# Does marriage shape gender role attitudes? Evidence from a

# schooling reform in China

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#### Abstract

This paper studies the dynamic interplay between marriage as a formal institution and gender roles as an informal institution. I find that marriage hammers out conservative gender role attitudes for women but not for men. Identifying the causality is challenging, because conservative gender role attitudes affect the decision to marry early. To address this reverse causality concern, I employ the *Compulsory Schooling Law* in 1986 in China as an instrumental variable, which provides exogenous variation in the decision of marriage for both men and women. By exploring heterogeneous variation in the schooling channel on marriage, I identify the causal relationship between exposure to marriage and gender role attitudes. I further examine the effects of years of schooling on non-gender-related attitudes such as trust and misanthropy for married women, and on gender attitudes for single women, ruling out the direct nurturing effect of schooling on attitudes. Studying the causal mechanisms at play, I find that both horizontal and oblique social learning and self-deception are behind the evolving pattern of gender role attitudes for men and women. These two mechanisms respond to the long-lasting challenge of endogeneity of gender norms to welfare economics.

Keywords: China, Culture, Gender Role Attitudes, Institutions, Marriage

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# 1 Introduction

Gender norms provide prescriptive roles to guide individual and collective behavior as a function of gender and have deep and far-ranging consequences. Conservative gender roles assign men to the public sphere and women to the private sphere, limiting women's access to economic and political resources. It is not surprising to see that traditional gender roles predict low employment of women in the job market (Fortin 2005). Moreover, even when women do participate in markets, traditional gender roles imply that women who break gender roles 'pay the price', by earning lower incomes than their male peers, by compensating their husbands or by having a 'double shift'. For example, OECD countries with more conservative gender roles have a higher gender pay gap (Fortin 2005). In addition, women earning more than their husbands do more housework than the men (Bertrand, Kamenica, and Pan 2015). Additionally, economically independent women are prone to experience domestic violence (Alesina, Brioschi, and La Ferrara 2021). That gender role attitudes evolve progressively is therefore critical for women's welfare and gender equality.

Like other cultural norms and beliefs, gender role attitudes are formed during youth and evolve slowly. They interact with formal institutions such as family (Alesina and Giuliano 2015, Bisin and Verdier 2001) and are transmitted across generations (Fernández, Fogli, and Olivetti 2004) and cultural boundaries (Bredtmann, Höckel, and Otten 2020). Institutional determinants of gender roles include political regimes (Bauernschuster and Rainer 2012), religion (Seguino 2011), structures of social groups (Fernández, Fogli, and Olivetti 2004), agricultural technology (Alesina, Giuliano, and Nunn 2013), language (Hicks, Santacreu-Vasut, and Shoham 2015, Santacreu-Vasut, Shenkar, and Shoham 2017) and education (Si 2022, Du, Xiao, and Zhao 2020).

This paper asks if marriage as an institution shapes gender role attitudes. Marriage is one of the most important institutions for human beings to make large social interactions possible and build a normative system on a small scale (Jordan et al. 2013). Gender role attitudes embedded in this normative system could be formed and reshaped through socialization in marriage. As Fernández (2018) said, "it is difficult to think of areas that have undergone more institutional and cultural change than those that touch upon women". However, the impact of marriage as an institution that potentially shapes the formation of gender roles is still understudied.

To study how marriage shapes gender role attitudes, I focus on the case of China as a relevant context for a variety of reasons. First, the central role of marriage has remained relatively stable in China<sup>1</sup>. Second, China has undergone institutional changes in other areas, such as Compulsory Schooling Law and marketization, bringing incentives for individuals to change their behaviors in marriage, such as postponing marriage or having fewer children. Third, while individual gender role attitudes have evolved across generations (Luo, 2021), traditional gender role attitudes remain prevalent, with more conservative attitudes held by married individuals and by men. Indeed, according to the national survey China General Social Survey (CGSS), married individuals are more conservative than single individuals, and the difference between married women and single women on conservatism is larger than for their male counterparts. For example, 49.7% of single women disagree with the statement that marrying good is better than doing a good job for women, while only 31.4% of married women disagree with it in 2010. In contrast, 36.9% single men and 35.9% married men disagree. In 2017, 63.5% single women and 38.4% married women disagree, while 43.2% single men and 37.7% married men disagree.<sup>2</sup> Since married individuals exhibit more conservative gender roles than single individuals, one can reasonably ask whether exposure to marriage contributes to forming and reshaping such attitudes, especially for married women.

Studying the impact of marriage on the formation of gender roles is difficult because of potential reverse causality concerns between marriage and gender role attitudes. In particular, more conservative individuals may be prone to marry earlier and are therefore more exposed to marriage. To address this problem, I employ the *Compulsory Schooling Law* in an instrumental variable analysis. Education increases individuals' human capital in the labor market, and encourages people to marry later, as it increases the opportunity cost of not working, especially for women. Besides, education also changes the mating in the marriage market, leading more edu-

<sup>&</sup>lt;sup>1</sup>In 2005, 99.3% of women were married by age 35 to 39 years, and less than 5% of men remained single (Ji and Yeung 2014) compared with the deinstitutionalization trend of marriage in the US and in most European countries (Cherlin 2004). According to the China General Social Survey, in 2010, the ratio of women who were ever married was 92.3% and 88.3% for men; in 2017, the ever married ratio became 88.5% for women and 83.9 for men.

<sup>&</sup>lt;sup>2</sup>Similar difference by gender and marital status are also in the following statements: men are more competent than women intrinsically; men should focus on career while women should focus on family; during recession, women should be fired first; husbands and wives should do housework equally.

cated men and women to find older and more educated spouses. In short, variation in exposure to marriage from the *Compulsory Schooling Law* comes from the impact of the law (and associated increased years of schooling) on both labor market and marriage market outcomes.

In the empirical strategy, I use the *Compulsory Schooling Law* as an instrument for both married individuals and for their spouses, because marriage is an assortative matching process in terms of education, age, family background, and so on (Chiappori, Dias, and Meghir 2020, Chiappori, Iyigun, and Weiss 2009, Blossfeld 2009). The impact of the law on the spouses helps capture the variation in this complicated matching process involved with the choices about when and who individuals choose to marry. What's more, the impact of the *Compulsory Schooling Law* on an individual's spouse cannot influence this individual's education, and also cannot directly influence gender role attitudes of this person except when they get married. The influence of the law of the spouses can only impact through the marriage institution.

Before doing the main empirical analysis, I study the determinants of the law and find evidence to support the legitimacy of the *Compulsory Schooling Law* as an exogenous source of increased years of schooling among men and women. I rule out the concerns that the initial illiteracy, gender illiteracy gap, and sex ratio among provinces are factors which influence the implementation of the *Compulsory Schooling Law*. I further explore the differences in exposure to the law across cohorts, across genders, across provinces, and across socioeconomic backgrounds.

In the main empirical analysis, I find a notable negative relation between exposure to marriage and progressive gender role attitudes for women but not for men. In particular, an increase of one standard deviation in the exposure to marriage for women is associated with a reduction of progressive gender role attitudes by the range between 0.372 and 0.684 standard deviations. For one specific gender role attitude that "men should focus on career, while women should focus on family", one standard deviation in the exposure to marriage is associated with a reduction of gender role attitudes by 0.631 standard deviations. This effect is the most significant in the provinces with highly skewed sex ratio. If the sample was constrained to provinces with large amount of men comparing with women, one standard deviation in the exposure to marriage is associated with a reduction of gender role attitudes by 1.029 standard deviations.

I further identify the causal relationships between exposure to marriage and gender role attitudes by exploring the schooling channel on marriage. The *Compulsory Schooling Law* is only binding for individuals with low educated parents. For individuals with middle or high educated parents, their exposure to marriage are not affected by the *Compulsory Schooling Law*, as the law has no impact on their years of schooling. Furthermore, for individuals who come from a low educated family, if those individuals marry quite late in the Chinese context, say after 25, their age of marriage is not affected by the 1.3 additional years of schooling on average from the *Compulsory Schooling Law*, even though their years of schooling are affected by the law. For those individuals, their exposure to marriage should have no impact on gender role attitudes by taking the law as the instrumental variable to marriage. Only for individuals who are binding to the *Compulsory Schooling Law* and whose marriage are also affected by the increased years of schooling from the law, their exposure to marriage significantly influences gender role attitudes.

Another concern is the direct nurturing effect of education on gender role attitudes. Increased years of schooling could impact gender role attitudes directly other than through its effects on marriage postponement, which would violate the exclusion restriction. However, empirical results rule out such concern by showing that in the 1986 *Compulsory Schooling Law* context, schooling has no impacts on gender role attitudes directly for single women, and has no effect on non-gender-related attitudes, such as general levels of trust and misanthropy, for married women. This finding suggests that there is no direct nurturing effect of schooling in this context.

There are two potential mechanisms behind the effects of marriage as an institution on gender role attitudes: socialization and self-deception. For socialization in marriage, married women observe, talk to and interact with people around them, and experience horizontal and oblique social learning. In this process, traditional gender norms are transmitted. Self-deception theory supplies a different explanation, stating that married women do not really believe the gender role attitudes they say they believe. They manipulate their memories by selecting preferable information to feel better, and deceive themselves in the direction of conservatism. For socialization, a critical point is that socialization is a process embedded in an unequal system. The aim of the horizontal and oblique learning is not for objective truth about the world, such as scientific knowledge or philosophic wisdom, but social norms and values clinging to specific social context. As a result, the effect of power relation in marriage on gender role attitudes is the key to validate the socialization mechanism. I use age gap among couples as the measurement of power relations. The empirical results show that one standard deviation increase in the age gap is associated with a reduction of progressive gender role attitudes by 0.068 standard deviations for women but not for men. Social learning in marriage indeed hammers out traditional gender role attitudes for women.

For self-deception, individuals deceive themselves on various beliefs, including gender roles, for affective reasons and instrumental reasons (Bénabou and Tirole 2002, Bénabou and Tirole 2011). Empirically, as the subjective well-being to disobedience gender norms in their head is negative for married women, woman have the incentive to deceive themselves. In contrast, for men, disobedience on gender norm in their head is not correlated with their subjective well-being, so men have no incentive to deceive themselves. What's more, women who have little social support are prone to deceive themselves more than other women. Nevertheless, it is difficult to distinguish these two mechanisms, because socialization and self-deception work in the same direction: gender inequality decides the intensity of both socialization and motivated reasoning.

This paper contributes to the study of the influence of education on gender role attitudes by digging into the influence from marriage. Du, Xiao, and Zhao (2020) suggest that the 1986 *Compulsory Schooling Law* in China make women more progressive in gender role attitudes, while Si (2022) finds that the expansion of higher education in China in 1999 negatively affects women's progressive gender role attitudes. These results about the effects of education are contradicting, and the negative influence of higher education on gender attitudes is surprising. More important, in both papers, the effects only exist in married women but not in single women. In this context, if education in school indeed reshaped attitudes of women directly, we should observe those effects also exist in single women, which is not the case here. In addition, the 1986 *Compulsory Schooling*  Law has no effects on non-gender-related attitudes, such as trust and misanthropy, even for married women. If education indeed directly nurtured beliefs of women, it would be unreasonable to see these effects only in gendered attitudes. This paper pushes the studies of education on gender role attitudes further to marriage. Especially in developing countries, marriage is one of the most important institutions, and brings unexpected but far-reaching consequences.

This paper sheds light on marriage as an institutional determinant of gender role attitudes, either as a form of horizontal and oblique social learning, or as a forceful source of self-deception. Marriage as an institution has broad implications for research into gendered social norms. As one of the most prevalent institutions in human society, marriage is the institutionalized form of pair bonding, with various premarital, marital and postmarital norms (Mathew, Boyd, and Van Veelen 2013). Gender role attitudes embedded in the normative pair-bonding system within one specific context could be formed or reshaped through socialization and practice of marriage. This arrangement, the marriage institution, has deep historical roots. Inspired by Edlund (2013), Fernández (2018) emphasizes parental rights as the fundamental reason for the existence of marriage. She argues that marriage is an arrangement for women to trade paternity rights for income support of childcare and for men to be legally and socially recognized as fathers before children are born because of paternity uncertainty. This arrangement forms and reinforces family structures where women are homemakers, premarital sex is forbidden and children out of wedlock are discriminated against. Moreover, this arrangement has far-reaching consequences, such as determining the inheritance norms. BenYishay, Grosjean, and Vecci (2017) find that in places where fishing is abundant, men specialize in fishing and are far from home. Geographical isolation among couples because of fishing leads to high paternity uncertainty. As a result, this society is matrilineal kinship other than patrilineal kinship, that parents in these places are prone to transmit wealth to daughters rather than sons.

Besides a macro perspective in culture and institution, this paper also connects to motivated beliefs in economics in terms of gender norms. Since Akerlof and Dickens (1982) firstly introduce in economics that people have some controls on their beliefs by selecting information, Bénabou and Tirole have contributed a series of theoretical work on motivated reasoning and self-deception, to analyze how individuals manipulate their beliefs when they encounter social pressure of identity and morality (Bénabou and Tirole 2002, Bénabou and Tirole 2011, Bénabou 2015). This paper finds that disobedience on gender norms indeed corresponds with lower subjective well-being for women, motivating women to deny their beliefs and deceive themselves. Besides, the methodology of empirical research in motivated beliefs usually is experiment (Zimmermann 2020). This paper also contributes to study motivated reasoning in social interactions by survey data at large scale.

This paper complements the growing literature on institutional determinants of gender role attitudes. Institutional determinants are fundamental social factors, such as religion, political regime, structure of social groups, technology, and language. Religion could shape gender ideology through socialization while experiencing religious activities and further influence gender inequality in the labor market and household resource allocation (Seguino 2011). Political regimes treat women differently in the public sphere and have a far-reaching influence on people's attitudes on gender roles. East Germans had more egalitarian attitudes of gender roles than West Germans, and the gap in attitudes remained even after reunification (Bauernschuster and Rainer 2012). The evolution of the structure of social groups slowly reshapes individuals' gender role attitudes. Fernández, Fogli, and Olivetti (2004) demonstrated that the increasing proportion of working mothers in society could improve their sons' preferences for working wives. Technology of daily life is also related to gender norms. As the plough required significant upper body strength and gave an advantage to men rather than women, plough civilization accompanies conservative gender roles (Alesina, Giuliano, and Nunn 2013). Language has also been shown to impact gender role attitudes. Gender is among the most stable grammatical features, can affect the formation and persistence of gender identity, and can influence speakers' time allocation, such as housework and caregiving in the household (Hicks, Santacreu-Vasut, and Shoham 2015, Santacreu-Vasut, Shenkar, and Shoham 2017).

This paper also speaks to the economics literature on the role of early life experiences as determinants of the evolution of individual attitudes. The empirical results show that experience of marriage during early adulthood makes women more conservative in gender role attitudes. Other than the gender role attitudes, this literature focuses mostly on the impact of early life experiences on political attitudes and social trust. For example, analysis on the impact of economic downturns shows that individuals who experienced recession during their youth believe in luck more than effort and support more redistribution policies (Giuliano and Spilimbergo 2014). Similarly, an analysis of individuals who experienced the Jewish expulsion of the 1930s during their youth finds that these individuals exhibit less interest in politics and have lower judgment of political activities (Akbulut-Yuksel, Okoye, and Yuksel 2020). Lastly, studies of epidemics show that such events make young people distrust scientists, although they have no effect on individuals trust in science (Eichengreen, Aksoy, and Saka 2020).

The rest of the paper is organized as follows. Section 2 lays out the evolution of marriage in China, the social background of gender role attitudes in China, and the conceptual framework. Section 3 introduces the *Compulsory Schooling Law* in China. Section 4 describes the data and variables and presents the empirical strategy. Section 5 reports the estimates. Section 6 identifies the causal relationships, while Section 7 further analyzes the mechanisms of marriage as an institution. Section 8 reports the results of the robustness check. Section 9 concludes and discusses implications of the research and opportunities for further research.

