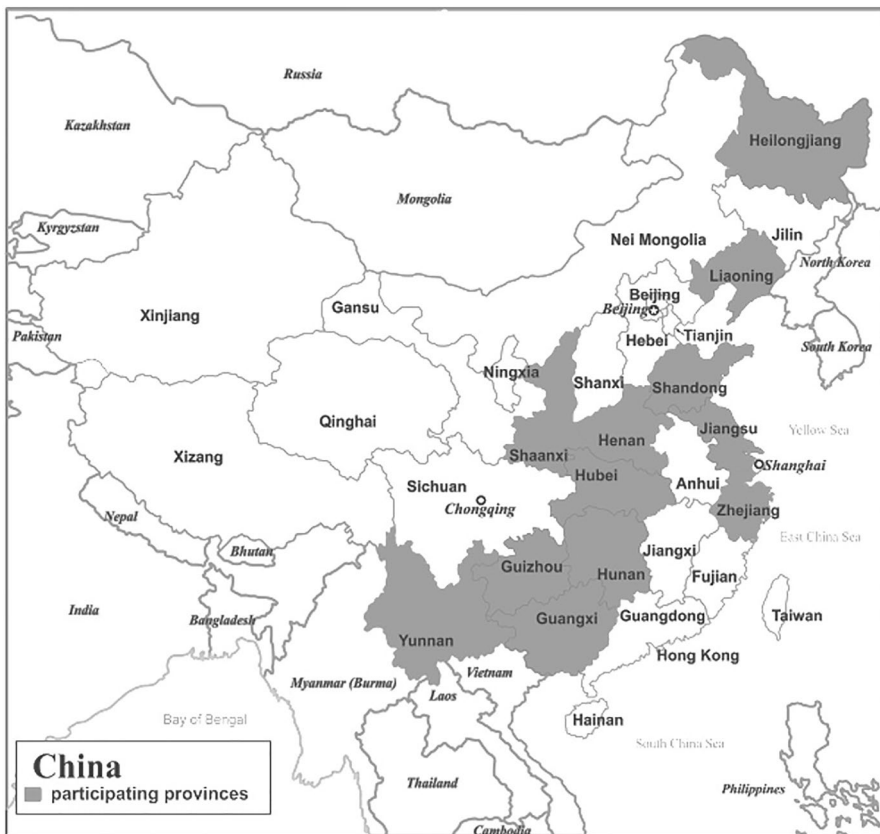


Fig. 1 Geographical distribution of CHNS sample (Source: <https://www.cpc.unc.edu/projects/china>)

cross-sectional analyses. Secondly, CHNS evaluates daily time spent on each housework task rather than just total housework time. This method improves measurement accuracy and acknowledges the variations among different types of housework (Coltrane, 2000).

The study's target population is married couples with both spouses living together in the same household and aged 18–49 during the waves of data collection. I focus exclusively on marital childbirth because CHNS collected fertility history only among ever-married female respondents. Given nonmarital childbirth remains extremely rare in the 1980s and earlier birth cohorts in China (Yu & Xie, 2021), which constitutes the majority of the analytical sample, excluding nonmarital childbirth should not substantially affect the findings. Moreover, I focus only on those married and co-resident spouses because marital and resident statuses are found to have a substantial influence on one's housework time and spousal division of labor (Gupta, 1999; Baxter, 2005; Dong & An, 2015). Nonmarried cohabitation is not included because CHNS does not have such a category when asking about marital status, and also due to the fact that marriage is found nearly universal among the analytic cohorts in this study (Yeung & Hu, 2016).

The following sample restrictions are imposed. First, for the matching purpose, individual respondents whose spouse did not take their individual questionnaire are excluded from this study. Second, after matching spousal records, paired observations with missing values in either their own or their spouse's time-use and socioeconomic information are dropped from analyses. Third, for matched pairs with non-missing information, couples in which one or both spouses have fewer than two waves of observations are further excluded because a minimum of two waves is necessary to obtain fixed-effect estimators. It is noteworthy that exclusions based on these criteria do not significantly change the distribution of respondents' education, age, and geographic location from that of the target population in this dataset.

The final analytical sample includes 2,267 couples (corresponding to 6,135 couple-waves) from 12 provinces and municipalities in China. This sample size resembles the sample size in previous studies that employed this dataset. Among them, 5.51% (125 out of 2,267 couples) have ever reported being childless and 98.32% (2,229 out of 2,267 couples) remain or become parents over the observation window. Table 6 in the Appendix provides a detailed description of the distribution of switchers and non-switchers in the analytical sample.

Measures

Outcomes

The study measures the gender division of housework using both absolute and relative indicators. Each respondent in CHNS was asked to report their own time-use information on four housework tasks since 1997: buying food, preparing and cooking food, washing and ironing clothes, and cleaning the house. Information on whether they performed each chore in the previous week and how much time they spent on it daily was collected. Respondents who answered that they did

not participate are recoded as “0” for their time spent on this chore. Answers of “unknown” on any of these chores are treated as missing values. The study does not include childcaring time because CHNS only collects childcaring time from respondents with children under 7.

Absolute housework time is obtained by summing the time spent on each of these four tasks. Respondents who did not participate in any of these tasks are coded as “0” for their absolute housework time. All time values are converted to “minutes per day” for standardization. However, for the task of buying food, respondents were given the option of “buying food on the way to and from work” without specifying the exact amount of time spent on this activity. To address this, I replaced these unknown values with the average time spent on buying food per wave (specifically, 35.02, 33.52, 33.89, 34.59, 39.79, and 36.99 min/day for each wave). It’s important to note that this mean substitution was applied to only a small proportion (4.2%) of total observations, minimizing the potential for introducing substantial bias into the estimates. Furthermore, to reduce bias from extreme values, the study follows previous practice and winsorizes housework time at the top 95% levels (Bianchi et al., 2000; Zhang, 2017).

The *relative housework share* is a measure of the proportion of housework time performed by each spouse and is calculated as follow: $R's\ housework\ time / (R's\ housework\ time + Spouse's\ housework\ time) * 100$. If neither spouse participates in housework, this proportion is set as 50.

Although the survey measures only four tasks and the summed housework time cannot fully represent total housework time, it provides a glimpse into respondents’ engagement in the most common chores. Three of these tasks, namely cooking, washing and ironing, and cleaning, are considered “feminized” chores that are often time-consuming, less flexible, and mostly performed by women. Notably, large social surveys in the U.S. have identified laundry, cleaning, and cooking as three of the top five most time-consuming chores (Blair & Lichter, 1991). Buying food, a necessary chore for meal preparation, is relatively less frequent and less gendered. Although CHNS does not provide information on participation in more “masculinized” chores, focusing on these feminized, gender-segregated, and time-consuming routines allows a better understanding of gender inequalities within the private sphere (Batalova & Cohen, 2002; Chesley & Flood, 2017).

Key Predictors

Parental status is set as a binary variable indicating whether the respondent had at least one child or not. To obtain this information, I used the birth history of ever-married women collected in CHNS and matched each mother to their biological children. Due to a large proportion of missing values on children’s residential status in CHNS, I cannot distinguish residential children from non-residents and thus included both in this study. To ensure accuracy, children who died before the age of 1 (265 observations) or whose age of death was unknown (18 observations) are removed. Female records with at least one biological child are coded as 1, while

those without any child are coded as 0. For male respondents, their child information is matched with that of their female spouses.

To explore the potential heterogeneity of childbirth effects, I further considered the *number of children*. I calculated the number of children for each woman in each survey year and matched the birth information to their male spouses. As families with three or more children were rare under the strict birth control during the survey period, I categorized the number of children into three groups: no child (coded as 1), one child (coded as 2), and two or more children (coded as 3).

The *stage of parenthood* is identified by the age category of the youngest child. Following previous practice, the first stage of parenthood is defined as parents with their youngest children as infants and toddlers aged 0–3 (Dribe & Stanfors, 2009; Grunow et al., 2012; Kühhirt, 2012), as these children require intensive care and nurturing, and public childcare has been suspended since the radical market reforms in 1989 (Du & Dong, 2013). The next stage is identified as parents with their youngest child being preschool-aged, which in China is from age 4–6. Privatization of preschool education in the 1990s has led to greater stratification of kindergarten attendance based on residence and economic conditions, which may result in parents at this stage experiencing greater gender divides in terms of paid and unpaid work. In China, most children start elementary school at 7, which defines the subsequent parenthood stage as parents with their youngest children being school age from age 7 to 15. Having the youngest children aged 16 years or above are regarded as the last stage of parenthood (parents of adult children), since children in China are legally allowed to work from age 16.