# 2 Marriage and gender role attitudes: preliminary evidence and conceptual framework

#### 2.1 Marriage patterns

While China has engaged in substantial institutional reforms to open its economy since 1978, institutions such as marriage have been stable, remaining key to social arrangements. According to Ji and Yeung (2014), 99.3% of women are married by age 35 to 39 years, and less than 5% men remain single in 2005. In 2010, the percentage of ever married women was 92.3% and 88.3%



Figure 1: Trend of age at first marriage by gender between 1980 and 2010, China<sup>a</sup> Female - Total

<sup>a</sup>Data Source and website: 2010 Chinese Census, http://www.stats.gov.cn/tjsj/pcsj/rkpc/6rp/indexch.htm

for men. In 2017, this became 88.5% for women and 83.9 for men<sup>3</sup>. The stability of marriage as an institution is reinforced by the law. Indeed, before 2016, a single mother could not register her baby in the hukou system<sup>4</sup>. Without a hukou, a child could not obtain access to basic public services.

The stability of marriage as an institution in China contrasts with the deinstitutionalization of marriage (Cherlin 2004) in the US and in most European countries. In the US, for example, 39.6% of babies were born to unmarried women in 2018 (U.S. National Center for Health Statistics 2018). In France, Bulgaria and Slovenia, 60% of babies were born to unmarried parents in 2016, a number equal to 52.8% in Portugal, 45.9% in Spain and 31.8% in Italy for that same year

<sup>&</sup>lt;sup>3</sup>The percentage of ever married was the percentage of people who are currently married, divorced, or widowed. Both descriptive ratios come from the *Chinese General Social Survey* dataset. The observations are constrained to people who were born after 1949 and who were at least 20 years old in the survey year. 1949 is the establishment year of the People's Republic of China.

<sup>&</sup>lt;sup>4</sup>Hukou is a household registration system used in mainland China. Hukou identifies and records personal information such as age, gender, permanent residence of an area, grandfather's birthplace (ancestral home), and similar information of their parents, children and spouses.

(Eurostat<sup>5</sup>).

Despite this stability, age at first marriage has slowly increased. Figure 1 presents the trend of average age at first marriage between 1985 and 2010 in China. Both men and women have slowly increased their age at marriage since 1990. These changes occurred before legal reforms, which eased access to hukou among unmarried families. For instance, on January 1<sup>st</sup> 2016, the state council of China released a regulation, *The decisions on solving the problem of registration* of hukou for people without hukou, which states that the registration of hukou for babies no longer requires parents to present a marriage certificate and that a birth medical certificate is legally acceptable. However, unmarried mothers are still financially fined by an equivalent of 2 to 3 times or even higher of yearly average disposable income because of giving birth out of wedlock<sup>6</sup>. The cost of giving birth out of wedlock is not only financial but also social, particularly due to social stigma resulting from conservative beliefs about marriage. We next discuss the evolution of gender role attitudes in China in recent decades.

#### 2.2 Gender role attitudes

An exploration of attitudes towards gender roles in China reveals substantial variation across generations. Figure 2 shows gender role attitudes as a function of age and gender in modern China. Gender role attitudes are measured using respondents' attitudes along five dimensions <sup>7</sup> in the CGSS data. The responses to each dimension are coded from 1 to 5, with 1 denoting a very conservative attitude and 5 denoting a very liberal attitude. To aggregate its various dimensions, I constructed a weighted variable from these 5 dimensions with each weighed 0.2.<sup>8</sup> As Figure 2 shows, younger cohorts hold more liberal attitudes than older cohorts. Furthermore, regardless

 $<sup>^5 {\</sup>rm The}$  data source comes from this website: https://ec.europa.eu/eurostat/en/web/products-eurostat-news/-/ddn-20180416-1

<sup>&</sup>lt;sup>6</sup>These fines are decided by *Regulations on Population and Family* at the provincial level. As a result, each province has a different regulation article on the number of fines for giving birth out of wedlock. For example, in Jiangsu Province, the fine is from 0.5 to 8 times the yearly average disposable income, while in Shangdong Province, the fine is 3 times the yearly average disposable income.

<sup>&</sup>lt;sup>7</sup>Respondents are asked the following: (1) Men should focus on career while women should focus on family; 2) Men are more competent than women biologically; (3) Marrying a good person is better than doing a good job; (4) During recession, women should be fired first; and (5) Husbands and wives should do housework equally.

<sup>&</sup>lt;sup>8</sup>Similar conclusions are reached when using a principal component analysis, which I used in the empirical analysis.



Figure 2: Attitudes towards gender role by gender and age, China<sup>a</sup>

of their cohort, women tend to exhibit more liberal gender role attitudes than men.

From the perspective of marriage as an institution, Figure 3 shows the difference in gender role attitudes by gender and marital status among different cohorts in China. In this figure, there are three important messages: 1) for both married and non-married cohorts, women express more liberal gender role attitudes than corresponding men; 2) non-married women in China express more liberal gender role attitudes than married women in the same cohorts, while non-married men only have express more liberal attitudes on gender roles than married men in young generations; and 3) women are more susceptible to attitude adaptation than men among cohorts, as the gap of gender role attitudes among old and young generation of women is larger than that of men in Figure 3.

In summary, gender role attitudes in China have evolved progressively among cohorts and have

<sup>&</sup>lt;sup>a</sup>Gender attitudes measure the attitudes about gender roles and expectations in family life and career. The higher its value, the more liberal a respondent is. Only respondents born after 1949 and married since age 15 are included. Current divorced and widowed respondents are not included. Year groups with fewer than 60 respondents are omitted. Data Source: CGSS 2010, 2012, 2013, 2015, 2017

Figure 3: Attitudes towards gender role by gender, age and marital status, China <sup>a</sup> Marital status - married male - married male - married female



 $<sup>^{</sup>a}$ Gender attitudes measure the attitudes about mens and women's roles and expectations in family life and career. The higher its value, the more liberal a respondent is.

maintained distinctive patterns among married and nonmarried individuals. At the same time, as shown in subsection 2.1 *Marriage Patterns*, age at marriage has increased slowly for both men and women, while marriage has remained universal for Chinese people to form a family. With the evolution of gender role attitudes under the background of a stable but evolving marriage institution in China, this paper explores how adjusted marriage behavior affects gender role attitudes among cohorts.

# 2.3 Conceptual Framework

To frame my research question concerning whether and how marriage as an institution forms and reshapes gender role attitudes, I review existing work on attitude change. In the economics

Only respondents born after 1949 and married since age 15 are included. Currently divorced and widowed respondents are not included. Age groups with fewer than 10 respondents are omitted. Data Source: CGSS 2010, 2012, 2013, 2015, 2017

literature, the study of attitude change is part of the analysis of cultural evolution, which refers to the evolution of preferences and beliefs.<sup>9</sup> The evolution of preferences and beliefs results from changes in incentives (Fernández 2018). Institutions partly determine the incentive structure and available choice sets for individuals in society (North 1991). When individuals are exposed to a new institution (such as religion or marriage) or the exposure becomes more intense, these individuals would socialize to fit in their new identities. They interact with their peers in the institution, and experience horizontal and oblique social learning.<sup>10</sup> In this process of socialization, individuals internalize their attitudes to fit in the specific institution. In the economics literature on culture, religion, political regime, structure of human groups or language socialize people systematically and form gender role attitudes embedded within their context (Seguino 2011, Bauernschuster and Rainer 2012, Fernández, Fogli, and Olivetti 2004, Hicks, Santacreu-Vasut, and Shoham 2015).

The study of marriage as an institution is part of the development of the New Institutional Economics (NIE). Fernández (2018) argues that NIEs have the advantage of exploring the interactions between marriage as an institution and culture but also clearly states that "Strangely perhaps, the NIE has not examined a potentially extremely rich and important field of inquiry: the interplay between institutional and cultural change and the most basic social organization the family. Intimately connected to this field is the area of gender."

Specifically, marriage as an institution either contributes to horizontal and oblique social learning which can reshape gender role attitudes, or leads to self-deception for married individuals to obey the gender norms and to feel better. Marriage corresponds with systematic social expectations and a new incentive structure. After a woman is married, she has to meet new social expectations as a wife, a mother, and a daughter-in-law from her husband, her husbands' parents, and even friends and colleges. Even her neighbors treat her differently because of her new identity. Not only are her social relationships changed, but her daily life routine is also different, especially

<sup>&</sup>lt;sup>9</sup>Recently, economists have defined *culture* as people's certain values (or preferences) and beliefs (Alesina and Giuliano 2015, Fernández et al. 2008), including general trust, family ties, generalized morality, attitudes towards luck versus effort, etc. Akerlof and Kranton (2010) emphasize the determinant of identity on values and preferences. Anthropologists also take language, religion and technology as culture (Richerson and Christiansen 2013).

<sup>&</sup>lt;sup>10</sup>According to Cavalli-Sforza and Feldman (1981), oblique transmission is culture transmission from individuals other than parents but from the same generations of parents; horizontal transmission is culture transmission from the age peers.

after she has children, as mothers are expected to look after their children. These new social expectations and social pressures might works as social learning, that women gradually learn that focusing on private spheres is actually a free and good choice for women. Or these new social relations works as pressure sources to make women self-deceiving, so that married women could feel better about themselves or get some social support when obeying.

A similar situation might happen for men. However, as China has the custom of patrilocal residence,<sup>11</sup> married women experience larger life changes than men. Patrilocal residence not only fosters the bonds between sons and their original families and weakens the bonds between daughters and their original families but also puts newly married wives in vulnerable positions. Because of patrilocal residence, wives must live with people they did not know before marriage and they lose the support system of their original families in their daily life after marriage. As a result, men are not expected to evolve their attitudes as much as women.

A second theory on attitude change focuses on the adaptation and development of the brain. Firstly, neuroplasticity states that personal experience and learning will change neural connections and lead to a fine-tuned brain, making decision making a function of experience (Malmendier 2021). D'Acunto, Malmendier, and Weber (2021) use women's exposure to grocery shopping to explain why women are more pessimistic about current and future inflation: volatile and positive changes in grocery price influence their expectation of inflation. The gender gap of inflation expectations only comes from the different exposure to the price changes. For my exploration in this paper, marriage is an experience of newly married women, and life as a wife and a mother could also change their neural connections and lead to long-lasting influence.

Secondly, sequential development of the brain during adolescence makes individuals easily adjust their attitudes during young adulthood. Adolescence lasts more than a decade and extends beyond the teenage years, with the beginning at ages 9 to 12 and lasting until the early twenties (Dahl 2004). According to Dahl, adolescence is beyond the inception of puberty, which only refers to genital maturity and includes "the development of cognitive, emotional, and social skills and

<sup>&</sup>lt;sup>11</sup>The percentage of patrilocal residence for provinces Shaanxi, Shandong and Guangdong between 1955 and 1985 are all above 80% (Lavely and Ren 1992). In 2010, almost 75% of married Chinese couples lived with or lived in the same village/community as their husbands' parents in China (Gruijters and Ermisch 2019).

knowledge, as well as the maturation of judgement". Besides, this long period relates to gradual and specific development in different regions in the brain. Both white matter and grey matter in the brain increase during the length of adolescence<sup>12</sup>. Dumontheil summarizes the development of regions of the brain and their effects on the functions of cognitive control, socialization and emotional control during adolescence.

A third theory on the change of attitudes from marriage comes from social psychology and is known as the impressionable years hypothesis from social psychology (Krosnick and Alwin 1989, Visser and Krosnick 1998). According to this hypothesis, people's attitudes are maleable early in life (in early adulthood, from 18 to 25) but are harder to change later on (after 25).<sup>13</sup> Women who experience marriage in early adulthood may be more likely to change their attitudes towards conservative gender roles and adopt more traditional views as the result of their new roles as wives and possibly as mothers.<sup>14</sup>

Empirical papers in economics have explored the impressionable years hypothesis in a variety of contemporaneous and historical settings. For example, Giuliano and Spilimbergo (2014) show that individuals who experienced recession during impressionable years believe in luck more than effort and support more redistribution policies. Besides, those who experienced Jewish expulsion in the 1930s during their impressionable years had less interest in politics and had lower judgment of political activities (Akbulut-Yuksel, Okoye, and Yuksel 2020). In addition, the epidemic also makes young people distrust scientists, although it has no effect on their trust in science (Eichengreen, Aksoy, and Saka 2020).

In summary, because marriage as an institution has various prescriptive gender norms and involves new social network, marriage functions as a way of horizontal and oblique social learning

<sup>&</sup>lt;sup>12</sup>Dumontheil (2016) writes that "white matter volume increases linearly during the first two or three decades of life, while grey matter volume peaks in mid-to-late childhood, and decreases during adolescence".

<sup>&</sup>lt;sup>13</sup>The impressionable years hypothesis originated from the seminal work of Theodore Newcomb. In his study, female students in Bennington College who came from conservative families developed liberal political attitudes after their college education in a liberal atmosphere, and these liberal attitudes remained even 25 years later (Newcomb 1943, Newcomb 1967).

<sup>&</sup>lt;sup>14</sup>Besides impressionable years hypothesis, there are two other competing hypotheses in terms of age on attitudes change, the life-long openness hypothesis, and the increasing persistence hypothesis. Since the *Compulsory Schooling Law* only influences early marriage, shown in Table 9, it is impossible to distinguish the competing hypotheses. However, for all the hypotheses, people in their early adulthood are open to change their attitudes.

to influence gender role attitudes in the practice. Meanwhile, the adaptation and development of the brain during the early adulthood also make the change of gender role attitudes possible, which is also consistent with the impressionable years hypothesis. However, because conservative attitudes can also influence individuals' decisions to marry early, it is empirically challenging to provide causal impact of marriage on attitudes. To overcome these challenges, I exploit exogenous variation in exposure to marriage from the *Compulsory Schooling Law* in China, a setting I explain in detail in the next section.

# 3 Compulsory Schooling Law in China

Providing empirical identification of the causal link between marriage and gender role attitudes is challenging, especially because of the potential for reverse causality. Individuals with more conservative gender role attitudes are likely to exhibit different marriage behaviors than individuals with more liberal attitudes. For example, Barber and Axinn (1998) find that women with conservative gender role attitudes enter marriage quickly if they have low expectations of future education and career. In contrast, women with progressive gender role attitudes and career pursuit enter marriage late. This correlation implies that exposure to marriage may be endogenously determined by attitudes, making it hard to empirically identify their causal relation to one on other.

This paper exploits the *Compulsory Schooling Law* of 1986 in China as a source of exogenous variation in years of schooling and, consequently, in marriage patterns. In the literature on marriage, compulsory schooling laws have a positive impact on the age at marriage for girls in low and middle income countries. For example, the decreased cost of compulsory schooling in Egypt increases girls' years of schooling, leading to higher ages at marriage and lower rates of underage marriage (Marie and Elsayed September 2021). Similar results were found in Turkey when compulsory schooling was extended (Kirdar, Dayloğlu, and Koç 2009). In high income countries, the research about the impact of the *Compulsory Schooling Law* focuses on the change of fertility other than age at marriage. The *Compulsory Schooling Law* in the UK reduces the

teen fertility rate (Geruso and Royer 2018), while it has no effect in Continental Europe (Fort, Schneeweis, and Winter-Ebmer 2016).

Before formally presenting the instrumental variable strategy in Section 4, this section presents the content of the law and rules out potential sources of concerns regarding the validity of the law as an exogenous source of variation in years of schooling and marriage patterns. First, I investigate the determinants of the order of implementation of the law at the provincial level. I find that the response of the implementation of the law to initial illiteracy levels among provinces can only lead to underestimated effects of years of schooling, which is not a problem in the analysis, and I rule out that the implementation of the law is a response to the initial literacy gender gap or a response to other social trends in Chinese society. Then, I present an analysis of the impact of the implementation of the law for different cohorts and for children from different socioeconomic backgrounds, showing substantial heterogeneity in the impact of law across the eligible population. Finally, the Appendix includes a placebo test of the law by setting a fake reform 5 years in advance.

## 3.1 The content and implementation of the law

Before the enactment of the 1986 Compulsory Schooling Law, illiteracy was quite high and unequal across provinces and gender. Consider, for example, data from the 1982 population census. The percentage of illiterate and semi-illiterate people aged 12 and older was 31.87% in the whole country, with 19.15% for men and 45.23% for women. The illiteracy rate among men was as high as 61.53% in certain provinces, even if substantial variation existed across provinces. Not surprisingly, the province of the capital city, Beijing, exhibited a much lower illiteracy rate of 7.75% among men. Illiteracy rates among women were higher across the board, with provinces reaching illiteracy rates as high as 84.33%, while Beijing exhibited a much lower illiteracy rate of 22.3% among women. The gender gap of illiteracy rates ranges from 10.94% to 38.74%.<sup>15</sup>

Breaking with the past and as part of the policy *bo luan fan zheng* implemented by the leaders of Communist Party around 1980, which intended to bring order out of chaos, the 1982

<sup>&</sup>lt;sup>15</sup>For more information on illiteracy, see table 17 in the appendix.

Constitution emphasized the importance of education for the country's development. To this end, the *Compulsory Schooling Law of China* was released on April 12th 1986 and has been in effect since July  $1^{st}$  1986. It was the first compulsory schooling law in China ever.<sup>16</sup> The law emphasized principles around the importance of implementing compulsory education, stating that children aged 6 should start compulsory schooling and that compulsory schooling should last a minimum of 9 years. As a result, schooling became mandatory from ages 6 to 15.

The law was implemented in different years across provinces<sup>17</sup>. Ten provinces implemented the law in 1986, eleven in 1987, three in 1988 and two in 1989. Five provinces implemented it after 1990. In total, 84% of provinces implemented the law before 1990. The impact of the law on different cohorts varies, therefore, as a function of the year of implementation in specific provinces. The earliest cohort affected by the law was born in 1971 in provinces where the law was implemented in 1986. Figure 4 shows the percentage of children not completing middle school born in a given cohort. As Figure 4 shows, since 1971, the percentage has decreased rapidly, from approximately 27.2% for men born in 1971 and 41.6% for women born in 1971 to almost 0 for both men and women born in 1995.

# 3.2 Determinants of the law

The law was not created to address gender inequality in access to education but to foster economic developmental goals. Nevertheless, the year of implementation at the province level could depend on economic and cultural factors. It is important to rule out the possibility that provinces choosing different years of implementation of the law were different in terms of their gender gap in illiteracy rates and/or different cultural norms related to gender.

Another concern arises if the implementation of the law in a given province in a given year

<sup>&</sup>lt;sup>16</sup>Before this law was publicized, the Central Committee of the Communist Party of China publicized guidance The Decision on the Reform of Educational Institution by Central Committee of the Communist Party of China. In China, the most important policies, such as institutional reforms and population policy, are decided by the Central Committee of the Communist Party. After the direction of the policy was decided, detailed legal terms were followed. This decision agreed that compulsory schooling could have different demands and contents in different areas.

<sup>&</sup>lt;sup>17</sup>Because of the different economic and financial capabilities of different provinces, the law stated that "provinces, autonomous regions and direct-controlled municipalities should self-determine their schedules of compulsory schooling law according to their local economic and cultural development".



Figure 4: Percentage not completing middle school among cohorts by gender<sup>a</sup>

<sup>a</sup>Note: All respondents are born after 1949. Cohorts that have fewer than 90 respondents are skipped. Data Source: CGSS 2010, 2012, 2013, 2015, 2017

is correlated with the initial illiteracy rate in the province. In particular, if this correlation were positive (less educated provinces adopted the law earlier), then the effect of the law on years of schooling would be underestimated. In contrast, if this correlation was negative (more educated provinces adopt the law earlier), then the effect of the law on years of schooling would be overestimated.<sup>18</sup>

I now turn to investigate the determinants of the implementation of the law across provinces and discuss whether this analysis gives cause for concern about its potential endogeneity. To check the determinants of the implementation of the *Compulsory Schooling Law* at the province level, I use the proportional hazards model or Cox model to estimate the hazard of the law being

 $<sup>^{18}\</sup>mathrm{A}$  formal derivation of this claim is available in the paper appendix.

implemented in a given period. The model is described as follows:

$$ln(h(t_p)) = ln(h_0(t_p)) + \beta_1 illiterate_p + \beta_2 X_p + \epsilon_p \tag{1}$$

where  $h(t_p)$  is the hazard of the event of the law being implemented in province p in year t;  $ln(h_0(t_p))$  is the baseline hazard, which is calculated by setting all covariates equal to 0; *illiterate*<sub>p</sub> is a variable of the percentage of illiterate people in province p in 1982;  $X_p$  is a vector for characteristics of province p, including total population, sex ration (men to women), GDP per capita, investment, government spending, and number of students and teachers in middle school.<sup>19</sup> Among  $X_p$ , except sex ratio is in 1982, others are in 1985.

To be noticed, the illiterate population and gender gap of illiteracy are both from 1982 Census of China, as the 1982 census is the only data source which has the illiteracy information near and before 1986. Besides, the illiteracy rate across provinces in 1982 would also be very similar to illiteracy rate in 1985, as significant improvement in literacy is not expected to happen in 3 years. For the same reasons, the sex ratio is also from the 1982 census.

Since the educational reform was decided by the central government in 1986, and a few provinces implemented the law that same year, I set the starting year of my estimation in 1985, and 1986 was the first year, while 1987 was the second year, etc. The event is whether the law was effectively implemented. The variables of interest are the illiteracy level in 1985, including the total illiteracy population and the gender gap in illiteracy rates, and sex ratio.

A negative coefficient of  $\beta_1$  means that provinces with higher illiteracy rates have a tendency to delay the implementation of the law and then implement the law relatively later, while a positive  $\beta_1$  means that they tend to implement the law relatively earlier.

Table 1 presents the results for estimating the effect of initial education on the time of implementation of the compulsory schooling laws. The coefficient of the illiterate population is positive and significant in Column (1). The gender gap in illiteracy rates in Column (2) is insignificant.

<sup>&</sup>lt;sup>19</sup>The unit of number of illiterate population and provincial total population is 1 million of people. Sex ratio is the population of men to women in 1982 from the 1982 Census. The unit of GDP, investment and government spending is 0.1 billion yuan. The unit of nominal GDP per capital is yuan. The unit of number of students and teachers is 10 thousand.

	Hazard of	the implements	ation of the law
	(1)	(2)	(3)
illiterate population	0.18***		0.18***
	(0.06)		(0.06)
gender gap of illiteracy		-0.07	-0.07
		(0.05)	(0.05)
sex ratio	0.17	$0.21^{*}$	0.18
	(0.11)	(0.11)	(0.11)
population	$-0.08^{**}$	0.01	-0.06
	(0.03)	(0.03)	(0.04)
GDP per capita	0.001	0.001**	0.001
	(0.001)	(0.001)	(0.001)
investment	0.01	0.01	0.01
	(0.01)	(0.01)	(0.01)
government spending	0.04	-0.04	0.01
	(0.05)	(0.06)	(0.06)
number of students	-0.01	0.02	0.01
	(0.01)	(0.02)	(0.02)
number of teachers	0.17	-0.24	-0.12
	(0.23)	(0.30)	(0.30)
Observations	71	71	71
$\mathbb{R}^2$	0.36	0.32	0.37
Log Likelihood	-84.38	-86.08	-83.35
Wald Test	$26.35^{***}$	21.26***	$26.65^{***}$
LR Test	31.23***	27.84***	33.28***

Table 1: The determinants of Compulsory Schooling Law implementation

Notes: The sample is province-level data. Before 1988, the Hainan province was part of the Guangdong province, so there are no illiteracy measurements on the Hainan province in 1982 census. As a result, the sample does not include the Hainan province. Two illiteracy measurements, illiterate population and gender gap of illiteracy, are 1982 variables, while all other variables are from 1985. Illiterate population is the population of illiterate and semi-illiterate people aged 6 and older in 1982. Gender gap of illiteracy is the gender gap of percentage of illiterate and semi-illiterate people aged 12 and older in 1982 between men and women. Sex ratio is the population of men to women in provinces in 1982. Number of students and teachers only limit to middle schools. Significance: \*p<0.1; \*\*p<0.05; \*\*\*p<0.01

Data source: Compilation of Statistical Data for Sixty Years of New China; 1982 population census of China

In Column (3), where both variables are combined, the illiterate population is still positive and significant, and the gender gap in illiteracy rates is still insignificant. Regarding the magnitude interpretation, the coefficient of illiterate population equals 0.18 in columns (1) and (3). As a result, the risk of illiterate population is approximately  $e^{0.18}$ , or 1.197, meaning that an extra one million initial illiterate people in one province increases the risk of its implementation of the law by 19.7%. As the effect is positive, the estimation of the effect of law is underestimated, which is a smaller cause for concern than overestimation.

An intuitive explanation about the underestimation is the following. The effect of the implementation of the law on the years of schooling should be positive, and the missing variables on the implementation of the law, let' say the illiterate level, should have negative effects on years of education (the higher the illiteracy, the less years of schooling). If we do not consider the influence of the initial illiteracy on the implementation of the law, the effect of the law on the years of schooling would include the interaction of two other effects: the effect of the illiteracy on the education (negative), and the effect of the illiteracy on the implementation of the law (positive). The interaction of these two effects is negative. As a result, if we do not consider the impact of initial illiteracy, the effect of the law on the years of schooling would be a real positive number plus a negative number. The estimated effect (still positive) is smaller than the real number. Since the effect of the law is underestimated, the missing variable of initial illiterate level across provinces is negligible.

For the concern about the influence of sex imbalance, the coefficients of sex ratio are positive but insignificant, as shown in Column (1) and (3). As a result, heterogeneous sex ratios across provinces are not correlated with the implementation of the law.

I also conducted a placebo test of this law. A fake law year has no effect on the years of schooling. The empirical results are in Table 18 in the Appendix.

To conclude, initial illiteracy across provinces only underestimates the strength of the implementation of the law. Besides, both the initial gender gap of illiteracy and the sex ratio do not affect the implementation of the law. These results rule out concerns about the missing factors related to gender.





<sup>a</sup>Note: X axis is the age gap between cohorts and the cohort who was 15 years old when the law was effective. For example, 1 means this cohort was 14 years old, and -1 means this cohort was 16 years old. The plotted coefficient is the regression of schooling on different cohorts, with province, survey year and province and survey year fixed effects. The reference group is the cohort aged 16 when the law was effective. Data Source: CGSS 2010, 2012, 2013, 2015, 2017

# 3.3 Impact of the law: sources of heterogeneity

Since the law requires 15-year-old and younger individuals to stay in school, it should have heterogeneous impacts: First, mechanically across cohorts, second, across individuals living in provinces with heterogeneous educational attainment rates, third, across individuals belonging to families as a function of their socioeconomic background, and fourth as a function of gender. This section describes each of these sources of heterogeneity in detail.

According to the reform content, the law only affects cohorts who were 15 years old and younger when the law was implemented. Naturally, among the cohorts impacted by the law, the impact should be highest for younger cohorts. Furthermore, the impact should be higher among



#### Figure 6: Effect of the law on schooling among cohorts by gender<sup>a</sup>

<sup>a</sup>Note: X axis is the age gap between cohorts and one cohort who were 15 years old when the law was effective. For example, 1 means this cohort was 14 years old, and -1 means this cohort was 16 years old. The key coefficient is the regression of schooling on different cohorts, with fixed effects of province, survey year and intersection of province and survey year. The reference group is the cohort aged 16 when the law was effected. Data Source: CGSS 2010, 2012, 2013, 2015, 2017

individuals with lower educational attainment had the law not happened, which can be the case of individuals living in provinces with low pre-existing levels of educational attainment, and of individuals from families with parents with low levels of education, and of women.

Figure 5 plots the effects of the law on schooling across cohorts and among provinces with different educational levels. Higher educational provinces are those below the one third illiteracy level, while the lower educational provinces are those above the two third illiteracy level.<sup>20</sup> In Figure 5, relative to cohorts who were 16 years old in the first law-effective year, the younger the cohorts, the larger the effects from the law, while in the 10 cohorts before, the effects of the law on schooling are mostly insignificant and negative in both low-education and high-education

 $<sup>^{20}</sup>$ The illiteracy level is the proportion of individuals with less than 9-year schooling in cohorts aged 16-18 in the 1982 census. Because Tibet only has 2 observations and Hainan only has 45 observations in the sample, the average schooling level in these provinces would be very biased. I omit Tibet and Hainan in the analysis of Figure 5

provinces. In addition, in the first decade, the law has little different effects among provinces. Low educational provinces experience higher expansion of education than high ones after one decade.

Regarding gender, the law should have a larger influence on women, as women have a lower initial educational level in all provinces. As shown in Table 17 in the Appendix, the gender gaps in the percentage of illiteracy are all positive in every province, from 10.94% to 38.74%, with a mean of 24.93%. In Figure 6, which shows the effects of the law on schooling among cohorts by gender, women have larger coefficients than men under large exposure to the law.

Another important dimension of heterogeneity is related to parental education. Although the causality of parents' schooling on children's schooling is still in dispute, the consensus is that there is a correlation between parents' and children's schooling (Hu, Behrman, and Zhang 2021). This correlation could help predict some heterogeneous impact of the law: for individuals with highly educated parents, the impact should be negligible. For example, if both parents have college degrees, it is highly probable that their children will have a relatively high education. As a result, this compulsory schooling law should have no effects on children in high educated families.

Table 2 shows the effects of the law on schooling on different parent-education samples. The standard errors are clustered at birth year, while all results stay if the standard errors are clustered at province \* survey year. For both men and women with low educated parents, the coefficients are positive and significant. For individuals with less educated parents, men have a 1.35-year increase in schooling, and women have a 1.253-year increase in schooling. For individuals with junior and higher educated parents, the coefficients are insignificant. These correlational results could help predict that the effect comes from the respondents with less educated parents.

# 4 Data and Empirical Strategy

## 4.1 Data

Since the research question of the paper is how exposure to marriage influences gender role attitudes, the main variable of interest is gender role attitudes. To measure them, I use data from the China General Social Survey (CGSS), the nationally representative continuous survey

	OLS Estimat	ion: Years of Schooling
	Male	Female
All sample	0.953***	0.667***
	(0.337)	(0.290)
Observations	13,795	$14,\!128$
$\mathbb{R}^2$	0.392	0.464
Parents with low education	1.350***	1.253***
	(0.412)	(0.281)
Observations	$7,\!898$	7,946
$\mathbb{R}^2$	0.254	0.306
Parents with junior education	-0.046	-0.490
	(0.371)	(0.412)
Observations	2,792	2,959
$\mathbb{R}^2$	0.344	0.429
Parents with senior education	0.132	0.446
	(0.311)	(0.469)
Observations	1,896	1,946
R <sup>2</sup>	0.397	0.459
Parents with high education	0.520	-0.911
	(0.685)	(0.757)
Observations	663	619
$\mathbb{R}^2$	0.410	0.477

Table 2: The effect of the *Compulsory Schooling Law* on years of schooling, by different educational family background

*Notes:* All sample are individuals born after 1960 and before 1993, both married and non married. Sample of parents with low education is for individuals whose both parents have 6 years years of schooling at most. Sample of parents with junior education is for individuals who has at least one parent with a junior middle school years of schooling. Sample of parents with senior education is for individuals who has at least one parent with a senior middle school years of schooling. Sample of parents with high education is for individuals who have at least one parent with a senior middle school years of schooling. Sample of parents with high education is for individuals who have at least one parent with college degree or even higher degree.

Standard errors are adjusted for clustering at the birth year levels. Results are similar if standard errors are clustered at the province \* survey year. The key coefficient is the regression of years of schooling on the compulsory years of schooling law, which is measured by the exposure.

Every regression controls personal characteristics of hukou, ethnicity, age and also controls fixed effects of province, survey year and intersection of province and survey year.

Significance: \*p<0.1; \*\*p<0.05; \*\*\*p<0.01

Data source: CGSS 2010, 2012, 2013, 2015, 2017

project run by academic institutions in mainland China since 2003. The sampling is a multistage stratified design with a probability proportional to the size method to choose samples in each stratum. For waves since 2010, only adults 18 years and older were eligible respondents. In each wave, the sample size is around 12,000.

I restrict my sample to married individuals born between 1960 and 1993. Within this sample, the cohorts totally unexposed to the *Compulsory Schooling Law* are roughly equal in size to the cohorts totally exposed to the *Compulsory Schooling Law*. In addition, this subsample avoids the influence of discontinuous trends of education because of the Cultural Revolution.<sup>21</sup>

Even though it has been illegal for women to marry before 20 and before 22 for men since 1980, and it was illegal for women to marry before 18 and before 20 for men between 1960 and 1980 in China<sup>22</sup>, in reality, de facto marriage existed before the legal marriage age.<sup>23</sup> In my main analysis, I exclude individuals who married before 15, as child marriage is not the focus of this paper. Nevertheless, I use a sample in which respondents married between 12 and 17, to distinguish the mechanical channel and the human capital channel of the law in Section 8 *Robustness Checks*.