Covariates

The study includes three layers of control variables. The first layer consists of individual-level controls, including *age*, *work status*, *educational attainment*, and *annual individual income*. Age is calculated by subtracting the year of birth from the year of the interview and is set as a continuous variable. Considering the dual nature of China's state-owned and private/informal sectors, where the former often excels in providing social goods, shorter working hours, and greater career stability (Xu, 2023; Zhang et al., 2008a, 2008b), offering more institutional support for a gender-neutral way of labor division, it is necessary to distinguish state-owned sectors in the controls to adjust for potential confounding. The work status in this study is therefore categorized as 1 = not working, 2 = working at state-owned sectors, and 3 = working at non-state-owned sectors. Educational attainment is coded as 1 = illiterate/semi-illiterate, 2 = primary school, 3 = junior school, 4 = high school, and 5 = college or above. To account for inflation, the annual individual income is adjusted using the Consumer Price Index (CPI) in 2015 and expressed in units of 10,000 RMB. For respondents who are not working, their personal income is set as 0.

The second layer of controls in this study pertains to factors at the spouse's level, including *spouse's work status*, *wife's relative economic level*, and *relative educational attainment*. The wife's relative economic level is calculated following Brines (1994)'s practice and is obtained by the formula: (wife's annual income – husband's

annual income) / (wife's annual income + husband's annual income), resulting in a range from -1 to 1. The value indicates both the direction and extent of income reliance between spouses: a value below 0 signifies the wife's dependence on her husband's income, with values closer to -1 indicating a higher degree of income dependence. A value of 0 denotes no income interdependence since they have the same income. Following this idea, the value is set to 0 in cases where neither spouse earns income, indicating they share identical income circumstances. Relative educational attainment is identified based on the education levels of both spouses and is categorized into three groups: wife < husband (coded as 1), wife = husband (coded as 2), and wife > husband (coded as 3).

The third layer controls for household-level factors, including the *status of co-residence with mothers and mothers-in-law* (1 = co-residence, 0 = non-co-residence) and *annual household income* (adjusted by 2015 CPI). Considering the prevalence of reciprocal intergenerational bonds in China, grandparents, especially grandmothers, play an increasingly pivotal role in supporting younger families through their help in household chores and grandparental childcare (Chen, 2005; Chen et al., 2011; Du et al., 2019). Therefore, the co-residence of mothers and mothers-in-law is controlled in the models as a proxy for intergenerational support. Models including the co-residence of both grandmothers and grandfathers are re-estimated for a robustness check, which returned the same results.

Table 1 presents the distribution of variables in the analytical sample by gender and parental status.

Analytical Strategy

To estimate the effect of parenthood on the gender division of housework, the study employs two-way person-based fixed-effect linear models. The model is specified as follows:

$$\begin{aligned} (\text{Housework Time/Share})_{it} = & \beta_0 + \beta_1(\text{Parental Status})_{it} \\ & + \beta_2(\text{Controls})_{it} + \gamma_t + \alpha_i + \varepsilon_{it}, \end{aligned}$$

where β_0 is the intercept, β_1 represents the effect of parental status on the time or share of housework, and β_2 is a vector of coefficients for controlled variables. Fixed-effect models allow the error term to include two components: α_i is the person-fixed component that captures variance caused by unobserved individual characteristics that remain stable over time and is dropped out when using within-person variations to estimate coefficients. Another one is ε_{it} , which represents random components that vary by person and time (Allison, 2009). γ_t is the time fixed effect that varies by waves. The Least Square Dummy Variable (LSDV) is employed, with T-1 time dummies included, to control for time effects. Individual-clustered robust standard error is used to account for the potential of heteroskedasticity between persons. Compared to pooled and random-effect linear models for panel data analysis, fixed-effect linear models focus solely on within-group variance, allowing us to account

Table 1 Descriptive statistics by gender and parental status

	Wives		Husbands	
	Childless	Mothers	Childless	Fathers
<i>Dependent variables</i>				
Housework time (min/day)	113.11(72.69) ^a	142.11(72.86)	38.03(56.17)	34.87(49.41)
Buy food for your household	18.26(18.70)	23.04(19.78)	10.82(15.81)	11.61(16.71)
Prepare and cook food	45.91(43.50)	65.67(47.28)	14.70(29.95)	14.46(28.23)
Wash and iron clothes	26.47(20.17)	30.18(19.12)	5.77(13.93)	3.78(11.03)
Clean the house	22.47(18.38)	23.22(17.09)	6.74(14.4)	5.02(11.24)
Housework share	75.48(28.01)	81.28(22.64)	24.52(28.01)	18.72(22.64)
<i>Core independent variables</i>				
Number of child (%)				
Childless	100	0	100	0
One child	–	56.73	–	56.73
Two or more children	–	43.27	–	43.27
Parenthood stage (%)				
0–3 infants and toddler	–	14.17	–	14.17
4–6 preschooler	–	12.42	–	12.42
7–15 school-age child	–	42.23	–	42.23
16 or above adult child	–	31.18	–	31.18
<i>Individual-level controls</i>				
Age	29.46(6.82)	37.73(6.59)	31.14(7.44)	38.99(6.45)
Work status (%)				
Not at work	23.12	20.98	11.29	10.22
Work at state-owned sectors	31.18	19.03	32.80	25.68
Work at non-state-owned sectors	45.70	59.99	55.91	64.09
Highest education level (%)				
Illiteracy/semi-illiteracy	4.84	9.43	2.69	3.26
Primary school	16.67	20.69	15.05	14.05
Middle school	29.03	41.40	33.33	45.37
High school	25.27	19.77	25.81	26.76
College or above	24.19	8.71	23.12	10.56
Annual income (10 k)	1.89(7.14)	1.41(3.09)	1.95(2.12)	2.18(4.43)
<i>Couple-level controls</i>				
Wife's economic independence	– 0.19(0.52)	– 0.17(0.49)	– 0.19(0.52)	– 0.17(0.49)
Relative educational level (%)				
Wife < Husband	19.89	35.28	19.89	35.28
Wife = Husband	65.59	51.08	65.59	51.08
Wife > Husband	14.52	13.63	14.52	13.63
<i>Household-level controls</i>				
Living with wife's mother (Yes, %)	2.69	2.37	2.69	2.37
Living with husband's mother (Yes, %)	50.00	22.91	50.00	22.91
Household annual income (10 k)	5.95 (9.26)	4.79 (6.92)	5.95 (9.26)	4.79 (6.92)
Observations (person-wave)	186	5949	186	5949

Table 1 (continued)

^aPercentage for categorical variables; mean for continuous variables with standard deviation in the parentheses

for unobserved individual-specific heterogeneity and therefore better examine the impact of childbirth over time within each individual.

Despite a significant number of zero in males' housework time, ordinary least square (OLS) is still preferred to obtain the fixed-effect estimator in this study. Because in time-use surveys, these zeros can arise from either the mismatch between the observation window and period of interest or from individuals who never engage in housework. It has been found that when dealing with such a mixed fraction of zeros, OLS still yields less biased estimates compared to Tobit and two-part models (Stewart, 2013).

The analysis consists of three stages, each focusing on different aspects of parenthood effects. In the first stage, the model will include *parental status* as a dummy variable to examine the impact of having a child on the absolute and relative division of housework for both husbands and wives. In the second stage, the *number of children* will be included in the model as a categorical variable to specify potential heterogeneity in the effects between having one child and having multiple children. In the final stage, *parenthood stages* will be included in the model to investigate varying effects of different parenthood stages on the absolute and relative amount of housework among all father and mother observations.

Results

Descriptive Results for Average Housework Time and Share

Table 1 presents a comparison of average housework time and share between childless observations and parent observations. The results reveal a consistent pattern where mothers dedicate more time to each of the four household chores and assume a higher share of housework compared to their childless counterparts. Conversely, fathers spend less time and assume a lower share of the housework than their childless counterparts. Specifically, mothers spend an average of 29 more minutes per day on housework than childless women, and their average housework share is 5.8 percentage points higher. Fathers, on the other hand, spend 3.16 fewer minutes per day on housework than childless men, and their average housework share is 5.8 percentage points lower.

Table 2 displays average housework time and shares for wives and husbands in each survey year, examining differences by number of children in the full sample. It shows that wives generally spend substantially more time on housework than husbands regardless of the number of children for observations in each survey year. Furthermore, wives with multiple children tend to do more housework and take a higher proportion than wives with only one child, while husbands with multiple

Table 2 Average housework time and share for respondents with different numbers of children by gender and wave

	1997	2000	2004	2006	2009	2011	2015
<i>Wives' housework time (minute/day)</i>							
Childless	111.47	103.78	121	104.07	109.35	135.69	88.95
One child	133.34	132.83	144.8	140.52	152.68	142.18	109.77
Two or more children	156.23	148.14	164.81	150.58	160.68	150.12	104.65
<i>Husbands' housework time (minute/day)</i>							
Childless	29.41	20.68	40.5	41.29	40.35	52.88	34.3
One child	33.77	34.69	58.99	57.23	34.42	40.31	31.30
Two or more children	22.06	25.80	54.73	48.70	27.81	30.81	19.39
<i>Wives' housework share (%)</i>							
Childless	80.86	81.18	72.64	65.47	76.23	73.15	71.11
One child	81.57	80.33	72.72	72.79	82.41	79.33	79.15
Two or more children	88.33	85.79	75.79	76.03	84.99	83.50	82.39
<i>Husbands' housework share (%)</i>							
Childless	19.14	18.82	27.36	34.53	23.77	26.85	28.89
One child	18.43	19.67	27.28	27.21	17.59	20.67	20.85
Two or more children	11.67	14.21	24.21	23.97	15.01	16.50	17.61

children tend to do less housework and undertake a lower housework proportion than their one-child counterparts in each survey year (Fig. 2). Additionally, the overall trend of daily housework time for wives decreases with fluctuations over the period of 1997–2015, while the overall trend for husbands' housework time is less pronounced. These results are consistent with findings from other nationally representative survey data in China.

The descriptive statistics do not show a clear pattern for parents at different parenthood stages (Table 3). Mothers with their youngest child aged 0–3 generally spend the least time on housework compared to mothers at any other parenthood stage. However, this may be due to age differentials since mothers with infants and toddlers are probably younger than mothers with older children and also more likely to have higher educational attainment due to the education expansion amidst China's modernization. No clear pattern can be captured in fathers' housework time across different parenthood stages.

FE Regression Results for Parental Status and Number of Children

Table 4 presents the findings of two-way fixed-effects regression models examining the impact of parental status (Column I) and number of children (Column II) on housework involvement outcomes. The first four columns of the table report the findings for wives, and the remaining four columns present the results for husbands.

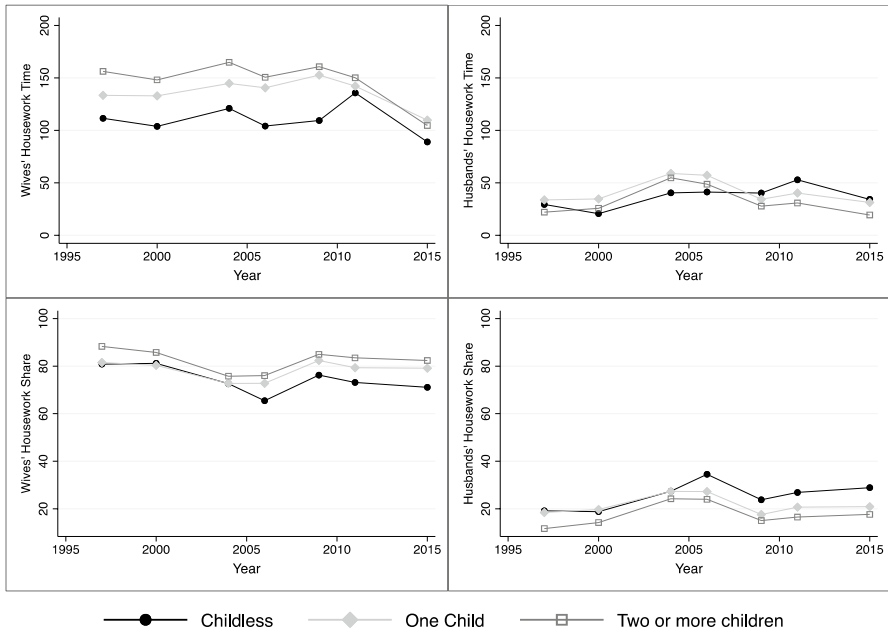


Fig. 2 Line graphs of average housework time and share for respondents with different numbers of children by gender and wave

The analysis reveals that for wives, compared to staying childless, motherhood is associated with a statistically significant increase of 14 min in daily housework time ($p < 0.1$) and a statistically significant increase of 6 percentage points in housework share ($p < 0.05$). Further examination of the varying effect of the number of children is presented in Columns a (II) and b (II). Although not statistically significant, having one child is still associated with a 13-min increase in wives' daily housework time. However, having two or more children is significantly linked to an approximately 30-min increase in daily housework time for wives ($p < 0.01$), compared to being childless. The Wald test indicates a significant difference between the magnitudes of the two coefficients ($F = 8.46$, $p = 0.0037$), suggesting that the childbirth effect on wives' daily housework time varies by birth order. Becoming the mother of two or more children leads to a higher family workload for women, which is excessive compared to the workload brought on by the first child.

On the other hand, the results show that fatherhood is associated with a reduction in daily housework time and housework share for husbands, with an average decrease of 11 min ($p < 0.05$) and a 6-percentage point decrease ($p < 0.05$), respectively. Results from Columns a(II) & b (II) indicate that having one child is associated with a statistically significant decrease of approximately 11 min in daily housework time for husbands ($p < 0.05$), while having multiple children is associated with a reduction of 9 min' housework, though not statistically significant. The Wald test does not demonstrate any significant difference between the two coefficients in the husband's model ($F = 0.32$, $p = 0.5733$).

Table 3 Average housework time and share for respondents at different stages of parenthood by gender and wave

	1997	2000	2004	2006	2009	2011	2015
<i>Wives' housework time (minute/day)</i>							
0–3 infants and toddlers	121.76	107.52	135.62	111.71	131.25	129.77	83.83
4–6 preschoolers	141.72	127.25	130.40	141.07	159.43	137.37	98.22
7–15 school-age children	152.88	150.70	171.16	148.31	152.81	145.17	105.38
16 or above adult children	158.82	142.03	150	159.14	164.35	151.68	117.97
<i>Husbands' housework time (minute/day)</i>							
0–3 infants and toddlers	30.32	24.76	41.08	34.48	23.04	38.09	14.42
4–6 preschoolers	20.38	31.74	40.57	35.64	29.19	27.39	27.93
7–15 school-age children	29.86	30.44	63.31	55.44	34.82	39.15	24.54
16 or above adult children	23.04	33.52	62.52	66.33	31.85	37.07	31.23
<i>Wives' housework share (%)</i>							
0–3 infants and toddlers	81.16	82.31	77.20	76.55	82.08	75.66	79.52
4–6 preschoolers	88.59	80.63	77.20	80.73	84.73	82.85	78.48
7–15 school-age children	84.95	84.25	74.59	73.64	81.73	80.22	81.00
16 or above adult children	87.60	81.20	71.06	71.74	84.99	82.50	80.47
<i>Husbands' housework share (%)</i>							
0–3 infants and toddlers	18.84	17.69	22.80	23.45	17.92	24.34	20.48
4–6 preschoolers	11.41	19.37	22.80	19.27	15.27	17.15	21.52
7–15 school-age children	15.05	15.75	25.41	26.36	18.27	19.78	19.00
16 or above adult children	12.40	18.80	28.94	28.26	15.01	17.50	19.53

Furthermore, it shows that having one child can significantly affect couples' share of housework. Specifically, having one child is associated with an increase of 6 percentage points in wives' share of housework ($p < 0.05$) and correspondingly 6 percentage points decrease in husbands' share ($p < 0.05$), compared to being childless. Although the coefficient of having multiple children is not statistically significant, the direction of the effect remains consistent.