I consider the five waves of the survey conducted in 2010, 2012, 2013, 2015 and 2017 because these are waves that include questions about gender role attitudes. In particular, the survey asks respondents whether they totally agree, agree slightly, neither agree nor disagree, disagree slightly or totally disagree with the following statements:

- 1. Men should focus on career, while women should focus on family
- 2. Men are more competent than women biologically
- 3. Marrying a good person is better than doing a good job for women

 $<sup>^{21}</sup>$ In Figure 4, cohorts born before 1960 have an increasing trend of schooling, while cohorts born between 1960 and 1966 have a decreasing trend. Cohorts born after 1960 were influenced by the Cultural Revolution, and the *Compulsory Schooling Law* tried to restore the social level of education from this political shock. Fang et al. (2012) use the same reason to constrain their sample to individuals born after 1960.

<sup>&</sup>lt;sup>22</sup>The 1950 Marriage Law in China determined the legal age for women to marry as 18 years old and for men as 20. The 1980 new Marriage Law in China claimed that the legal age to marry for women was 20 and that it was 22 for men. Because of the requirements in the Marriage Law in China, it is expected that for the restricted sample with individuals born between 1960 and 1993, age at first marriage is 23 years old on average

 $<sup>^{23}</sup>$ Luo et al. (2020) found that adolescent marriage has increased since 2010 in China.

4. During recession, women should be fired first

#### 5. Husbands and wives should do housework equally

Agreement or disagreement with these statements captures respondents' attitudes on gender roles about family life and career. I assign values to the answers from 1 to 5 from very conservative answers to very liberal answers for each of the five statements. Value 1 means that the respondent is very conservative, while a value of 5 means that the respondent is very liberal.

I constructed the gender role attitude index by giving each specific gender role attitude variable equal weight. In addition, I used principal component analysis to reduce the dimensionality of gender role attitudes and obtain two principal components for robustness checks. The two specific principal components can be checked in the Appendix.

Another key variable is how much a given respondent was affected by the compulsory schooling law. I created the variable *exposure* as a measure of the impact of the Compulsory Schooling Law (CSL) on the respondent depending on his or her age. It equals 0 if the respondent was older than 15 when CSL was effective and 1 if the respondent was 6 or younger when CSL was effective; it is linearly decreasing among respondents aged from 7 to 15, with a yearly coefficient of 1/10. For example, the exposure is 1/10 for cohorts aged 15 when CSL was effective, 9/10 for cohorts aged 7, and 10/10 for cohorts aged 6. The mean of *exposure* is 0.404, while the variance is 0.44

The next essential information is where the respondent obtained her or his compulsory education. The surveys do not ask where the respondents had their compulsory education. I measure the provinces where the respondents had their compulsory education by using the information of Hukou and their mothers' residential provinces when the respondents were born. Specifically, I take an individual's current resident province to be her/his compulsory educational province if this respondent's birth hukou is the same province or his/her hukou was transferred in this province before s/he was 16 years old. For those moved to their current residential hukou province after 15 years old, I take their educational provinces to be their mothers' residential provinces when they were born. There is no information about the mothers' residential provinces in 2010, 2015 and 2017 surveys, so I exclude those respondents whose hukou were moved to current residential

Variables	Observations	Mean	S.D.	Min	Max
exposure to the law	$27,\!967$	0.404	0.440	0	1
exposure to the law of spouses	$23,\!197$	0.340	0.415	0	1
female	27,967	0.506	0.500	0	1
age	27,967	39.106	9.540	17	57
hukou	27,946	0.579	0.494	0	1
ethnicity	27,944	0.089	0.285	0	1
schooling years	$27,\!967$	9.953	4.001	0	19
schooling years of spouses	$23,\!222$	9.523	3.804	0	19
schooling years of fathers	27,036	5.999	4.484	0	19
schooling years of mothers	$27,\!309$	4.204	4.406	0	19
age at marriage	$23,\!536$	23.508	3.546	12	53
age at marriage of spouses	22,369	23.766	3.910	12	114
exposure to marriage	$22,\!475$	18.209	9.028	1	45
age gap of couples	$23,\!197$	1.890	3.293	-30	89
gender role attitudes: index	27,967	3.276	0.700	1	5
gender role attitudes: housework	27,967	3.815	1.031	1	5
gender role attitudes: career	$27,\!967$	2.619	1.208	1	5
gender role attitudes: marriage	$27,\!967$	2.932	1.190	1	5
gender role attitudes: ability	27,967	3.093	1.211	1	5
gender role attitudes: work	27,967	3.923	0.988	1	5
trustworthy	$27,\!954$	3.357	1.043	1	5
others taking advantage	27,922	3.086	1.064	1	5
friends gathering	27,929	2.489	0.923	1	5
online	$27,\!939$	2.932	1.793	1	5
reading	27,897	2.334	1.342	1	5

Table 3: Summary statistics in the sample

*Notes:* The sample is constrained to respondents born between 1960 and 1993. Exposure to the law is the impact that the Compulsory Schooling Law has on the respondents. Exposure to marriage is the years that respondent stays in the marriage. Age at first marriage is the age when the individual was married. For six gender role attitudes, higher values mean more liberal attitudes. Trustworthy measures how an individual trusts the people in the society. Others taking advantage measures how an individual distrust others. For attitudes of sex before marriage, the higher the value, the more liberal the attitude. Friend gathering, online and reading are the frequency of relative activities. The higher the value, the higher the frequency. The frequencies measure how many times a respondent does the activities in the last survey year.

Data source: CGSS 2010, 2012, 2013, 2015, 2017

provinces after 15 years old and who were without information of mothers' residential provinces when they were born, in these 3 waves of surveys from my sample.

For the hukou information of spouses, unfortunately CGSS does not supply this information. However, most marriage are among individuals from the same provinces. Using the national representative survey, China Labor-force Dynamics Survey 2012, Wang and He (2014) find that around one quarter of married people experience marriage migration, but most of marriage migration happens in the provinces and below the county level. As a result, I assume that the spouses have the same hukou information on provinces like their spouses.

Table 3 provides detailed descriptive statistics for the sample. The variables include gender, hukou, ethnicity, age, years of schooling of own, parents and spouses, age at first marriage of own the spouses, age gap of couples, exposure to the law of own and spouses, exposure to marriage, six gender role attitudes, and attitudes on trust and others taking advantage, the frequency of friend gathering.

## 4.2 Empirical Strategy

#### 4.2.1 OLS estimation of marriage on gender role attitudes

Equation 2 is the OLS form of the regression of exposure to marriage on gender role attitudes.

$$gender \ attitudes_{ipct} = \alpha_1 marriage_{ipct} + \alpha_2 X_{ipct} + \mu_t + \lambda_p + \eta_{pt} + \epsilon_{ipct} \tag{2}$$

In this equation, *i* indexes individual, *p* indexes province, *c* indexes cohorts, and *t* indexes survey years. The variable *marriage* is the number of years individuals have been married; *X* is individual characteristics, including hukou, ethnicity, age and age squared, years of schooling of oneself and the spouse;  $\mu$  is fixed effect of survey year;  $\lambda$  is fixed effect of province;  $\eta$  is fixed effect of intersection of survey year and province. According to the discussion in the conceptual framework based on existing literature,  $\alpha_1$  should be negative, meaning that individuals who have been married for longer have more conservative gender role attitudes.

#### 4.2.2 Effects of *Compulsory Schooling Law* on marriage and gender role attitudes

The source of variation of exposure to marriage from the *Compulsory Schooling Law* comes from the labor market and the marriage market. In the following, I firstly analyze how marriage behavior responds to improved education in the labor market and in the marriage market respectively. I conclude that I need two instrumental variables to capture variation in both markets. Based on the discussion on the source of variation, I introduce the estimation model of the exposure to marriage on gender role attitudes.

In the labor market, the expansion of the law improves individuals' human capital and increases the cost to leave labor market, leading individuals to postpone marriage. In the literature, the implementation of the *Compulsory Schooling Law* leads to higher age at marriage for girls in developing countries (Marie and Elsayed September 2021, Kirdar, Dayloğlu, and Koç 2009). The higher the years of schooling, the later individuals enter into marriage. This relationship between education and age at marriage also exists in China, as Yu and Xie (2015) find that education has a negative impact on the age at marriage for women in urban China.

Postponement of marriage is correlated with increased age at marriage, and less exposure to marriage. To avoid misunderstanding, I discuss the relation between age at marriage and the exposure to marriage. Age at marriage is at a time point, while exposure to marriage, or the number of years individuals have been married, is in a time period. To study whether and how marriage affects gender role attitudes, a time-period measurement is more relevant, as marriage is regarded as experience and social learning, which plays the role during a period of time. Nevertheless, age at marriage is closely connected to exposure to marriage. For a married individual, if her age is known, the higher the age at marriage, the less exposure to marriage. Empirically, this negative relation is presented in the following Table 4, which I will discuss soon.

In the marriage market, increased education leads to a dynamic process of mutual selection between men and women: if individuals are more educated, they would choose different spouses.<sup>24</sup>

 $<sup>^{24}</sup>$ It would be another independent research question to explore how the marriage market exactly changes because of the schooling law. Chiappori, Dias, and Meghir (2020) write a whole paper to answer this seemingly easy research question in the US context.

In the literature, marriage is an assortative matching process in terms of education, age, family background, and so on (Chiappori, Dias, and Meghir 2020, Chiappori, Iyigun, and Weiss 2009, Blossfeld 2009). In the *Compulsory Schooling Law* context, Wang and Ou (2022) find that the increased female's education is associated with a significant increase of their husbands' education and income.

To capture variation in the labor market, the impact of the 1986 Compulsory Schooling Law on oneself in an instrumental variable. More importantly, to capture variation from the mutual selection of mating, the impact of the 1986 Compulsory Schooling Law on the spouses is an additional IV. To be noticed, the impact of the law on an individual's spouse cannot directly influence gender role attitudes of this person, but can only influence gender role attitudes after they get married. The additional IV only captures the variation from the marriage.

Table 4 presents the results of regressions measuring the effects of education on age at marriage and exposure to marriage. Samples are separated into men and women, and the impact of the *Compulsory Schooling Law* is the instrumental variable for years of schooling. In Column (1) and (2), years of schooling increase the age at marriage for both men and women, while in Column (3) and (4), years of schooling of the spouses also increase the age at marriage for both men and women. While the effects in Column (1) and (2) are attributed to both the labor market and the marriage market, the effects in Column (3) and (4) are only attributed to the marriage market.

In addition, years of schooling have insignificant effect on the exposure to marriage for men in Column (5), but years of schooling significantly reduce the exposure to marriage for women in Column (6). In Column (7) and (8), years of schooling of the spouses significantly reduce the exposure to marriage for both men and women. Empirically, age at marriage is negatively correlated to exposure to marriage, as I discussed before, and for the research purpose, I use exposure to marriage as the measurement of marriage. Besides, similar to the first 4 columns, the effects in Column (5) and (6) are attributed to two market, and the effects in Column (7) and (8) are attributed to the marriage market.

		Age at	marriage			Exposure	to marriage	
	Men	Women	Men	Women	Men	Women	Men	Women
	(1)	(2)	(3)	(4)	(5)	(9)	(2)	(8)
years of schooling	$0.096^{*}$ (0.052)	$0.112^{***}$ (0.030)			0.193 (0.198)	$-0.710^{***}$ (0.201)		
years of schooling of spouses			$0.541^{***}$ (0.040)	$0.332^{***}$ (0.037)			$-1.226^{***}$ (0.291)	$-0.879^{***}$ (0.357)
Cragg-Donald Statistic (F-stat) Kleibergen-Paap Statistic (F-stat) Wu-Hausman test (p-value)	592.0 432.7 0.622	$\begin{array}{c} 1, 385.2 \\ 850.6 \\ 0.009 \end{array}$	$\begin{array}{c} 1, 195.8 \\ 619.8 \\ 0.000 \end{array}$	710.4 355.2 0.000	51.3 48.7 0.040	37.1 31.7 0.0002	31.8 33.1 0.000	16.1 15.7 0.002
IV of the law Individual controls	self Ves	self Ves	spouses	spouses	self Vos	self Ves	spouses	spouses
FE of province	Yes	${ m Yes}$	${ m Yes}$	Yes	Yes	Yes	Yes	Yes
FE of survey year	$\mathbf{Yes}$	$\mathbf{Yes}$	$\mathbf{Y}_{\mathbf{es}}$	$Y_{es}$	$\mathbf{Yes}$	$\mathbf{Yes}$	Yes	$Y_{es}$
FE of province * year	Yes	$\mathbf{Yes}$	$\mathbf{Yes}$	$\mathbf{Yes}$	$\mathbf{Yes}$	$\mathbf{Yes}$	$\mathrm{Yes}$	$\mathbf{Yes}$
Observations	10,277	11,080	10,258	11,067	10,277	11,080	10,258	11,067
$ m R^2$	0.151	0.202	0.037	0.160	0.878	0.875	0.758	0.852

*Notes:* All sample are individuals born after 1960 and before 1993, and married after 15. Standard errors are adjusted for clustering at province \* survey year. From Column (1) to (4), individual controls include hukou and ethnicity; from Column (5) to (8), individual controls include hukou, ethnicity, age of oneself, and age of spouse. Significance: \*p<0.1; \*\*p<0.05; \*\*\*p<0.01. Data source: CGSS 2010, 2012, 2013, 2015, 2017

More importantly, the coefficients in Column (3), (4), (7) and (8) prove the existence of mating effect in the marriage market in the *Compulsory Schooling Law* context: the higher the education, the older the spouses are.<sup>25</sup> Like human capital effect, for the mating effect, the increased years of schooling correspond with less exposure to marriage (or higher age at marriage).

gender attitudes<sub>ipct</sub> =
$$\beta_1 the \ law_{pct} + \beta_2 the \ law \ of \ spouses_{pct} +$$
  
$$\beta_3 X_{ipct} + \mu_t + \lambda_p + \eta_{pt} + \nu_{ipct}$$
(3)

gender attitudes<sub>ipct</sub> = 
$$\zeta_1$$
the marriage<sub>pct</sub> +  $\zeta_2 X_{ipct} + \mu_t + \lambda_p + \eta_{pt} + \varsigma_{ipct}$ 

$$(4)$$
marriage<sub>ipct</sub> =  $\gamma_1$ the law<sub>pct</sub> +  $\gamma_2$ the law of spouses<sub>pct</sub> +  $\gamma_3 X_{ipct} + \mu_t + \lambda_p + \eta_{pt} + \xi_{ipct}$ 

Equation 3 is the reduced form of estimation of the *Compulsory Schooling Law* on gender role attitudes. The variable *the law* is the impact of the law on individuals, while *the law of spouses* is the impact of the law on individuals' spouses. Equation 4 is the 2SLS estimation, using *the law* and *the law of spouses* as the instrumental variables to *marriage*. According to my conceptual framework and extant literature, marriage leads women to become more conservative in terms of their gender roles. As a result, I predict that  $\zeta_1$  is negative.

# 5 Empirical Results

In this section, I first present the baseline results about the effects of exposure to marriage on gender role attitudes by taking the *Compulsory Schooling Law* as an instrumental variable for both the individuals and their spouses, and discuss the source of variation from the labor market and the marriage market. Then, I estimate the effects of exposure to marriage on specific gender role attitudes. Finally, I discuss the heterogeneous effects based on sex ratio.