The results from Table 4 also highlight the importance of multi-generational co-residence in China and its association with the amount of time spouses spend on household chores. Specifically, living with the husband's mother is significantly linked to a decrease in both wives' and husbands' absolute housework time, while living with the wife's mother only results in a significant decrease in the husband's housework time. Moreover, the results further support prior findings that both his and her work status significantly impacts their housework involvement. Specifically, compared to stay-at-home wives, women working in state-owned and non-state-owned sectors reduce housework by 25 and 16 min respectively ($p < 0.001$), leading to a corresponding decline of 5 and 4 percentage points decrease in their housework share ($p < 0.05$). Additional analyses are performed to further test the mediating effect of spousal work status (see Appendix Table 7). The results indicate that parenthood effects on housework time are mediated by the spouse's work status rather than his or her own work status. Figure 3 (in the Appendix) illustrates that when the

Table 4 Fixed-effect regressions of housework on parental status and number of children for wives and husbands

	W ^a				H			
	a. Housework time		b. Housework share		a. Housework time		b. Housework share	
	I	II	I	II	I	II	I	II
Parental status	14.43 ⁺ (8.25) ^b		6.38* (3.00)		- 11.04* (5.47)		- 6.35* (2.99)	
Number of children (ref. childless)								
One child		13.21 (8.33)		6.46* (2.99)		- 11.18* (5.48)		- 6.43* (2.98)
Two or more children		29.62**		5.43		- 9.33		- 5.42
Age	- 1.52*** (0.24)	(9.98)	- 0.21** (0.08)	(3.54) (0.08)	0.09 (0.16)	(6.26) (0.17)	0.21** (0.08)	(3.54) (0.08)
Work status (ref. not at work)								
Work at state-owned sectors	- 25.40*** (5.78)	- 25.70*** (5.77)	- 4.67** (1.80)	(1.80)	- 9.72* (4.28)	- 9.77* (4.28)	- 6.11** (1.90)	- 6.13** (1.90)
Work at non-state-owned sectors	- 16.34*** (3.81)	- 15.90*** (3.83)	- 3.94*** (1.10)	(1.10)	- 17.10*** (3.59)	- 17.14*** (3.59)	- 8.02*** (1.54)	- 8.04*** (1.54)
Annual income	- 0.68 ⁺ (0.39)	- 0.64 ⁺ (0.39)	- 0.17 (0.12)	(0.12)	- 0.01 (0.27)	- 0.01 (0.28)	- 0.14 (0.12)	- 0.14 (0.12)

Table 4 (continued)

	W ^a				H				
	a. Housework time		b. Housework share		a. Housework time		b. Housework share		
	I	II	I	II	I	II	I	II	
Spouse's work status (ref. not at work)									
Work at state-owned sectors	18.73** (5.85)	18.27** (5.86)	6.19** (1.90)	6.22** (1.90)	6.86 ⁺ (4.11)	6.82 ⁺ (4.12)	4.74** (1.80)	4.72** (1.80)	
Work at non-state-owned sectors	14.01** (4.68)	13.62** (4.68)	8.08** (1.55)	8.11** (1.55)	9.10** (2.44)	9.15** (2.44)	3.99** (1.10)	4.02** (1.10)	
W's economic independence	-1.89 (2.80)	-1.98 (2.80)	-0.61 (0.89)	-0.60 (0.89)	1.69 (1.90)	1.68 (1.90)	0.64 (0.91)	0.64 (0.91)	
Relative educational level (ref. W < H)									
W = H	-7.86 ⁺ (4.30)	-8.23 ⁺ (4.28)	-4.54*** (1.38)	-4.52** (1.38)	7.08* (2.90)	7.04* (2.91)	4.56*** (1.38)	4.54** (1.38)	
W > H	3.55 (7.74)	2.74 (7.70)	-6.96** (2.34)	-6.91** (2.35)	10.51* (5.15)	10.42* (5.16)	7.04** (2.34)	6.90** (2.35)	
Living with W's mother	-11.73 (12.82)	-10.57 (12.85)	7.00 ⁺ (4.22)	6.93 (4.22)	-16.86* (6.79)	-16.73* (6.79)	-7.08 ⁺ (4.23)	-7.01 ⁺ (4.23)	
Living with H's mother	-15.92**	-14.82**	1.04	0.97	-12.86***	-12.74***	-1.17	-1.10	

Table 4 (continued)

	W ^a				H			
	a. Housework time		b. Housework share		a. Housework time		b. Housework share	
	I	II	I	II	I	II	I	II
Household annual income	(5.27) - 0.07	(5.26) - 0.07	(1.68) 0.04	(1.67) 0.04	(3.49) - 0.17	(3.51) - 0.17	(1.68) 0.08	(1.68) 0.08
Time fixed effects	(0.20)	(0.19)	(0.07)	(0.07)	(0.20)	(0.20)	(0.08)	(0.08)
Constant	179.95*** (12.59)	182.26*** (12.64)	83.62*** (4.32)	83.48*** (4.32)	40.82*** (8.53)	41.11*** (8.59)	15.97*** (4.38)	16.13*** (4.38)
N (person-wave)	6135	6135	6135	6135	6135	6135	6135	6135
Within R ²	0.07	0.07	0.04	0.04	0.06	0.06	0.04	0.04

^aW stands for wife and H stands for husband

^bIndividual-clustered robust standard errors in parentheses

⁺ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

husband stays at work, her housework time increases with the number of children, and it stays relatively stable when the husband is not at work. In addition, the husband's housework time significantly decreases with the number of children when his wife is not at work and stays relatively stable when she is at work.

To check for robustness, the models in Table 3 were re-estimated using a subsample of dual-earner couples (see Appendix Table 8). The results turn out similar, indicating the finding that parenthood widens the gender division of housework holds for dual-earner couples. The only slight difference lies in the the effect of parental status on her housework time becomes no longer significant, while husbands in these families even show a greater decrease in their housework time upon the arrival of children, compared to results from the full sample. This may arise from the high reliance on domestic support from grandparents to sustain dual-earner family models among younger families in China.

In summary, the analyses show that parenthood has a significant influence on the gender division of housework among married couples by increasing wives' absolute housework time and share while reducing both for husbands. Moreover, analysis of the number of children reveals husbands' housework retreatment is mainly observed over the advent of the first child while having multiple children is associated with a substantial increase in wives' housework time. The main findings hold consistent when considering only dual-earner couples.

Heterogeneous Effects Across Different Parenthood Stages

To examine the long-term effect of childbirth across stages of parenthood, the analytical sample was confined to all parent respondents (2229 couples in 5949 couple waves) and the models were re-estimated with parenthood stages added. Table 5 presents the estimated results of parenthood stages on housework time and share by gender, with all covariates included and the number of children controlled as a continuous variable.

For wives, the estimated coefficients for each parenthood stage are all positive except for having adult children, indicating that mothers' housework load continues to be high in the early and middle stages and then decreases as the youngest child grows into adulthood. Specifically, having the youngest child as a 4–6 preschooler and a 7–15 school-aged child increases wives' daily housework time by 11 min ($p < 0.01$) and 9 min ($p < 0.1$), respectively. When the youngest child grows into adulthood, mothers' housework time decreases by approximately 6.5 min compared to those at the first stage, though not statistically significant. For husbands' housework time, all parenthood stages are consistently negatively associated with their housework time, but none of the coefficients is statistically significant.

Regarding relative share, compared to 0–3 infants and toddlers, having the youngest child as 4–6 preschoolers significantly widens the gender gap in parents' housework share. Specifically, it leads to an increase of 2.8 percentage points in wives' housework share ($p < 0.05$) and a correspondingly 2.8 percentage point decrease for husbands ($p < 0.05$). The size of the effect is moderate probably because the spousal housework share is already very unequal before childbirth and gets more

asymmetrical from childless to parental status, which leaves limited room for change for subsequent parenthood stages. When the youngest child reaches 16 or above, the coefficient of housework share does not change its direction, though not statistically significant, indicating the gender division of housework does not get more equal at the final parenthood stage, compared to the first stage.