Table 5 reports the baseline results of the effects of marriage on gender role attitudes by gender with two instrumental variables, the schooling law on individuals, and the law on the

 $<sup>^{25}</sup>$ One difference between my research and Wang and Ou (2022) is that I use an instrumental variable strategy, while Wang and Ou use a regression discontinuity design.

	gend	ler role attit	udes
	All	Men	Women
	(1)	(2)	(3)
Panel A: OLS correlation			
exposure to marriage	-0.001	-0.0004	$-0.011^{***}$
	(0.001)	(0.002)	(0.003)
exposure to marriage $*$ female	$-0.009^{***}$		
	(0.001)		
R <sup>2</sup>	0.138	0.092	0.188
Part B: Reduced form			
the schooling law	-0.032	0.050	$-0.107^{**}$
	(0.047)	(0.054)	(0.053)
the schooling law of spouses	$-0.080^{**}$	-0.056	0.107**
	(0.037)	(0.036)	(0.044)
the schooling law * female	-0.016	. ,	. ,
	(0.058)		
the schooling law of spouses * female	0.220***		
	(0.056)		
$\mathbb{R}^2$	0.138	0.092	0.187
Part C: 2SLS			
exposure to marriage	0.002	0.007	$-0.029^{**}$
1 0	(0.005)	(0.005)	(0.015)
exposure to marriage * female	$-0.011^{***}$	()	()
I man a solution of the soluti	(0.001)		
$\mathbb{R}^2$	0.138	0.091	0.183
Cragg-Donald Statistic (F-stat)	532.3	832.2	139.2
Kleibergen-Paap Statistic (F-stat)		437.9	107.6
Wu-Hausman test (p-value)	0.037	0.116	0.189
Individual controls	Yes	Yes	Yes
FE of province	Yes	Yes	Yes
FE of survey year	Yes	Yes	Yes
FE of province * year	Yes	Yes	Yes
Observations	$21,\!325$	10,258	11,067

Table 5: Considering the influence of spouses: the effect of exposure of marriage on gender role attitudes, all married individuals, by gender

Notes: All sample are individuals born after 1960 and before 1993, married after 15. Every regression controls personal characteristics of hukou, ethnicity, age, age squared, years of schooling of oneself and her/his spouse and also controls fixed effects of province, survey year and intersection of province and survey year. Standard errors are adjusted for clustering at province \* survey year. Significance: \*p<0.1; \*\*p<0.05; \*\*\*p<0.01. Data source: CGSS 2010, 2012, 2013, 2015, 2017 36
	Ability	Career	Housework	Marry	Work
	(1)	(2)	(3)	(4)	(5)
exposure to marriage	-0.020	$-0.086^{***}$	-0.021	-0.019	-0.001
	(0.027)	(0.025)	(0.024)	(0.027)	(0.022)
Cragg-Donald Statistic (F-stat)	139.186	139.186	139.186	139.186	139.186
Kleibergen-Paap Statistic (F-stat)	107.6	107.6	107.6	107.6	107.6
Wu-Hausman test (p-value)	0.906	0.003	0.387	0.651	0.727
Individual controls	Yes	Yes	Yes	Yes	Yes
FE of province	Yes	Yes	Yes	Yes	Yes
FE of survey year	Yes	Yes	Yes	Yes	Yes
FE of province * year	Yes	Yes	Yes	Yes	Yes
Observations	11,067	11,067	11,067	11,067	$11,\!067$
$\mathbb{R}^2$	0.115	0.128	0.054	0.076	0.109

Table 6: The effects of marriage on five specific gender role attitudes for all married women

Notes: All sample are married individuals born after 1960 and before 1993 and are constrained to women only. Individual controls include age, age squared, ethnicity, and hukou, years of schooling of oneself and her/his spouse. Standard errors are adjusted for clustering at province \* survey year. The null hypothesis of the Wu-Hausman test is that the OLS estimates are consistent. Significance: p<0.1; p<0.05; p<0.01 Data source: CGSS 2010, 2012, 2013, 2015, 2017

spouses of individuals. Results are estimated for the full sample and for the men and women samples separately. Part A reports the correlation between exposure to marriage and gender role attitudes. In Column (1), only interaction of exposure to marriage and female is significantly negative, and the coefficient is -0.009. In Column (2), for men, one additional year in marriage insignificantly corresponds with -0.0004 gender role attitudes at the absolute values; in Column (2), for women, it is -0.011; when the samples of men and women are pooled together, results are similar, with -0.009 additional correlation for women than men.

In Part B of Column (1), the law of the spouses are negatively correlated with men's gender role attitudes, while it is positively correlated with women's gender role attitudes; in Column (2), the schooling law does not correlate with men's gender role attitudes; in Column (3), the schooling law has negative relation with gender role attitudes of women themselves, and the schooling law of the spouses positively relates to women's gender role attitudes. In Part C of Column (1), the coefficient interaction of exposure to marriage and female is -0.011 and is significant at 1 % level, meaning that comparing with men, women become more conservative in gender role attitudes. In Column (2) and (3), only women lower their gender role attitudes by their exposure to marriage. The significant effect of marriage on women's gender role attitudes is -0.029. This effect is not significant for men. The first stage F-statistic, both the Cragg-Donald Statistic and the Kleibergen-Paap Statistic in Column (1), (2) and Column (3) exists 10, further supporting the relevance condition of the instrumental variables.<sup>26</sup> The results in Column (1) are consistent with the results in Column (2) and (3).

I next discuss the quantitative interpretation of the results using mean values and standard deviation. The mean of gender role attitudes for women in this sample is 3.303. As a result, one additional year of exposure to marriage makes women more conservative at 0.9% in absolute value at mean. In terms of standard deviation. An increase of one standard deviation in the exposure to marriage for women is associated with a reduction of gender role attitudes by 0.372 standard deviations. This magnitude is quite notable.

If there is only one instrumental variable, the law on spouses, results are similar in Table 5.<sup>27</sup> Besides, by taking the impact of the law on oneself as the only instrumental variable, I find that the marriage market channel supplies most variation on the marriage, other than the labor market. The estimated results in Table 19 and the relevant discussion are in the appendix.

Table 6 presents the results of effects of exposure to marriage on the five specific gender role attitudes for married women. Standard errors are adjusted for clustering at province time survey year. The effect on gender role attitudes of career is significant in Column (2) and is -0.086. The effect on gender role attitudes of ability, housework, marry, and work in Column (1), (3) to (5) are all negative, but not significant. The average gender role attitudes of career in this sample are 2.611. As a result, one additional year of exposure of marriage makes women more conservative

 $<sup>^{26}</sup>$ Column 1 in Table 5 only reports one first stage F-statistic, the Cragg-Donald Statistic. For the weak instrument F-test in multiple endogenous variables, Cragg-Donald Statistic is an appropriate test for weak instruments with a homoskedastic setting (Sanderson and Windmeijer 2016). Besides, for the F test in weak instruments, Lee et al. (2021) suggests that for one IV model, the threshold for the first-stage F at 5% t-ratio requires an F greater than 104.7, other than the rule of thumb 10; or if one wants to maintain F of 10, then the t value need to be adopted.

<sup>&</sup>lt;sup>27</sup>The results are available upon request.

		gender role	attitudes	
	High s	sex ratio	Low se	ex ratio
	Men	Women	Men	Women
	(1)	(2)	(3)	(4)
exposure to marriage	0.011	$-0.081^{**}$	0.001	-0.023
	(0.009)	(0.034)	(0.010)	(0.030)
Cragg-Donald Statistic (F-stat)	180.7	28.7	205.7	41.7
Kleibergen-Paap Statistic (F-stat)	90.7	25.5	98.8	35.6
Wu-Hausman test (p-value)	0.378	0.037	0.816	0.513
Individual controls	Yes	Yes	Yes	Yes
FE of province	Yes	Yes	Yes	Yes
FE of survey year	Yes	Yes	Yes	Yes
FE of province * year	Yes	Yes	Yes	Yes
Observations	$2,\!246$	2,508	$3,\!106$	$3,\!212$
$\frac{\mathbf{R}^2}{\mathbf{R}^2}$	0.091	0.141	0.093	0.148

Table 7: The effects of marriage on gender role attitudes, by gender and regions with different sex ratios

Notes: All sample are married individuals born after 1960 and before 1993. There are two instrumental variables in all the columns. Sex ratio is the population of men to women in provinces. Individual controls include age, age squared, ethnicity, hukou, years of schooling of oneself and his/her spouse. There are 2 IVs. Standard errors are adjusted for clustering at the province \* survey year. The null hypothesis of the Wu-Hausman test is that the OLS estimates are consistent. Significance: \*p<0.1; \*\*p<0.05; \*\*\*p<0.01 Data source: CGSS 2010, 2012, 2013, 2015, 2017

at 3.3% at absolute value at mean for these two specific gender role attitudes. In addition, an increase of one standard deviation in the exposure to marriage for women is associated with a reduction of gender role attitudes in terms of career by 0.631 standard deviations respectively. In short, exposure to marriage makes women more conservative in the following gender role attitudes: men should focus on career, while women should focus on family.<sup>28</sup>

After presenting the main results, I explore the heterogeneous variation in the marriage market. As I explained before, the effects of the *Compulsory Schooling Law* on exposure to marriage are

<sup>&</sup>lt;sup>28</sup>If the samples are pooled by married men and women and even with only one IV, the impact of the law on oneself, all five gender role attitudes for married women get significantly negative influence from exposure to marriage. The results are available upon request. Nevertheless, the strict way to do econometrics, by separating samples into men and women, still get significant results, which support the validity of the empirical results.

mostly driven by the marriage market, other than the labor market. Since imbalanced sex ratio and missing women are notorious phenomena in China(Ebenstein 2010, Yi et al. 1993), and Chinese women are prone to marry up (Ong, Yang, and Zhang 2020, Yu and Xie 2015), for women from severe sex-imbalanced provinces, the impact of the *Compulsory Schooling Law* on marriage behavior would be larger than women in other provinces. For women in provinces with severe sex imbalance, the *Compulsory Schooling Law* would lead them to choose much better husbands than women in other provinces. As a result, the *Compulsory Schooling Law* would have bigger impact on marriage for these women than women in other provinces, and then their gender attitudes would have larger change.

The rank of sex ratio  $\left(\frac{population \ of \ men}{population \ of \ women}\right)$  among provinces in this paper is based on the Census of China in 1982, 1990, 2000, and 2010. For each province, there is an average sex ratio. Individuals in provinces ranked in the 8 lowest sex ratio are pooled as low-sex-ratio sample, while individuals in provinces ranked in the 8 highest sex ratio are pooled as high-sex-ratio sample.<sup>29</sup>

Table 7 presents the heterogeneous effects of exposure to marriage on gender role attitudes among provinces with different sex ratio. As predicted, the effect of marriage is driven by individuals living in regions with relatively less women, which is the result in Column 2 in Table 7. One additional year in marriage reduces -0.081 gender role attitudes at the absolute values. An increase of one standard deviation in the exposure to marriage for women in provinces with low sex ratio is associated with a reduction of gender role attitudes by 1.029 standard deviations. This magnitude is very notable.<sup>30</sup>

## 6 Evidence on the Channels of the Causality

The empirical strategy to explore the effect of exposure to marriage on gender role attitudes is taking the *Compulsory Schooling Law* as an instrumental variable. The mechanism behind

<sup>&</sup>lt;sup>29</sup>The eight provinces with the lowest average sex ratio are Tibet, Jiangsu, Shandong, Liaoning, Shanghai, Hebei, Heilongjiang, Jilin, and the eight provinces with the highest average sex ratio are Hainan, Guangxi, Neimenggu, Hunan, Shaanxi, Shanxi, Guizhou, Jiangxi.

<sup>&</sup>lt;sup>30</sup>For women in high sex-ratio provinces, except specific attitude of housework is insignificantly negative, all other 4 gender attitudes in term of ability, career, marriage and work, have significant negative coefficients. The results are available upon request to the author.

this empirical strategy is the following: after the *Compulsory Schooling Law* increases the years of schooling, the mating effect leads individuals to find older spouses, while the human capital effect makes individuals, especially women, postpone to enter into marriage; as a result, these two effects reduce individuals' exposure to marriage, leading to less conservative gender role attitudes. These causal relationships are presented in the first line of logic links in Figure 7.

Either through the human capital effect or the mating effect, increased years of schooling lead to variation in exposure to marriage. As a result, to identify the logic links in the causal relationships between marriage and gender role attitudes, I manipulate the schooling channel in this section. Firstly, I block the logic link between the law and education, and then the logic link between education and marriage. If the law is not binding for individuals or increased education has no effect on marriage, we should not observe the existence of the effects of marriage on gender role attitudes. These results are in the second and third lines of logic links in Figure 7.

Secondly, under the condition that both the link between the law and education, and the link between education and marriage exist, I estimate the effect of education on non-gender-related attitudes such as trust and misanthropy. If the *Compulsory Schooling Law* can directly nurture individuals' attitudes, we should observe that education can also nurture non-gender-related attitudes directly. Empirically, this is not the case. Moreover, I also directly estimate the effect of education on gender role attitudes for single individuals, and I get insignificant results. By doing these new estimations, I rule out the direct nurturing channel of education on gender role attitudes, which is the fourth line of logic links in Figure 7.

#### 6.1 Manipulating the Schooling Channel

The *Compulsory Schooling Law* only impacts individuals with low educated parents, as shown in Table 2. For individuals with middle and high educated parents, the law has no effects on their education, and as a result, there should be no effect of years of schooling on marriage for those individuals. Besides heterogeneous effects in the family educational background, how much the law impacts individuals' exposure to marriage may correlate with the age at marriage. As the law



Figure 7: Channels of the Causal Relationships

increases on average 1.5 years of schooling for both of men and women, the change of exposure to marriage would not be large. I separate the sample into two groups by age at marriage. If an individual marries before 26, s/he is considered in an early marriage, while if an individual marries after 25, s/he is in a late marriage. The reason to take age 25 and age 26 as the cutoff is based on the impressionable year hypothesis presented in the conceptual framework.

Table 8 presents the effects of education on marriage by family background, marrying period and gender. Firstly, in the sample with low educated parents in Column (1) to (4), the years of schooling only influences individuals married before 26, for both men and women. As shown in Column (3) and (4), one additional year of schooling postpone 0.846 year for men to enter into marriage, and postpone 0.898 year for women to enter into marriage. Secondly, in the sample with middle and high educated parents in Column (5) to (8), no matter when men and women marry, the years of schooling has no effect on the exposure to marriage. In conclusion, the *Compulsory Schooling Law* only postpone individuals in low educated families and married early.<sup>31</sup>

<sup>&</sup>lt;sup>31</sup>To be noticed, for the concern of sample selection, I also do the estimation for individuals in low educated family and high educated family, without separating age at marriage. For individuals in high and middle educated families, the schooling has no effect on exposure to marriage, and for individuals in low educated families, the schooling significantly increases both men's and women's exposure to marriage. The results are presented in Table 20 in appendix.

				Exposure t	o marriage			
Family education background			Low			High and	Middle	
	Married	after 25	Married	before 26	Married	after 25	Married	before 26
	Men	Women	Men	Women	Men	Women	Men	Women
	(1)	(2)	(3)	(4)	(2)	(9)	(2)	(8)
years of schooling	0.174	-0.943	$-0.846^{**}$	$-0.898^{***}$	-9.186	8.918	1.595	-4.232
	(0.591)	(1.544)	(0.330)	(0.345)	(264.930)	(29.929)	(1.439)	(6.736)
Cragg-Donald Statistic (F-stat)	4.131	0.527	10.296	10.9	0.001	0.088	1.799	0.384
Kleibergen-Paap Statistic (F-stat)	3.6	0.915	13.2	25.8	0.060	0.878	0.314	0.433
Wu-Hausman test (p-value)	0.931	0.446	0.001	0.0003	0.803	0.025	0.006	0.003
Individual controls	$\mathbf{Yes}$	$\mathbf{Yes}$	$\mathbf{Yes}$	Yes	Yes	Yes	Yes	Yes
FE of province	$\mathbf{Yes}$	$\mathbf{Yes}$	$\mathbf{Yes}$	${ m Yes}$	${ m Yes}$	$\mathbf{Yes}$	Yes	$\mathbf{Yes}$
FE of survey year	$\mathbf{Yes}$	$\mathbf{Yes}$	$\mathbf{Yes}$	${ m Yes}$	$\mathbf{Yes}$	$Y_{es}$	$\mathbf{Yes}$	$\mathbf{Yes}$
FE of province * year	$\mathbf{Yes}$	$\mathbf{Yes}$	$\mathbf{Y}_{\mathbf{es}}$	$\mathbf{Y}_{\mathbf{es}}$	$\mathbf{Yes}$	$Y_{es}$	$\mathbf{Yes}$	$\mathbf{Yes}$
Observations	1,725	840	4,936	6,181	$1,\!437$	962	2,160	3,084
$ m R^2$	0.825	0.776	0.887	0.874	-5.282	-4.816	0.813	-0.135

Table 8: The effects of education on exposure in marriage. by family background, marrying period, and gender

marriage for both men and women in high and middle families, but have significant effects in low educated families. These results are present in Table 20 in the appendix. Significance: \*p<0.1; \*\*p<0.05; \*\*\*p<0.01. Data source: CGSS 2010, 2012, 2013, 2015, 2017 Notes: All sample are married individuals born after 1960 and before 1993 and married after 15. Individual controls include age, age squared, ethnicity, hukou, otherwise this person marries early. Standard errors are adjusted for clustering at the province \* survey year. The null hypothesis of the Wu-Hausman test is and years of schooling of spouse. The instrument is the Compulsory Schooling Law of oneself. If someone is married after 25, then this person marries late, that the OLS estimates are consistent. To be noticed, without separating samples by the age at marriage, years of schooling have no effect on exposure to

		gender rol	e attitudes	3
	Married	after 25	Married	before 26
	Men	Women	Men	Women
	(1)	(2)	(3)	(4)
exposure to marriage	-0.002 (0.017)	0.051 (0.183)	$0.002 \\ (0.025)$	$-0.056^{*}$ (0.028)
Cragg-Donald Statistic (F-stat) Kleibergen-Paap Statistic (F-stat)	67.0 49.5	0.723 0.575	80.9 43.6	81.0 67.6
Wu-Hausman test (p-value)	0.283	0.732	0.713	0.064
Individual controls FE of province	Yes Yes	Yes Yes	Yes Yes	Yes Yes
FE of survey year FE of province * year	Yes Yes	Yes Yes	Yes Yes	Yes Yes
$\frac{\rm Observations}{\rm R^2}$	$1,725 \\ 0.159$	840 0.286	$4,936 \\ 0.095$	$6,181 \\ 0.141$

Table 9: The effects of marriage on gender role attitudes in low educated families, by gender and marrying period

Notes: All sample are married individuals born after 1960 and before 1993 and with low educated parents. There are two instrumental variables in all the columns. Individual controls include age, age squared, ethnicity, hukou, years of schooling of oneself and his/her spouse. There are 2 IVs. If someone is married after 25, then this person marries late, otherwise this person marries early. Standard errors are adjusted for clustering at the province \* survey year. The null hypothesis of the Wu-Hausman test is that the OLS estimates are consistent. Significance: \*p<0.1; \*\*p<0.05; \*\*\*p<0.01. Data source: CGSS 2010, 2012, 2013, 2015, 2017

For women in low educated families and married early, there should be significant negative effect of marriage on gender role attitudes. What's more, for women from low educated families, if they marries late, there also should be no significant effect, as the law has no influence on their marriage. For these women, the law indeed increases their years of schooling, but their decisions on the time of marriage are under the influence of factors other than the *Compulsory Schooling Law*. Since the law has no impact on their marriage, there should be no effect of marriage on their gender role attitudes by taking the law as the IVs.