To check for robustness, I replaced the parenthood stage with the age of the youngest child as a continuous variable and tested for its quadratic relationship with the outcomes (See Appendix Table 9). The quadratic term is statistically significant and negatively correlated with wives' housework time and relative share ($p < 0.05$), suggesting that both women's housework time and share increase in the early parenthood stage and then decrease in subsequent stages. While on the other hand, men's housework time demonstrates no significant change relevant to the age of the youngest children.

Overall, the results indicate that the unequal division of housework becomes deepest when having preschoolers as the youngest children and stays highly asymmetric over the subsequent parenthood stages. Though mothers' housework time decreases as the youngest child grows up to 16 and older, no evidence of fathers' domestic increase is found at later parenthood stages.

Table 5 Fixed-effect regressions of housework on parenthood stages by gender

	Mothers		Fathers	
	HW ^a time	HW share	HW time	HW share
Parenthood stage (ref. 0–3 infants and toddlers)				
4–6 preschoolers	10.78** (3.94)	2.85* (1.34)	– 1.55 (2.67)	– 2.82* (1.34)
7–15 school-age children	9.14 ⁺ (4.99)	2.56 (1.58)	– 3.26 (3.39)	– 2.49 (1.58)
16 or above adult children	– 6.68 (7.93)	0.67 (2.47)	– 3.37 (5.42)	– 0.57 (2.47)
Number of children	7.47 (5.67)	– 1.18 (1.86)	0.23 (3.59)	1.21 (1.86)
Covariates		Controlled		
Time fixed effects		Controlled		
Constant	161.89*** (13.87)	88.79*** (4.40)	26.71** (9.37)	10.96* (4.52)
<i>N</i>	5949	5949	5949	5949
<i>R</i> ²	0.08	0.04	0.06	0.04

^aHW stands for housework

^bIndividual-clustered robust standard errors in parentheses

⁺ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Conclusion and Discussion

This study provides new insights into the gendered outcomes of parenthood regarding the division of housework in China. The findings highlight a significant disparity in housework time between wives and husbands following the birth of a child, with wives experiencing a notable increase in their household responsibilities while husbands' involvement decreases. Further investigation reveals this gendered division of housework reaches its peak during the subsequent years of child-rearing, particularly when the youngest children are in their preschool years, and does not show any sign of equalization in the subsequent stages. These findings underscore the pivotal role of parenthood in reinforcing traditional gender roles and shaping the ongoing gendered division of domestic labor within married couples.

These findings are particularly noteworthy in light of the unexpected low fertility observed following the relaxation of China's One-Child Policy (OCP). In response to the growing challenge of a shrinking population, the Chinese government has gradually relaxed the policy since 2013 and further implemented the universal two-child policy since the beginning of 2016 (NPC, 2015). Despite these changes in birth control policies, China's fertility rate has not yet exhibited a sustained increase (Attané, 2016; Tong et al., 2023). According to the most recent population census, the total number of new births in 2020 decreased to 12 million from 18 million in 2016 and 17 million in 2017 (National Bureau of Statistics, 2021). Given that gender equity inside households is recognized as an unneglectable element in reviving fertility rates, as contended by the GRF theory and supported by a bunch of empirical studies (Cooke, 2004; Kan et al., 2019), it becomes crucial for policymakers to incorporate gender-friendly institutional support into family policies, to better facilitate China's fertility rate while at the same time ensuring gender equity. Indeed, a recent study from China suggests that the universal "two-child policy" without corresponding support is likely to reinforce the existing gender inequality in Chinese society (Zhou, 2019). The current study provides support for this notion and emphasizes the need for a more comprehensive approach to policymaking.

In contrast to previous studies from industrialized countries, where researchers found the advent of the first child has the most significant impact on spouses' housework time, with subsequent children exerting a moderate effect (Baxter et al., 2008; Kim & Cheung, 2019; Kühhirt, 2012), this study reveals a distinct pattern that having two or more children in China substantially increases the amount of housework performed by wives, with this effect being notably larger than that of having one child. However, it is crucial to interpret these findings cautiously, given the potential group selectivity associated with higher-order childbirth under China's fertility control. Specifically, the Chinese government implemented the "1.5 child policy" in most rural areas during the mid-1980s, permitting qualified rural households to have additional children. Consequently, there exists a higher proportion of multi-child families in rural regions than in urban areas. This policy-based selectivity may limit the generalizability of the estimated effect of higher-order childbirth in this study.

Nevertheless, the results arguably indicate a substantial escalation in domestic responsibilities for women who have given birth to two or more children, implying that mothers with multiple children under China's birth control are likely to face doubled inferiority to both men and women with fewer children due to their greater domestic burden. Indeed, differential fertility has long been recognized as a significant contributor to social inequality (Ahluwalia, 1976). A recent study focused on China suggests that differential fertility embodied in China's OCP has exacerbated socioeconomic disparities between singletons and those with siblings through assortative mating (Wen, 2023). While existing research has examined the stratified outcomes for offspring, there is limited understanding of the extent to which the differential fertility driven by OCP reinforces disparities among mothers. The present study provides initial insights into this question through the lens of unpaid household labor. Further investigations are necessary to identify the underlying mechanisms and patterns based on a more comprehensive range of measurements.

While prior studies from other countries generally indicate either a moderate increase or no change in men's absolute housework time before and after childbirth (Baxter et al., 2008; Dribe & Stanfors, 2009; Kim & Cheung, 2019; Kühhirt, 2012), this study found a reduction in husbands' housework time after they become fathers, which is consistent to Yavorsky et al.'s (2015) findings among dual-earner couples in the U.S. Such distinct pattern may partly because the housework measurement in this study focuses on more gender-segregated routine chores, without including nonroutine housework that men are more likely to engage in (Sayer, 2010), as well as childcare time, which would otherwise be counted as an increase in men's absolute time devoted in household labor when they change from childless to fathers. Another understanding of this result concerns the heterogeneous effects across urban and rural families, given a relatively high proportion of rural residents in the analytical sample. Considering the huge rural–urban disparities in China, rural families are more embedded in traditional gender norms and are less able to outsource domestic needs due to their lower socioeconomic status, compared to their urban counterparts (Hu, 2015). This may contribute to a greater possibility of men's housework reduction in rural China. I further tested this hypothesis by rerunning the models using rural and urban subsamples. The results demonstrate men's housework reduction surrounding the first childbirth is more pronounced in rural families than in urban families, providing support for this explanation.

Furthermore, this finding is in line with Niu's (2020) observation of a decline in men's housework involvement over the course of marriage based on the same dataset. This study provides new insights by explicitly uncovering childbirth as a crucial turning point that has triggered men's housework withdrawal over the life course. This finding also adds to the ongoing debate on the long-term trend of Chinese men's domestic involvement. While it has been argued that the gender division of domestic work is becoming more equalized in China (Niu, 2020), the findings here suggest that the long-term trend toward equalization, as advocated by some scholars, is most likely impeded and even offset by the advent of children over the life course. As childbirth retains its highly gendered nature under China's existing institutional settings and societal culture, it will continue to embody gendered norms,

perpetuating traditional roles that associate femininity with domestic work, and further exacerbate gender inequalities in various aspects of social life.

For the long-term effect of parenthood, the study found wives' housework time peaks when the youngest child is a preschooler, remaining high at school age, and only declines when the youngest child grows into an adult. This finding partially aligns with previous evidence from other countries (Leopold et al., 2018; Rexroat & Shehan, 1987). The heaviest housework load for mothers with preschoolers can be attributed in part to both the cultural expectations that prioritize mothers' domestic involvement and the absence of universal preschool education in post-reform China. As the classic economic framework predicts a tradeoff between maternal employment and childcare costs (Blau & Robins, 1988), the privatization of kindergarten in post-reform China has made preschool childcare less accessible and affordable to younger parents (Cook & Dong, 2011), which further drives mothers with preschoolers to exit the workforce and focus on domestic needs (Zhao, 2018), and ultimately contributes to their increased housework time. Moreover, the enduring housework burden for women with school-aged children underscores the social norms of domesticity attached to motherhood is rather sticky for mothers with young dependents.