Table 9 presents the results of heterogeneous effect of marriage on gender role attitudes by marrying period and gender for individuals from low educated families. In Column (1) and (2),

	Others Ta	king Advantage	Trust	worthy
	Men	Women	Men	Women
	(1)	(2)	(3)	(4)
years of schooling	0.104	0.007	-0.081	-0.055
	(0.114)	(0.073)	(0.107)	(0.070)
Cragg-Donald Statistic (F-stat)	13.9	22.6	13.9	22.6
Kleibergen-Paap Statistic (F-stat)	16.2	25.8	16.2	25.8
Wu-Hausman test (p-value)	0.301	0.953	0.366	0.369
Individual controls	Yes	Yes	Yes	Yes
FE of province	Yes	Yes	Yes	Yes
FE of survey year	Yes	Yes	Yes	Yes
FE of province * year	Yes	Yes	Yes	Yes
Observations	4,941	$6,\!189$	$4,\!941$	$6,\!189$
<u>R<sup>2</sup></u>	-0.031	0.039	0.011	0.023

Table 10: The effects of education on non-gender role attitudes for individuals married early and in low educated families

Notes: All sample are married individuals born after 1960 and before 1993 and with low educated parents. The null hypothesis of the Wu-Hausman test is that the OLS estimates are consistent. Individual controls include age, age squared, ethnicity, hukou, years of schooling of oneself and his/her spouse. The results are also insignificant, if the sample of men and women are pooled, and with an additional IV of law on its partner. Significance: \*p<0.1; \*\*p<0.05; \*\*\*p<0.01 Data source: CGSS 2010, 2012, 2013, 2015, 2017

men and women marry after age 25, and the effects of marriage on gender role attitudes are both insignificant. In Column (3) and (4), the effect of marriage on gender role attitudes is 0.002 but insignificant for men, and is -0.056 and significant for women. In the sample of women married before 26, the average gender role attitudes for women is 3.166. As a result, one additional year of exposure to marriage lower women's gender role attitudes at 1.8%. An increase of standard deviation of exposure in marriage is associated with a negative change in gender role attitudes for women married before 26 by 0.684 standard deviations, which is quite large.

In conclusion, for men and women whose exposure to marriage is not influenced by the law, the impact of marriage has no significant effects on gender role attitudes. For women whose exposure to marriage is influenced by the law, the exposure to marriage makes them more conservative on gender role attitudes. And again, the exposure of marriage has no impacts on men even if their marriage to exposure are reduced because of the schooling law.

### 6.2 Ruling Out the Direct Nurturing Channel

One concern is that the Compulsory Schooling Law has a direct effect on gender role attitudes, and therefore, the increased years of schooling cause both changes in marriage behavior and evolving in gender role attitudes. If this was the case, marriage effect on attitudes would be spurious. Actually, Du, Xiao, and Zhao (2020) suggest that the 1986 Compulsory Schooling Law improves gender role attitudes, although the authors do not provide quantitative evidence on the mechanism. One mechanism the authors suggest is that education fosters values directly. If this was the case, then we would expect non-gender-related attitudes to change as well. The literature supports the hypothesis of educational nurturing effects. Smith (1997) shows that higher schooling tends to lower misanthropy, where misanthropy is defined as a negative attitude towards human nature and lack of trust in others. Alesina and La Ferrara (2002) and Knack and Keefer (1997) also find that people with low education trust others less than those with high education. Contrast to the positive nurturing effect, education might even harm progressive attitudes. Si (2022) finds that the expansion of higher education in China in 1999 actually makes Chinese women more conservative in gender attitudes. This seemly surprising result comes from a worse labor market for women relative to men, that expansion of higher education makes women work less, leading to conservatism in gender for women.<sup>32</sup>

Table 10 presents the effects of years of schooling on trust and misanthropy for people married early and with low educated parents. I constrain the sample to individuals whose marriages are affected by the *Compulsory Schooling Law*, so that both key channels exist: the channel of the schooling on marriage, and the channel of marriage on gender role attitudes. Individual exposure to the *Compulsory Schooling Law* is the instrumental variable for the years of schooling. From Column (1) to Column (4) in Table 10, the effects of years of schooling on trust and misanthropy

<sup>&</sup>lt;sup>32</sup>In this paper, from the discussion about empirical results on the difference between one IV and two IVs in the appendix, I conclude that the source of variation from the *Compulsory Schooling Law* to bring changes on attitudes comes from the marriage market, other than the labor market.

	Index of all	Ability	Career	Housework	Marry	Work
	(1)	(2)	(3)	(4)	(5)	(6)
years of schooling	-0.009	-0.122	-0.058	0.182*	0.003	-0.052
	(0.069)	(0.125)	(0.139)	(0.102)	(0.125)	(0.080)
Cragg-Donald F-stat	14.3	14.3	14.3	14.3	14.3	14.3
Kleibergen-Paap F-stat	14.3	14.3	14.3	14.3	14.3	14.3
Wu-Hausman p-value	0.446	0.103	0.377	0.093	0.688	0.334
Individual controls	Yes	Yes	Yes	Yes	Yes	Yes
FE of province	Yes	Yes	Yes	Yes	Yes	Yes
FE of survey years	Yes	Yes	Yes	Yes	Yes	Yes
FE of province * years	Yes	Yes	Yes	Yes	Yes	Yes
Observations	$1,\!312$	$1,\!312$	1,312	$1,\!312$	1,312	1,312
$\mathbb{R}^2$	0.193	0.017	0.157	-0.006	0.165	0.136

Table 11: The effects of the Compulsory Schooling Law on gender role attitudes by the channel of education, for single women

*Notes:* All sample are married individuals born after 1960 and before 1993 and are constrained to women. Individual controls include age, years of schooling of father and mother, ethnicity, and hukou. There is no age square in all the regressions here, as after controlling age square, the law would have no effect on the years of schooling, while this is not the case for married men and women. For married sample, whether controlling age square or not, the results are stable. Standard errors are adjusted for clustering at province \* survey year. The null hypothesis of the Wu-Hausman test is that the OLS estimates are consistent. Significance: \*p<0.1; \*\*p<0.05; \*\*\*p<0.01. Data source: CGSS 2010, 2012, 2013, 2015, 2017

are all insignificant for both men and women. As a result, the increased years of schooling following the *Compulsory Schooling Law* do not have a significant effect on trust and misanthropy.<sup>33</sup> Since this empirical result shows that the direct nurturing effect does not exist, it is marriage, other than the extra years of schooling, which leads to the evolving of gender role attitudes.<sup>34</sup>

I now present the effect of education on gender role attitudes for single women as additional evidence to rule out the direct nurturing effect in the 1986 law context. Table 11 presents the

 $<sup>^{33}</sup>$ To be noticed, this conclusion only sticks into this *Compulsory Schooling Law* context, not for general results of education on trust or misanthropy. Besides, the surprising result from Si (2022) is that expansion of higher education in 1999 in China even makes Chinese women more conservative in gender role attitudes.

<sup>&</sup>lt;sup>34</sup>In addition, because the law of individuals' spouses cannot influence individuals' own education, it is inappropriate to add the law on the spouses as an additional IV. Even the impact of the law on the spouses is treated as an IV, the results all stay. Besides, if the sample of men and women are pooled, all results also stay. These results further support the causal relationship between marriage and gender role attitudes, as the impact of the law on spouses can only influence the individuals after they get married.

coefficients of years of schooling on the five specific gender role attitudes for all single women. All results except in Column (4) are insignificant. Nevertheless, the  $R^2$  is negative, meaning that the regression itself does not fit. In addition, after the sample is separated into single women with low educated parents and other parents, all estimations get insignificant results.<sup>35</sup> I conclude that the significant result in Column (4) is mostly a statistic phenomenon, and is unlikely due to real changes in the society.

## 7 Mechanism Analysis: Socialization and Self-deception

There are two potential mechanisms to explain how and why marriage only makes women more conservative: socialization and self-deception. For socialization, married women gradually internalize traditional gender norms in marriage in which they observe, talk to and interact with people around them. Married women experience horizontal and oblique social learning, and traditional gender norms are transmitted. Self-deception theory supplies a different explanation, stating that married women do not really believe the gender role attitudes they say they believe. They manipulate their memories by selecting preferable information to feel better, and deceive themselves in the direction of conservatism.

In this section, First, I discuss the unequal gender relations in marriage and scrutinize the meaning of socialization embedded in gender inequality. Highlighting the conflict-ridden feature in socialization of marriage, I conclude that women in more unequal status have to follow the socialization more than other women, and experience bigger change. Second, I discuss how individuals deceive themselves for affective and instrumental reasons and manipulate their beliefs, and further analyse how self-deception could explain the different evolving pattern of gender role attitude for men and women. At last, I discuss the challenge of endogeneity of gender norms to welfare economics.

<sup>&</sup>lt;sup>35</sup>These results are available upon request.

#### 7.1 Socialization and cultural transmission

Marriage as an institution supplies a new incentive structure for women to socialize as married women. In this process, those women further develop their awareness of gender norms and values, and achieve the sense of self as a married woman.<sup>36</sup> Traditional gender norms are transmitted through horizontal and oblique social learning, when married women interact with their peers and senior generations in the above-mentioned process. A critical point here is that, generally, socialization is unpleasant and not smooth, and is a conflict-ridden and emotion-laden affair, which indicates unequal power relations. As a result, the purpose and the subsequent results from socialization and cultural transmission are not for objective truth about the world, such as scientific knowledge or philosophic and practical wisdom, but social norms and values clinging to specific social context.

The analysis above implies that marriage as an institution reproduces unequal gender relation, enforces horizontal and oblique learning for married women, and transmits traditional gender role attitudes. To test whether socialization is one mechanism in the context of marriage, I need to estimate the effect of power relations among couples on gender role attitudes. For this purpose, I first argue that marriage indeed systematically reproduces an unequal gender relation. I then introduce the measurement of power relations among couples and do the estimations.

As a gendered system, marriage reproduces a long-lasting unequal gender relation. Firstly, the tradition of female hypergamy paves the road to the long-lasting gender inequality during marriage. Women are prone to marry up in terms of education, income, social status, and so on (Ong, Yang, and Zhang 2020, Yu and Xie 2015). This matching pattern implies an unequal power relation between men and women after they get married. One consequence of unequal gender relation is that married women generally have low social support. They have low participation in social activities, such as gathering with friends, and constrained exchange of information, such as reading books or surfing online.

<sup>&</sup>lt;sup>36</sup>Description of this process is based on the definition of socialization. According to Giddens and Sutton (2021), socialization is social processes through which individuals develop awareness of social norms and values and achieve a distinct sense of self.

Secondly, patrilocality creates a local environment of daily life favoring men. Because of this living arrangement, only men inherit their parents' property and housing because daughters will leave parents' homes to live with their husbands' families after they are married (Ebenstein 2021, Bau and Fernández 2021). As a result, women get low investment in health and human capital when they are in their original families during childhood (Bau 2021), and this situation of low status persists after they live in their husbands' original families (Gottlieb and Robinson 2016). Besides, women depend on themselves to interact with their husbands' families in their daily lives and lack support from their own original families. If there is conflict, it is difficult for a married woman to fight back because of their lack of social support. Specifically, China has a patrilocal culture. Women move to their husbands' original families and live with their husbands' parents and other relatives. In 2010, almost 75% of married women lived with their husbands' parents or lived in the same village/community in China (Gruijters and Ermisch 2019). This residential arrangement resocializes Chinese married women in the direction of low status in the family.

Thirdly, social expectation on women is strongly related to being good wives and mothers, resulting in low participation in public affairs and social ambitions (Beauvoir 1949). Social expectations and social image are very powerful, economically and psychologically (Butera et al. 2022, Bursztyn and Jensen 2017). Especially for married women, these social expectations further push them into private spheres, forging an unequal gender relation.

The review above emphasizes that marriage as an institution indeed reproduces gender inequality among married men and women. Empirically, to study whether power relations of gender in marriage result in conservatism of gender role attitudes, I have to measure the power relations among couples.

One measurement of the power relations and the agency of women in a couple is the age gap between husbands and wives, as it is associated with patriarchy families and gender inequality (Carmichael 2011, Van de Putte et al. 2009, Mu and Xie 2014). This is the case especially in developing countries like China. During the process of marketization in China, the gender earning inequality among couples has increased, and age gap has expanded (Mu and Xie 2014). The study

	gender ro	le attitudes
	Men	Women
	(1)	(2)
OLS estimation		
age gap	-0.002	-0.002
	(0.003)	(0.003)
R <sup>2</sup>	0.097	0.159
2SLS estimation		
age gap	0.001	$-0.014^{***}$
	(0.003)	(0.004)
Cragg-Donald Statistic (F-stat)	3,092.0	1,300.2
Kleibergen-Paap Statistic (F-stat)	1,616.1	279.9
Hausman test (p-value)	0.445	0.001
R <sup>2</sup>	0.097	0.156
Individual controls	Yes	Yes
Fixed Effects	Yes	Yes
Observations	$6,\!661$	7,021

Table 12: The age gap and gender role attitudes in low educated families

*Notes:* All sample are married individuals born after 1960 and before 1993 and with low educated parents. Individual controls include age, age squared, ethnicity, hukou, years of schooling of oneself and spouses. Fixed effects include province, survey year, and the interaction of province and survey year. Standard errors are adjusted for clustering at the province \* survey year. The null hypothesis of the Wu-Hausman test is that the OLS estimates are consistent. Age gap is the gap between husbands and wives, and is measured as age of husbands minus age of wives.

Significance: \*p<0.1; \*\*p<0.05; \*\*\*p<0.01. Data source: CGSS 2010, 2012, 2013, 2015, 2017

of Brandt, Siow, and Vogel (2016) also gives similar evidence. Using the 1982 census and the 1990 census, the authors find that the total gains<sup>37</sup> from marriage is the highest among the couples with 0 to 4 years of age gap (age of husbands - ages of wives). This is especially the case when the cohorts are born in the Great Famine (1958-1961) in China. The total gains from marriage drop sharply when wives are a bit older than the husbands, while the attraction and gains drop slowly even if husbands are 5 or more years older than the wives.

Table 12 reports the estimates of the age gap on the gender role attitudes for individuals in

<sup>&</sup>lt;sup>37</sup>The total gain is the gains from marriage relative to keeping single. The measurement is a probability that if two individuals of specific types are randomly picked, the two individuals are married relative to remaining single.

	Fri	ends	O	nline	Rea	ding
	Men	Women	Men	Women	Men	Women
	(1)	(2)	(3)	(4)	(5)	(6)
age gap	-0.008	$-0.013^{**}$	0.002	$-0.031^{***}$	0.001	-0.001
	(0.006)	(0.006)	(0.008)	(0.009)	(0.007)	(0.008)
Cragg-Donald F-stat	3,085.2	1,266.8	3,085.2	1,266.8	3,085.2	1,266.8
Kleibergen-Paap F-stat	1,618.1	275.0	1,618.1	275.0	1,618.1	275.0
Hausman test (p-value)	0.113	0.048	0.0001	0.0001	0.158	0.786
Individual controls	Yes	Yes	Yes	Yes	Yes	Yes
Fixed effects * year	Yes	Yes	Yes	Yes	Yes	Yes
Observations	$6,\!629$	$6,\!981$	$6,\!629$	$6,\!981$	$6,\!629$	$6,\!981$
$\mathbb{R}^2$	0.117	0.116	0.443	0.451	0.268	0.291

Table 13: The 2SLS estimation of age gap on daily life, for individuals in low educated families

*Notes:* All sample are married individuals born after 1960 and before 1993 and with low educated parents. The null hypothesis of the Wu-Hausman test is that the OLS estimates are consistent. Standard errors are adjusted for clustering at the province \* survey year. Age gap is the gap between husbands and wives, and is measured as age of husbands minus age of wives. Friends measure the frequency to gather with friends in the last survey year. Online measures the frequency of going online in the last survey year. Reading measures the frequency of reading in the last survey year. For all three frequency measurement, the high the value, the more frequency the activities have. Every regression controls personal characteristics of hukou, ethnicity, age, age square, years of schooling of oneself and her/his spouse, and also controls fixed effects of province, survey year and intersection of province and survey year. Significance: \*p<0.1; \*\*p<0.05; \*\*\*p<0.01. Data source: CGSS 2010, 2012, 2013, 2015, 2017

low educated families, and the *Compulsory Schooling Law* of the individuals and their spouses are two instrumental variables. In the OLS estimation in Table 12, the age gap does not correlate with both men's and women's gender role attitudes. In the 2SLS estimation part in Table 12, age gap has no significant effect on gender role attitudes of married men in Column (1), while 1 year of age gap decreases 0.014 gender role attitudes for wives in Column (2). A one standard deviation increase in the age gap is associated with negative change in gender role attitudes by 0.068 standard deviations. The results show that the unequal power relations in marriage make women more conservative in gender role attitudes. Since power relations among couples affect women's gender role attitudes, marriage as an institution indeed hammers out traditional gender role attitudes for married women.

Table 13 further analyzes the specific consequences of impact of unequal gender relations in

marriage. This table presents the estimation of age gap on the frequency of gathering with friends, surfing on the internet and reading books for both men and women in low educated families. The effect of the age gap on the frequency of gathering with friends for women is significant and is -0.013 for women in Column (2), while the effect on surfing on the internet is also significant and equals to -0.031. Both effects are insignificant for men in Column (1) and Column (3). The magnitude of the results for women is not very large. An increase of one standard deviation of age gap is associated with a negative change of frequency of gathering with friends by 0.047 standard deviations, and a reduction of frequency of surfing online by 0.065 standard deviations. Besides, the age gap has no significant effects on reading for both men and women, as shown in Column (5) and (6). In summary, inequality in the marriage indeed changes women's life style, constraining women's social life and limiting their use of internet. Their behaviors exhibit the obedience or internalization of the traditional gender norms.

### 7.2 Motivated reasoning and self-deception

People deceive themselves on various beliefs, including beliefs about the society and about themselves. Self-deception or the formation of motivated beliefs is either for affective reasons (to feel better) or for instrumental reasons (to perform better) (Bénabou and Tirole 2002, Bénabou and Tirole 2011, Bénabou 2015). The motivated reasoning is based on morality and future fate in specific social environments (Bénabou 2015). Akerlof and Dickens (1982) firstly introduce in economics that people have some controls on their beliefs and they can manipulate their beliefs by selecting information. In the subject of psychology, individuals are prone to manipulate their self-concept especially when they have negative self-conceptions. Negative self-conceptions trap individuals in a crossfire between self-verification (what kind of person I truly am) in a cognitive system and self-enhancement (what kind of person I would like to be) in an affective system (Swann 1987). Empirically, people indeed manipulate their memories and deceive themselves purposely to feel better about themselves or to get economic benefits (Zimmermann 2020).

Identity includes a set of beliefs (Bénabou and Tirole 2016). Specifically, identity of mar-

	happi	iness		satisfac	tion abou	t life in n	narriage	
			marr	iage	econo	omics	house	work
	women	men	women	men	women	men	women	men
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
social image	$0.243^{***}$ (0.068)	-0.002 (0.064)	$\begin{array}{c} 0.112^{***} \\ (0.041) \end{array}$	$0.038 \\ (0.037)$	$0.098^{**}$ (0.042)	0.037 (0.040)	$\begin{array}{c} 0.145^{***} \\ (0.046) \end{array}$	0.004 (0.038)
Individual controls	yes	yes	yes	yes	yes	yes	yes	yes
FE individual	yes	yes	yes	yes	yes	yes	yes	yes
FE year	yes	yes	yes	yes	yes	yes	yes	yes
Observations	$10,\!684$	10,381	$10,\!684$	10,381	$10,\!684$	10,381	$10,\!684$	10,381
$\mathbb{R}^2$	0.777	0.773	0.694	0.680	0.707	0.681	0.732	0.690

Table 14: The welfare effects of social image concerns for married men and women

*Notes:* social image is measured as how much the individuals obey the majority in gender norms. When social image is positive, the individual is more conservative in gender role attitudes than the community on average; when social image is negative, the individual is more liberal. Individual controls include age, age squared, age of the spouses, years of schooling of married women and their spouses, yearly income, and health, gap of gender role attitudes between oneself and the spouse, happiness of the spouse, and average happiness in the community. Significance: \*p<0.1; \*\*p<0.05; \*\*\*p<0.01. Data source: CFPS 2014, 2020

ried women implies and favors the social role of women being a good wife, a good mother, and other series of social roles in private sphere for women, while gender role attitudes include beliefs about which social roles married men and women should take. According to the theory of motivated beliefs, married women have the motivations to be self-deceiving in the direction of being conservative in gender role attitudes.

Theories of motivated beliefs or self-deception can explain why only married women change their beliefs. The model of motivated beliefs within social groups, in the paper by Bénabou (2015), explains how individuals manipulate their beliefs in the condition of payoffs in bad state. The propositions from the model is that, if the payoff in bad state is positive, then individuals are prone to accept the reality, when others in the group deny the reality; if the payoff in bad state is negative, then individuals are prone to deny the reality, when others deny the reality; if the payoff in bad state is 0, then there is no relationship between individual self-deception and collective self-deception. I apply these propositions for married men and women in terms of gender role attitudes. The reality for people with relatively progressive gender attitudes is that they believe women are as good as men in abilities, and men have the same responsibilities in the family like women, etc. The bad situation is that men and women disobey the traditional gender norms. According to the propositions by Bénabou (2015), if the payoff to disobey the gender norm is positive, then when other people in the social groups do not believe gender equality, these people would hold on their progressive gender attitudes. In contrast, if the payoff to disobey the gender norm is negative, then when other people do not believe gender equality, these people are prone to deny the reality, and deceive themselves that women actually have to focus more on the families than men.

In the Chinese context, the payoff to disobey gender norms is negative for women, so that women do the motivated reasoning and deceive themselves that women have to focus on the families other than careers. That is to say, married women become more conservative in gender role attitudes. In contrast, the payoff to disobey gender norms is zero for men on average, so that men do not do the motivated reasoning in terms of gender role attitudes.

To test the hypothesis, I need to prove that the average payoff to disobey gender norms is negative for married women and zero for married men. For this purpose, I use a national longitudinal general social survey in China, *China Family Panel Studies* (CFPS), in 2014 and 2020. Equation 5 is the regression of social image concerns (obedience of the local gender norms) on the subjective well-being.

$$SWB_{ict} = \gamma_1 social \ image_{ict} + \gamma_2 X_{ict} + i + t + \epsilon_{ict} \tag{5}$$

where SWB is the subjective well-being of individual *i* in community *c* in year *t*; social image concerns, defined as how others perceive oneself (Leary 2007), is constructed as the level of obeying the local gender norms;<sup>38</sup>  $X_{ict}$  is a vector of individual characteristics, including age, age squared, age of the spouses, years of schooling of self and the spouse, yearly income, health, gap of gender

<sup>&</sup>lt;sup>38</sup>Social image is measured as individual's gender role attitudes minus the community's gender role attitudes. Community's gender role attitudes are the average gender role attitudes in each community. When the value of social image is positive, the individual is more conservative in gender role attitudes than the community on average; when the value of social image is negative, the individual is more liberal.

	happ	piness		satisfac	tion abou	ıt life in m	arriage	
			mar	riage	econ	omics	hous	ework
	large	little	large	little	large	little	large	little
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
social image	$0.196 \\ (0.119)$	$\begin{array}{c} 0.257^{***} \\ (0.082) \end{array}$	$0.082 \\ (0.087)$	$0.126^{***}$ (0.046)	-0.020 (0.088)	$0.143^{***}$ (0.048)	0.061 (0.098)	$0.173^{***}$ (0.051)
Individual controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Individual FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,905	7,779	2,905	7,779	2,905	7,779	2,905	7,779
$\mathbb{R}^2$	0.772	0.780	0.682	0.702	0.708	0.708	0.720	0.736

Table 15: The heterogeneous welfare effects of social image for married women by natal family support

*Notes:* Samples are restricted to married women by natal family support. Large and little represent the level of support which women get from their natal families. Social image is measured as how much the individuals obey the majority in gender norms. When social image is positive, the individual is more conservative in gender role attitudes than the community on average; when social image is negative, the individual is more liberal. Individual controls include age, age squared, age of the spouses, years of schooling of married women and their spouses, yearly income, and health, gap of gender role attitudes between oneself and the spouse, happiness of the spouse, and average happiness in the community. Significance: \*p<0.1; \*\*p<0.05; \*\*\*p<0.01. Data source: CFPS 2014, 2020

role attitudes between oneself and the spouse, happiness of the spouse and the community.

Subjective well-being is the measurement of individual payoff. I use 4 survey questions to measure the subjective well-being for married men and women in China. In particular, the CFPS survey asks respondents to score their subjective well-being: 1), how happy are you in general; 2), in general, are you satisfied with your current marriage; 3), are you satisfied with the economic contribution that your spouse makes to the family; 4), are you satisfied with the contribution on housework that your spouse makes to the family.

If the theory of motivated beliefs is correct, then  $\gamma_1$  should be positive for married women and insignificant for married men: the welfare effect of disobeying the norms, or the payoff in the bad state, is negative for women and zero for men. To be noticed, social image in bad state is disobeying the local gender norms, and in this case the measurement of social image is negative.

Table 14 presents the welfare effects of social image for married men and women. Social

image is positively correlated to 4 SWB for married women in Column (1), (3), (5) and (7), while the correlation is insignificant for married men in the left columns. This is to say, positive (negative) social image significantly corresponds with increasing (decreasing) subjective well-being for women, while it has insignificant influences on subjective well-being for men. In summary, in bad state or if women disobey the local gender norms, their payoff is negative. According to motivated theory, women respond to deceive themselves by manipulating their memories and selecting preferable information, and become more conservative. For men, they have no incentive to deceive themselves in gender role attitudes.

To further test the self-deception theory, let's consider the influence of social support which individuals have. If a woman has social support from her natal family, then she has small incentive to concern her social image and is able to fulfill her willpower. Natal family support is measured by whether the individual gets the following support either from her father or her mother: 1), whether gets economic support; 2), whether gets money; 3), whether get help on housework; 4) frequency to contact and visit in person. If a woman get one kind of support at most in the above 4 categories either from her father or from her mother, I define her getting little support from her natal family. Otherwise, I define her getting large support.

Table 15 presents the results of heterogeneous welfare effects of social image for married women by natal family support. In the even columns, for women who get little support from their natal families, social image corresponds with positive happiness and satisfaction about life in marriage. This result also means that disobeying local gender norms significantly corresponds with decreasing subjective well-being. As a result, those women are prone to be self-deceiving. In contrast, for women who get large support from their original families, social image concerns have insignificant influences on their subjective well-being. As a result, those women have no incentive to deceive themselves in gender role attitudes.

In comparison, results in Table 12 suggest that women in low status internalize the traditional gender norms more than other women. Nevertheless, it is difficult to distinguish these two mechanisms, because socialization and self-deception work in the same direction: gender inequality decides the intensity of both socialization and motivated reasoning. In other words, women who have to socialize the most in the direction of conservatism also do the most self-deception.

# 7.3 Further discussion: long-lasting challenge of endogeneity of gender norms to welfare economics

Adaptation of gender role attitudes activates the enduring challenge of endogeneity of preference to welfare economics (Lundberg 2022). Solving social problems such as inequality and poverty by evolving individual preferences is disappointing. Specifically, when thinking about changing gender role attitudes in marriage, it is straightforward to ask this questions: is it really goodness that by obeying the traditional gender norms, women feel happier and more satisfied about their spouses? Empirically, in Table 14, being more conservative than people on average is indeed correlated with higher subjective well-being for women.

In this paper, if the mechanism is only self-deception, one can argue that this kind of change is suspicious to count as real change: if those individuals suddenly move to a gender-friendly environment, they would come back to their real beliefs. However, there is also the mechanism of socialization, while socialization perseveres the challenge of endogeneity of preferences to welfare economics. For socialization, the values and beliefs from internalization of social norms is real and sticky. Women gradually internalize the ethical judgements that it is the right thing for women to mainly take care members in the family, for men to fulfill social ambitions as breadwinners. For those women, no matter where they move later, their preferences and beliefs are sticky.

It is tough to handle the challenge of the change of preferences and beliefs for disadvantage groups just by observing their attitudes alone. From the macro and long-term perspective, people's attitudes are malleable in either traditional or liberal direction. Although it is beyond this paper's exploration, it is pertinent and valued to discuss the severe challenge in the context of evolution of gender norms.

If a woman in severe deprivation is told that if she accepts and obeys her deprived situation, she would be treated nicer, what is the ethical judgement in this situation? If a woman wants to fit in the society to get opportunities and resources, which are mostly in the hand of men, is it still meaningful to distinguish socialization and self-deception? To judge whether the evolving gender role attitudes are good or not, it is necessary to add principles which are able to bring women the improvements in reality.<sup>39</sup> Increased subjective well-being of individual women is not necessary to make the judgement. The inequality in reality, such as deprived opportunities in careers and sex-selective abortion, would always keep the challenge of endogeneity of gender norms to women's welfare. Specifically, marriage socializes women towards conservatism in the whole, but it is still challenging to make general judgements about welfare variation for each individual woman.

## 8 Robustness Checks

This section presents two robustness checks. First, I provide evidence that the impact of the *Compulsory Schooling Law* is not simply mechanic, resulting from the postponement of marriage due to the extra years spent at school. Second, I rely on alternative measures of gender role attitudes to confirm whether the main results hold using these measures.

In the main analysis, I argue that in addition to mating effect, increased schooling leads to marriage postponement through a human capital mechanism (Chiappori, Iyigun, and Weiss 2009, Luo et al. 2020). That is, more educated individuals, especially women, have a higher opportunity cost to marry early. However, there might be mechanical postponement of marriage due to the increased years of schooling. In that case, we would expect that the *Compulsory Schooling Law*, requiring students staying in school until at least 15 years old, would reduce the probability of marrying before age 16. I only consider individuals marrying before 20 or even younger. For both men and women, I use two subsamples, one for age at first marriage between 12 and 18 and the other for marrying between 12 and 20. Results should be similar in both subsamples.

I use a logit model to test whether this is the case. The logit model is the following:

$$P(child \ marriage_{ipct} = 1) = \Lambda(\omega_1 exposure_{ipct} + \omega_2 Xipct + \lambda_p + \sigma_t + \delta_{pt} + \eta_{ipct}), \tag{6}$$

<sup>&</sup>lt;sup>39</sup>Amartya Sen brings the concept of capability as an additional principle or constraint to consider welfare.