On the other hand, no statistically significant fluctuation in husbands' housework time is observed across all stages of parenthood. Consequently, the gendered division of housework turns out least egalitarian for married couples having their youngest children at preschool age. In other words, if there is any "egalitarian" trend of couples' housework division in the later stages of parenthood, it should be predominantly driven by the reduction in women's housework time, rather than any increase in men's contributions. This finding is noteworthy as it differs from the patterns observed in some developed countries, where the convergent trend is partially attributed to men's increasing participation (Leopold et al., 2018). In the case of China, husbands withdraw from housework when they first become fathers and do not increase their domestic input at any stage of fatherhood. This implies not only women's role of housekeepers is reinforced as they become and stay as mothers, but also men's domesticity-aversion becomes strengthened and maintained as they become and stay as fathers. Despite considerable focus on motherhood, the societal perceptions of fatherhood remain less explored in China. Future studies could further investigate the cultural constructions of fatherhood in the context of China, as well as how it may align with or diverge from those observed in other societies.

Lastly, it is noteworthy that the effect size of parenthood is found relatively small compared to estimates from other countries (see Kühhirt, 2012 on Germany, Baxter et al., 2008 on Australia, and Kim & Cheung, 2019 on Korea for example). This may be partially due to the limited measure of housework used here. Considering the substantial amount of time parents invest in caring for their children, the exclusion of childcare time in this study may have led to an underestimation of the impact of childbirth on both men's and women's absolute time spent in household labor. Studies reported a greater increase in domestic time for parents when incorporating childcare into the measure (Kim & Cheung, 2019; Kühhirt, 2012). Another possible explanation concerns the inability to account for the residential status of children in this study. Due to a large proportion of missing values concerning children's

residential status in CHNS data, I included both residential and non-residential children in my analytic sample and did not control for their residential status in the models. This may have resulted in more conservative estimates of the parenthood effect since couples with their children living elsewhere are expected to face fewer domestic needs and thus less affected by childbirth, which may partially account for the relatively small effect size reported in the current study.

Altogether, these findings emphasize the ongoing significance of parenthood in reinforcing and perpetuating gender divides in domestic chores, highlighting the need for continued attention to promoting greater gender equality in the current context of the lowest-low fertility rate in China. Despite the valuable insights gained from the findings, the present study is not without its limitations. First, this study relies on time-use data collected through survey interviews, which has been reported to yield less accurate estimates than time-diary (Kan, 2008). However, given the limited availability of time-diary data in China, this study offers novel insights into the influence of parenthood on the division of domestic labor that cannot be derived from currently available time-diary data. Secondly, childcare is not included in this study because the measure is limited to children under 7 in CHNS and also due to the fact that childcare is allocated in a different way from housework within couples (Sullivan, 2013). Such exclusion may have caused an underestimation of the parenthood effect as discussed above. Moreover, due to different understandings of childcare and housework, there is a probability that males and females may differently report their time as childcare rather than housework, which may introduce bias into the observed gender gap in housework time. Nevertheless, compared to other social surveys, CHNS is among the few that asked for time spent on each specific domestic chore, rather than generally asking their total housework time. Such a detailed way of data collection may have mitigated potential bias arising from misreports and made CHNS one of the best datasets for this investigation. Thirdly, although fixed effects models can address bias caused by unobserved time-invariant omitted variables (such as childhood experience and family background), there remain some unobservant time-variant factors not being controlled for, such as gender ideology, which usually become less egalitarian over the transition to parenthood (Vespa, 2009) but was unfortunately not included in CHNS. Such omission may undermine the reliability of the results in this study.

Appendix

See Fig. 3 and Tables 6, 7, 8, and 9.

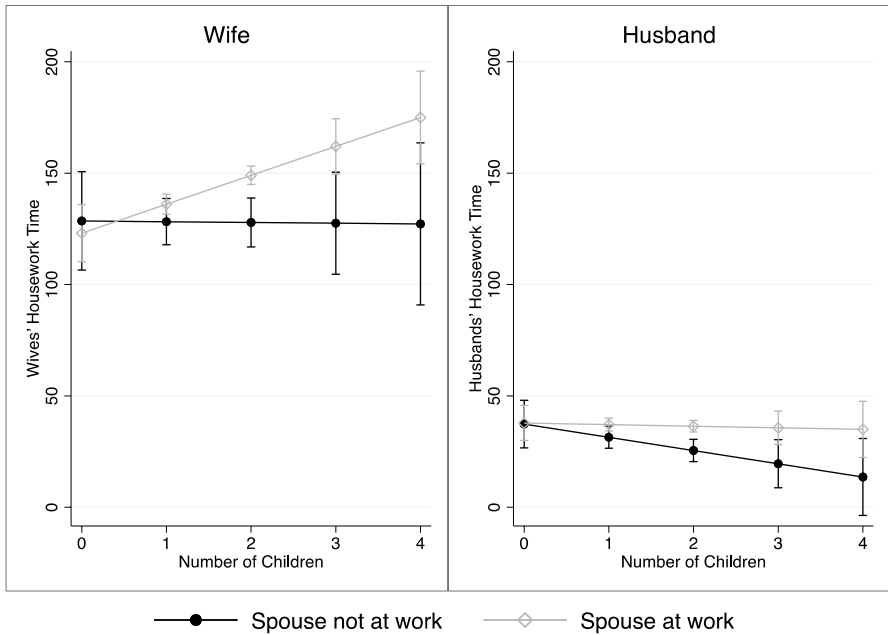


Fig. 3 Adjusted Predictions of Housework Time by Spouse's Work Status with 95 CIs (all covariates controlled at means)

Table 6 Distribution of switchers and non-switchers by parental status and stages in the analytical sample

	Number of couples (n = 2267)	Percentage (%)
Always childless	38	1.68
From childless to one child or more	87	3.84
Always one child	1,110	48.96
From one child to more	189	8.34
Always more than one child	843	37.19
	Number of parents (n = 2229)	Percentage (%)
Always infants/toddlers	124	5.56
From infants/toddlers to older	528	23.69
Always preschool	19	0.85
From preschool to older	314	14.09
Always school-aged	329	14.76
From school-aged to adult	648	29.07
Always adult	267	11.98

Table 7 Fixed-effect regressions of housework time with and without interactions of work status and number of children

	W's HW time ^a		H's HW time	
	I	II	I	II
Number of Children	10.96* (4.37)	- 2.55 (6.47)	- 2.41 (2.57)	- 7.83 ⁺ (4.38)
R at work (ref. not at work)	- 17.24*** (3.79)	- 21.98** (7.85)	- 16.01*** (3.55)	- 19.40** (7.26)
SP at work (ref. not at work)	14.80** (4.65)	- 5.46 (9.64)	8.58*** (2.38)	0.48 (4.88)
R's work status*n of children (ref. not at work)		2.80 (4.33)		2.12 (4.14)
SP's work status*n of children (ref. not at work)		13.31* (5.78)		5.22 ⁺ (2.79)
Covariates	Controlled			
Time fixed effects	Controlled			
Constant	181.47*** (11.30)	202.22*** (13.50)	35.73*** (7.65)	44.27*** (9.52)
N (person-wave)	6135	6135	6135	6135
Within R ²	0.07	0.07	0.06	0.06

Individual-clustered robust standard errors in parentheses

W stands for wife and H stands for husband, R stands for respondent, SP stands for spouse

+p < 0.10, *p < 0.05, **p < 0.01, ***p < 0.001

Table 8 Fixed-effect regressions of housework time and share for dual-earner couples^a

	W ^b				H			
	a. Housework time		b. Housework share		a. Housework time		b. Housework share	
	I	II	I	II	I	II	I	II
Parental status	7.30 (10.65) ^c		11.58* (5.20)		-17.96* (8.25)		-11.63* (5.17)	
Number of children (ref. childless)								
One child	5.72 (10.80)		11.70* (5.16)		-18.38* (8.24)		-11.76* (5.13)	
Two or more children	28.30* (13.03)		9.95 (6.15)		-12.42 (9.03)		-9.92 (6.12)	
Covariates								
Time fixed effects								
Constant	177.70*** (20.54)		81.26*** (7.55)		39.05*** (14.60)		18.60* (7.62)	
N (person-wave)	3519		3519		3519		3519	
Within R ²	0.05		0.03		0.05		0.03	

^aDual-earner couples are identified as both spouses having over 80% of their records reported at work

^bW stands for wife and H stands for husband

^cIndividual-clustered robust standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.001$

Table 9 Fixed-effect regressions of housework time and share by the youngest children's age^a

	Mothers		Fathers	
	HW ^b time	HW share	HW time	HW share
Age of the youngest child	0.32 (1.44)	0.33 (0.50)	- 0.64 (1.04)	- 0.32 (0.49)
Age of the youngest child (quadratic)	- 0.23*** (0.04)	- 0.04** (0.01)	0.03 (0.03)	0.04** (0.01)
Number of children	- 19.81* (9.64)	- 4.82 (3.69)	- 0.07 (6.64)	4.85 (3.69)
Covariates	Controlled			
Time fixed effects	Controlled			
Constant	94.22*** (24.22)	79.28*** (7.54)	27.49+ (16.07)	21.30** (8.04)
<i>N</i>	5074	5074	5074	5074
<i>R</i> ²	0.09	0.05	0.07	0.05

^aThe analytical sample is confined to parents with the youngest child aged under 20

^bHW stands for housework

^cIndividual-clustered robust standard errors in parentheses

+*p* < 0.10, **p* < 0.05, ***p* < 0.01, ****p* < 0.0

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Data availability The data used in this study are publicly available at the official website of the China Health and Nutrition Survey (CHNS): <https://www.cpc.unc.edu/projects/china>.

Declarations

Conflict of interest The author has no competing interests to declare that are relevant to the content of this article.

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References

- Abendroth, A. K., Huffman, M. L., & Treas, J. (2014). *The parity penalty in life course perspective: Motherhood and occupational status in 13 European countries*. *American Sociological Review*.
- Ahluwalia, M. S. (1976). Inequality, poverty and development. *Journal of Development Economics*, 3(4), 307–342.
- Allison, P. D. (2009). *Fixed effects regression models*. SAGE.
- Asian Development Bank. (2015). *Women in the Workforce: An Unmet Potential in Asia and the Pacific*. Mandaluyong: Asian Development Bank.
- Attané, I. (2012). Being a woman in China today: A demography of gender. *China Perspectives*, 2012(2012/4), 5–15.
- Attané, I. (2016). Second child decisions in China. *Population and Development Review*, 42, 519–536.
- Batalova, J. A., & Cohen, P. N. (2002). Premarital cohabitation and housework: Couples in cross-national perspective. *Journal of Marriage and Family*, 64(3), 743–755.
- Baxter, J. (2005). To marry or not to marry: Marital status and the household division of labor. *Journal of Family Issues*, 26(3), 300–321.
- Baxter, J., Hewitt, B., & Haynes, M. (2008). Life course transitions and housework: Marriage, parenthood, and time on housework. *Journal of Marriage and Family*, 70(2), 259–272.
- Becker, G. S. (1991). *A treatise on the family (Enlarged edition)*. Harvard University Press.
- Bianchi, S. M., Milkie, M. A., Sayer, L. C., & Robinson, J. P. (2000). Is anyone doing the housework? Trends in the gender division of household labor. *Social Forces*, 79(1), 191–228.
- Bittman, M., England, P., Sayer, L., Folbre, N., & Matheson, G. (2003). When does gender trump money? Bargaining and time in household work. *American Journal of Sociology*, 109(1), 186–214.
- Blair, S. L., & Lichter, D. T. (1991). Measuring the division of household labor: Gender segregation of housework among American couples. *Journal of Family Issues*, 12(1), 91–113.
- Blau, D. M., & Robins, P. K. (1988). Child-care costs and family labor supply. *The Review of Economics and Statistics*, 70, 374–381.
- Brines, J. (1993). The exchange value of housework. *Rationality and Society*, 5(3), 302–340.
- Brines, J. (1994). Economic dependency, gender, and the division of labor at home. *American Journal of Sociology*, 100(3), 652–688.
- Brinton, M. C., & Oh, E. (2019). Babies, work, or both? Highly educated women's employment and fertility in East Asia. *American Journal of Sociology*, 125(1), 105–140.
- Bumpass, L. L., Rindfuss, R. R., Choe, M. K., & Tsuya, N. O. (2009). The institutional context of low fertility: The case of Japan. *Asian Population Studies*, 5(3), 215–235.
- Cai, Y. (2010). China's below-replacement fertility: Government policy or socioeconomic development? *Population and Development Review*, 36(3), 419–440.
- Chen, F. (2005). Residential patterns of parents and their married children in contemporary China: A life course approach. *Population Research and Policy Review*, 24(2), 125–148.
- Chen, F., Liu, G., & Mair, C. A. (2011). Intergenerational ties in context: Grandparents caring for grandchildren in China. *Social Forces*, 90(2), 571–594.
- Chesley, N., & Flood, S. (2017). Signs of change? At-home and breadwinner parents' housework and child-care time. *Journal of Marriage and Family*, 79(2), 511–534.
- Coltrane, S. (2000). Research on household labor: Modeling and measuring the social embeddedness of routine family work. *Journal of Marriage and Family*, 62(4), 1208–1233.
- Connelly, R., Dong, X. Y., Jacobsen, J., & Zhao, Y. (2018). The care economy in post-reform China: Feminist research on unpaid and paid work and well-being. *Feminist Economics*, 24(2), 1–30.
- Cook, S., & Dong, X. Y. (2011). Harsh choices: Chinese women's paid work and unpaid care responsibilities under economic reform. *Development and Change*, 42(4), 947–965.
- Cooke, L. P. (2004). The gendered division of labor and family outcomes in Germany. *Journal of Marriage and Family*, 66(5), 1246–1259.
- Craig, L. (2016). *Contemporary motherhood: The impact of children on adult time*. Routledge.
- Dong, X. Y., & An, X. (2015). Gender patterns and value of unpaid care work: Findings from China's first large-scale time use survey. *Review of Income and Wealth*, 61(3), 540–560.
- Drabe, M., & Stanfors, M. (2009). Does parenthood strengthen a traditional household division of labor? Evidence from Sweden. *Journal of Marriage and Family*, 71(1), 33–45.

- Du, F., Dong, X. Y., & Zhang, Y. (2019). Grandparent-provided childcare and labor force participation of mothers with preschool children in urban China. *China Population and Development Studies*, 2(4), 347–368.
- Esping-Andersen, G., & Billari, F. C. (2015). Re-theorizing family demographics. *Population and Development Review*, 41(1), 1–31.
- Goldscheider, F., Bernhardt, E., & Lappegård, T. (2015). The gender revolution: A framework for understanding changing family and demographic behavior. *Population and Development Review*, 41(2), 207–239.
- Greenstein, T. N. (2000). Economic dependence, gender, and the division of labor in the home: A replication and extension. *Journal of Marriage and Family*, 62(2), 322–335.
- Grunow, D., Schulz, F., & Blossfeld, H. P. (2012). What determines change in the division of housework over the course of marriage? *International Sociology*, 27(3), 289–307.
- Gupta, S. (1999). The effects of transitions in marital status on men's performance of housework. *Journal of Marriage and the Family*, 1, 700–711.
- He, G., & Wu, X. (2021). Family status and women's career mobility during urban China's economic transition. *Demographic Research*, 44, 189–224.
- Hu, Y. (2015). Gender and children's housework time in China: Examining behavior modeling in context. *Journal of Marriage and Family*, 77(5), 1126–1143.
- Ji, Y., Wu, X., Sun, S., & He, G. (2017). Unequal care, unequal work: Toward a more comprehensive understanding of gender inequality in post-reform urban China. *Sex Roles*, 77(11), 765–778.
- Jia, N., & Dong, X. Y. (2013). Economic transition and the motherhood wage penalty in urban China: Investigation using panel data. *Cambridge Journal of Economics*, 37(4), 819–843.
- Kan, M. Y. (2008). Measuring housework participation: The gap between "stylised" questionnaire estimates and diary-based estimates. *Social Indicators Research*, 86, 381–400.
- Kan, M. Y., Hertog, E., & Kolpashnikova, K. (2019). Housework share and fertility preference in four East Asian countries in 2006 and 2012. *Demographic Research*, 41, 1021–1046.
- Kim, E. H. W., & Cheung, A. K. L. (2019). The gendered division of household labor over parenthood transitions: A longitudinal study in South Korea. *Population Research and Policy Review*, 38, 4.
- Kong, S. (2021). Women and work in contemporary China. The effect of market transition on women's employment, earnings, and status attainment (Doctoral dissertation, Utrecht University).
- Kühhirt, M. (2012). Childbirth and the long-term division of labour within couples: How do substitution, bargaining power, and norms affect parents' time allocation in West Germany? *European Sociological Review*, 28(5), 565–582.
- Leopold, T., Skopek, J., & Schulz, F. (2018). Gender convergence in housework time: A life course and cohort perspective. *Sociological Science*, 5, 281–303.
- Liu, Bohong, Yongying Zhang, and Yani Li. (2009). *Reconciling work and family: Issues and policies in China*. Geneva: International Labour Organization (ILO).
- Luo, M. S., & Chui, E. W. T. (2018). Gender division of household labor in China: Cohort analysis in life course patterns. *Journal of Family Issues*, 39(12), 3153–3176.
- Maurer-Fazio, M., Connelly, R., Chen, L., & Tang, L. (2011). Childcare, eldercare, and labor force participation of married women in urban China, 1982–2000. *Journal of Human Resources*, 46(2), 261–294.
- McDonald, P. (2000a). Gender equity in theories of fertility transition. *Population and Development Review*, 26(3), 427–439.
- McDonald, P. (2000b). Gender equity, social institutions and the future of fertility. *Journal of the Australian Population Association*, 17(1), 1–16.
- National Bureau of Statistics of China. (2011). Report on Major Results of the Third Wave Survey on The Social Status of Women in China. http://www.china.com.cn/zhibo/zhuanti/ch-xinwen/2011-10/21/content_23687810.htm
- National Bureau of Statistics of China. (2019). 2018 National Time Use Survey Bulletin. http://www.stats.gov.cn/tjsj/zxfb/201901/t20190125_1646796.html, 2019-1-25.
- National Bureau of Statistics of China. (2021). Press Conference for Release of Main Results of the Seventh National Population Census, Q&A Session. http://www.stats.gov.cn/xxgk/jd/sjjd2020/202105/t20210511_1817280.html
- Nitsche, N., & Grunow, D. (2016). Housework over the course of relationships: Gender ideology, resources, and the division of housework from a growth curve perspective. *Advances in Life Course Research*, 29, 80–94.

- Niu, J. (2020). Gender Division of Housework and Its Dynamics within Life-cycle in Transitional China. *Studies in Labor Economics*, 8(04), 42–74. [in Chinese].
- NPC, National People Congress of PRC. 2015. “Zhongguo yinglai ‘quanmian lianghai’ shidai,” Xinhua wang, 27 Dec. 2015. http://www.npc.gov.cn/zgrdw/npc/xinwen/lfgz/lfdt/2015-12/28/content_1957481.htm.
- Pittman, J. F., & Blanchard, D. (1996). The effects of work history and timing of marriage on the division of household labor: A life-course perspective. *Journal of Marriage and the Family*, 1, 78–90.
- Qi, L., & Dong, X. Y. (2016). Unpaid care work’s interference with paid work and the gender earnings gap in China. *Feminist Economics*, 22(2), 143–167.
- Rexroat, C., & Shehan, C. (1987). The family life cycle and spouses’ time in housework. *Journal of Marriage and the Family*, 1, 737–750.
- Sanchez, L., & Thomson, E. (1997). Becoming mothers and fathers: Parenthood, gender, and the division of labor. *Gender & Society*, 11(6), 747–772.
- Sayer, L. C. (2010). Trends in housework. Dividing the domestic: Men, women, and household work in cross-national perspective, 19–38.
- Schober, P. S. (2013). The parenthood effect on gender inequality: Explaining the change in paid and domestic work when British couples become parents. *European Sociological Review*, 29(1), 74–85.
- Shen, K., Yan, P., & Zeng, Y. (2016). Coresidence with elderly parents and female labor supply in China. *Demographic Research*, 35, 645–670.
- Shen, K., Zhang, Y., & Yan, P. (2012). Family structure and female labor force participation in China. *Population Research*, 36(5), 15. [in Chinese].
- Song, S. P. (2012). From visible to invisible: Housework in the Collectivist Period (1949–1966). *Jiangsu Social Sciences*, 1, 116–125. [in Chinese].
- Stewart, J. (2013). Tobit or not Tobit? *Journal of Economic and Social Measurement*, 38(3), 263–290.
- Sullivan, O. (2013). What do we learn about gender by analyzing housework separately from child care? Some considerations from time-use evidence. *Journal of Family Theory & Review*, 5(2), 72–84.
- Sun, S., & Chen, F. (2017). Women’s employment trajectories during early adulthood in urban China: A cohort comparison. *Social Science Research*, 68, 43–58.
- Tong, Y., Gan, Y., & Zhang, C. (2023). Whose preference matters more? Couple’s fertility preferences and realization in the context of China’s two-child policy. *Journal of Family Issues*, 0192513X221150976.
- Tsuya, N. O., Bumpass, L. L., & Choe, M. K. (2000). Gender, employment, and housework in Japan, South Korea, and the United States. *Review of Population and Social Policy*, 9(9), 195–220.
- Vespa, J. (2009). Gender ideology construction: A life course and intersectional approach. *Gender & Society*, 23(3), 363–387.
- Wen, F. (2023). Assortative mating on only-child status and accumulation of economic advantages in contemporary China. Available at SSRN 4519501.
- Whyte, M. K., Feng, W., & Cai, Y. (2015). Challenging myths about China’s one-child policy. *The China Journal*, 74, 144–159.
- Xu, Qi. (2016). Trend, source and heterogeneity of the change of gender-role attitude in China: A case study of two indicators. *Journal of Chinese Women’s Studies*, 3, 33–43. [in Chinese].
- Xu, Q. (2023). From fatherhood premium to motherhood penalty: Trends in the fertility effects on men’s and women’s wage in China (1989–2015). *The Journal of Chinese Sociology*, 10(1), 20.
- Yang, J. (2014). Continuity and strategy: A gender pattern of household work division in China between 1990–2010. *Academic Research*, 4, 31–41. [in Chinese].
- Yavorsky, J. E., Kamp Dush, C. M., & Schoppe-Sullivan, S. J. (2015). The production of inequality: The gender division of labor across the transition to parenthood. *Journal of Marriage and Family*, 77(3), 662–679.
- Yeung, W. J. J., & Hu, S. (2016). Paradox in marriage values and behavior in contemporary China. *Chinese Journal of Sociology*, 2(3), 447–476.
- Yu, J., & Xie, Y. (2021). Recent trends in the Chinese family. *Demographic Research*, 44, 595–608.
- Zabel, C., & Heintz-Martin, V. K. (2013). Does children’s age impact the division of housework? A comparison of France, eastern and western Germany. *European Societies*, 15(5), 663–685.
- Zhang, J., Han, J., Liu, P. W., & Zhao, Y. (2008a). Trends in the gender earnings differential in urban China, 1988–2004. *ILR Review*, 61(2), 224–243.
- Zhang, Y., & Hannum, E. (2015). Diverging fortunes: The evolution of gender wage gaps for singles, couples, and parents in China, 1989–2009. *Chinese Journal of Sociology*, 1(1), 15–55.

- Zhang, Y., Hannum, E., & Wang, M. (2008b). Gender-based employment and income differences in urban China: Considering the contributions of marriage and parenthood. *Social Forces*, 86(4), 1529–1560.
- Zhang, Z. (2017). Division of housework in transitional urban China. *Chinese Sociological Review*, 49(3), 263–291.
- Zhao, M. (2018). From motherhood premium to motherhood penalty? Heterogeneous effects of motherhood stages on women's economic outcomes in urban China. *Population Research and Policy Review*, 37(6), 967–1002.
- Zhenzhen, Z., Cai, Y., Feng, W., & Baochang, G. (2009). Below-replacement fertility and childbearing intention in Jiangsu Province, China. *Asian Population Studies*, 5(3), 329–347.
- Zhou, Y. (2019). The dual demands: Gender equity and fertility intentions after the one-child policy. *Journal of Contemporary China*, 28(117), 367–384.
- Zuo, J., & Bian, Y. (2001). Gendered resources, division of housework, and perceived fairness—A case in urban China. *Journal of Marriage and Family*, 63(4), 1122–1133.

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