In this equation,  $\Lambda(Z) = \frac{e^Z}{1+e^Z}$ , and P() means probability. Besides, *i* indexes individual, *p* indexes province, *c* indexes cohort, *t* indexes survey years. *child marriage* is equal to 1 when the individual marries between 12 and 15; *exposure* is the impact of the *Compulsory Schooling Law* on individuals; *X* is individual characteristics, including hukou and ethnicity;  $\lambda$  is fixed effect of province;  $\sigma$  is fixed effect of survey year;  $\delta$  is fixed effect of intersection of survey year and province;  $\eta$  is the error terms. A negative  $\omega_1$  is expected if the mechanical mechanism exists.

		probability of a	child marriage	
-	M	ale	Fen	nale
-	(1)	(2)	(3)	(4)
exposure to the law	-1.758	-0.076	-0.493	-0.539
	(1.122)	(0.641)	(0.402)	(0.348)
Sample: age at first marriage	12 - 18	12 - 20	12 - 18	12 - 20
Individual controls	Yes	Yes	Yes	Yes
FE of province	Yes	Yes	Yes	Yes
FE of survey year	Yes	Yes	Yes	Yes
FE of province * year	Yes	Yes	Yes	Yes
Observations	189	887	613	2212

Table 16: The probability of marrying before 16 by gender

*Notes:* All samples only include respondents born between 1960 and 1993 and with low educated parents. Individual controls include hukou and ethnicity. The probability model is logit. When an individual marries between 12 and 15, the dependent variable of the logit model is 1, otherwise is 0. Significance: p<0.1; p<0.05; p<0.05; p<0.01

Data source: CGSS 2010, 2012, 2013, 2015, 2017

Table 16 represents the probability of marrying between 12 and 15 by gender. In all columns, the coefficient of exposure to the law is insignificant, showing that the *Compulsory Schooling Law* does not significantly reduce the probability of marrying before 16. This result supports that the mechanism of this law is not mechanic.

I also checks robustness by using two principal components of gender role attitudes to test the former two paths by gender and age at first marriage. Overall, for principal component 1, which captures the largest variation of 5 specific gender role attitudes, results are similar with Table 5. For principal component 2, whose eigenvalue is only 1.02 and most captures the variation of gender role attitudes of housework, the results are insignificant. Table 22 in the Appendix shows all the estimating results of the two PCs.

# 9 Conclusion

This paper is among the first to empirically examine the importance of marriage in shaping gender roles attitudes. Conceptually, discussions on how marriage supplies an incentive structure for men and women to socialize, either hammering out their daily life and personal perceptions, or activating motivated reasoning and self-deception, etc., are well developed in disciplines other than economics such as sociology, cultural anthropology and psychology. In those fields, discussions are mainly qualitative and normative. Nevertheless, studies in economics pay a little attention on whether or how marriage (a kind of social arrangement of family) empirically influences gender role attitudes. As Fernández (2018) said, it is strange that economics has not examined the interplay between family arrangement and culture related to gender. One empirical difficulty comes from the endogeneity between marriage and gender role attitudes. By dealing with this endogenous problem, this paper sheds light on the understudied role of marriage as an institution in the formation of gender role attitudes.

To deal with potential reverse causality concerns between marriage and gender role attitudes, I employ the *Compulsory Schooling Law* as an exogenous source of variation for exposure to marriage. Specifically, I use two instruments: exposure to the *Compulsory Schooling Law* for oneself and exposure to the *Compulsory Schooling Law* for the spouse. These two instruments allow me to consider two channels of increased years of schooling on exposure to marriage: a labor market channel and a marriage market channel. I find that the *Compulsory Schooling Law* of the spouse (marriage market channel) provides most of the variation in an individual's exposure to marriage. The main results of the paper show that marriage as an institution indeed holds women back in terms of their gender role attitudes. Those results are consistent with theory of socialization and self-deception in marriage as an institution, as well as the role of personal life experiences and the impressionable years hypothesis. This paper's main results suggest that encouraging young women to postpone marriage after early adulthood can contribute to making their gender role attitudes more progressive. On the contrary, public policies and laws, such as lowering the legal age of marriage or setting up barriers to divorce, may contribute to making women more conservative. This paper also suggests that reshaping conservative gender role attitudes in low and middle income countries is particularly challenging. This is the case because in low and middle income countries, marriage is the dominant way for people to build their families and create their lives. It is difficult for women in those countries to bear the social pressure to marry later or stay single. Nevertheless, as I confess before, although marriage socializes women towards conservatism in the whole, it is still challenging to make general judgements about welfare variations for each individual woman. Improvements in reality, such as prohibition of sex-selective abortion, enforcement of equal pay for men and women, institutional intolerance of domestic violence in the families and sexual harassment in the firms, etc, are indispensable to relieve the plight for women.

There are a few limitations of this study. First, the empirical analysis focuses on the sample of married individuals because of the high prevalence of marriage in China and because of the nature of the data (repeated cross-section). Comparing single and married individuals is direct if panel datasets were available. Second, the impact of marriage on gender role attitudes may depend on the country's prevalence of marriage. In high income countries, the deinstitutionalization of marriage implies that marriage may becomes a symbol of successful life (Cherlin 2004). Whether exposure to marriage in such a context still matters (and how) is an empirical question.

In future research, it might be insightful to study gender role attitudes as a function of other family arrangements. For example, public childcare services substitute part of social arrangements to look after the children in the families, and supply a quasi-experience to explore how the interaction of formal governance and family arrangement affects individuals' gender role attitudes.

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# Appendix

Province	Law Effective year	Male illiteracy	Female illiteracy	Gender gap
Beijing	1986	7.75	22.30	14.55
Tianjin	1987	8.38	26.25	17.87
Hebei	1986	17.54	42.08	24.54
Shanxi	1986	15.97	33.46	17.49
Neimenggu	1989	21.68	41.48	19.80
Liaoning	1986	10.02	23.38	13.36
Jilin	1987	14.97	28.93	13.96
Heilongjiang	1986	14.35	30.39	16.04
Shanghai	1987	7.39	25.86	18.47
Jiangsu	1987	19.25	50.39	31.14
Zhejiang	1986	19.12	44.22	25.10
Anhui	1987	29.57	64.12	34.55
Fujian	1988	18.32	57.06	38.74
Jiangxi	1986	16.85	48.35	31.50
Shandong	1987	21.68	52.10	30.42
Henan	1987	23.36	50.96	27.60
Hubei	1987	17.74	45.20	27.46
Hunan	1991	13.18	35.48	22.30
Guangdong	1987	9.15	37.10	27.95
Hainan	1992			
Guangxi	1991	12.25	38.56	26.31
Sichuan	1986	19.77	44.98	25.21
Chongqin	1986	19.77	44.98	25.21
Guizhou	1988	29.33	67.37	38.04
Yunnan	1987	34.47	64.37	29.90
Tibet	1994	61.53	84.33	22.80
Shaanxi	1987	22.31	44.91	22.60
Gansu	1991	32.66	64.65	31.99
Qinghai	1989	31.87	62.77	30.90
Ningxia	1986	29.48	57.59	28.11
Xinjiang	1988	25.43	36.37	10.94

Table 17: Effective year of compulsory schooling law and initial illiteracy by province level in 1982

*Notes:* Male (female) illiterate percentage is the percentage of illiterate and semi-illiterate men (women) aged 12 and older in all men aged 12 and older in 1982. Gender gap of illiteracy is the gender gap of percentage of illiterate and semi-illiterate people aged 12 and older in 1982 between men and women. Hainan province was part of Guangdong province before 1988. As a result, Hainan does not have values for illiteracy. Data source: 1982 population census of China

#### Determinants of the Law

For a rigorous consideration, let's assume that the different initial education level among provinces have an effect on the implementation of compulsory schooling laws, and think about how this would affect the exogeneity of the the law and its effect on schooling.

Let's assume the true model of the law on schooling is as following:

 $schooling_{itp} = \eta_1 law_{pt} + \eta_2 illiterate_{p,1982} + \eta_3 X_{itp} + e_{itp},$ 

where  $schooling_{ip}$  is years of schooling of individual *i* in province *p* in year *t*;  $law_{pt}$  is whether province *p* has the law in year *t*;  $illiterate_{p,1982}$  is the illiterate situation in province *p* in 1982;  $X_{itp}$  is individual *i*'s characteristics. I assume that for a low illiterate province, individuals in this province would have higher years of schooling; and for a high illiterate province, individuals in it would have low years of schooling. As a result,  $\eta_2$  is negative.

If I omitted the variable *illiterate*<sub>pt</sub>, it would have no consequences for the estimation insofar as *illiterate*<sub>pt</sub> has no relationship with  $law_{pt}$ . If these two variables are correlated, then the effect of the law on schooling would be biased. This biased model would become *schooling*<sub>itp</sub> =  $\eta_1 law_{pt} + \eta_3 X_{itp} + v_{itp}$ , and the estimate of  $\eta_1$  would become

$$\hat{\eta_1} = \eta_1 + \eta_2 \frac{cov(illiterate_{p,1982}, law_{pt})}{var(illiterate_{p,1982})}$$

, where the  $\frac{cov(illiterate_{p,1982}, law_{pt})}{var(illiterate_{p,1982})}$  is the estimate of the regression of law on illiterate. It is showed as following:  $law_{pt} = \rho_0 + \rho_1 illiterate_{p,1982} + \sigma_{pt}$ .

And then I could rewrite the equation of estimate of  $\eta$ , as  $\hat{\eta}_1 = \eta_1 + \eta_2 \rho_1$ . If  $\rho_1$  is positive, then  $\hat{\eta}_1$  would be smaller than  $\eta_1$ . In this case, the effect of the law would be under-estimated, which is not a serious problem. However, if  $\rho_1$  is negative,  $\hat{\eta}_1$  would be larger than  $\eta_1$ , and the effect of the law on schooling would be over-estimated. If this negative effect is large, it would make the eligibility of the law weak.

### Placebo test of the law

	Cohorts aged 16 to 25 at the true reform year with a placebo reform year 5 years in advance OLS Estimation of Reform on Schooling	
	Male	Female
All sample	7.130	3.600
	(6.400)	(7.063)
Observations	5,481	$5,\!464$
$\mathbb{R}^2$	0.296	0.366
Parents with low education	6.323	5.883
	(7.230)	(8.003)
Observations	$3,\!975$	$3,\!873$
$\mathbb{R}^2$	0.240	0.295
Parents with junior education	35.710	4.624
	(29.973)	(17.985)
Observations	702	713
$\mathbb{R}^2$	0.447	0.505
Parents with senior education	37.388	17.071
	(30.002)	(36.359)
Observations	393	397
$\mathbb{R}^2$	0.535	0.562

Table 18: Placebo test of Compulsory Schooling Law on schooling

*Notes:* All sample are individuals born after 1960 and before 1993, both married and non married. Sample of parents with low education is for individuals whose both parents have 6 years schooling at most. Sample of parents with junior education is for individuals who has at least one parent with a junior middle school schooling. Sample of parents with senior education is for individuals who has at least one parent with a senior middle school schooling.

The coefficient in the table is the regression of schooling on the compulsory schooling law, which is measured by the exposure. Every regression controls personal characteristics of hukou, ethnicity, age and age squared, and also controls fixed effects of province, survey year and intersection of province and survey year.

Significance: \*p<0.1; \*\*p<0.05; \*\*\*p<0.01

Data source: CGSS 2010, 2012, 2013, 2015, 2017

Table 18 shows the result of a placebo test for the effects of the law on schooling for different

parent-education samples. A fake law is set effectively 5 years in advance in each province. The
sample is limited to individuals aged 16 to 25 at the true first eligibility reform year. This age range and fake reform year makes the faked exposed individuals equaling to the unexposed individuals. In table 18, in all sample and low-education-parents sample, for both men and women, the coefficients are insignificant. For individuals with junior and higher educated parents, the coefficients stay insignificant.

## One instrumental variable estimation and the discussion

Table 19 presents the results of the effects of exposure to marriage on gender role attitudes by gender with only one instrumental variable. Part A reports the results of reduced form of the estimation of the law on gender role attitudes. When the samples are separated for men and women, both effects of the law have no significant effects on gender role attitudes. However, if men and women are pooled together, the law significantly reduces men's gender role attitudes, while it significantly improves women's gender role attitudes. Part B presents the 2SLS estimation results of exposure to marriage on gender role attitudes with the law as the IV. Again, when the samples are separated for men and women, the exposure to marriage has no significant negative effects on gender role attitudes for both men and women; and when men and women pooled together, the exposure to marriage only significantly makes women more conservative.

The insignificant results in separated samples for men and women in Table 19 shows that the effects from variation of the labor market is very weak: one instrumental variable, the impact of the law on oneself, could capture the variation from the human capital effect and part of mating effect, and these two effects work in the same direction on exposure to marriage. In addition, when only the instrumental variable of the impact of the law on the spouses is used, the results in Table 5 stays. The results are available upon request.

In addition, results in Table 19 further rule out the concern that the empirical effect of marriage on gender role attitudes for married women directly comes from education. If this was the case, then one instrumental variable would bring the statistically significant result in Column (3) in Table 19. Since the law also has no effect on married men's gender role attitudes, the significant effect in Column (1) in Table 19 further confirms the channel in the marriage.

The significant result in Column (1) in Table 19 also lead to an obvious question: why are the results insignificant when the samples are separated, and significant for women when the samples are pooled? From the econometrics view, it is always good to have a larger sample than a smaller sample, and the results from a larger sample would be more precise, as the standard deviations are smaller in Column (1). To economically explain the different results between pooled sample

	gender role attitudes			
	All Men		Women	
	(1)	(2)	(3)	
Part A: Reduced form				
the schooling law	$-0.115^{***}$	0.008	-0.033	
<u> </u>	(0.034)	(0.044)	(0.044)	
the schooling law * female	0.182***	()	()	
	(0.025)			
$\mathbb{R}^2$	0.137	0.092	0.186	
Part B: 2SLS				
exposure to marriage	0.024	-0.007	0.031	
	(0.031)	(0.043)	(0.042)	
exposure to marriage * female	-0.011***		· · · ·	
	(0.002)			
$\mathbb{R}^2$	0.126	0.091	0.162	
Cragg-Donald Statistic (F-stat)	31.1	19.8	35.4	
Kleibergen-Paap Statistic (F-stat)		14.2	37.1	
Wu-Hausman test (p-value) 0.181	0.874	0.284		
Individual controls	Yes	Yes	Yes	
FE of province	Yes	Yes	Yes	
FE of survey year	Yes	Yes	Yes	
FE of province * year	Yes	Yes	Yes	
Observations	$21,\!325$	10,258	$11,\!067$	

Table 19: Without consideration of the influence of spouses: the effects of exposure of marriage on gender role attitudes, all married individuals, by gender

*Notes:* All sample are individuals born after 1960 and before 1993, married after 15. Every regression controls personal characteristics of hukou, ethnicity, age, age squared, years of schooling of oneself and her/his spouse, and also controls fixed effects of province, survey year and intersection of province and survey year. Standard errors are adjusted for clustering at province \* survey year.

Significance: \*p<0.1; \*\*p<0.05; \*\*\*p<0.01

Data source: CGSS 2010, 2012, 2013, 2015, 2017

and separate samples, one hypothesis is that the whole sample could capture the whole dynamic matching in terms of age at marriage, and then capture the variation of exposure to marriage from both sides, while the separated samples can only capture the variation of age at marriage from one side in the marriage. Specifically, spouses' education influences spouses' choices about age to marry, and also influences their matching choice based on the matching of education. As a result, education of the spouses could indirectly influence individuals' own choice about time to marry. In other words, the exposure to marriage of the individuals are influenced by both individuals and their spouses' education.

The assumption for this economic explanation is that the social characteristics of married women in the sample are exact the characteristics of wives of married men in the sample, and the social characteristics of married men are the characteristics of husbands of married women in the sample. This assumption is reasonable, as both married women sample and married men sample represent the populations of married women and men.

A second hypothesis is that, the evolution of conservative gender role attitudes for married women partly results from their husbands, as shown in Figure 3, that married women evolve their gender role attitudes conservatively to approach married men, other than that married men evolve liberally to approach women. Indeed, all results in Table 5 stay even if only one IV, the law of the spouse, is used in all estimations. What's more, the analysis in mechanism part in Section 7 presents that power relations in marriage narrow women's social life and limit their access to information on the internet, while power relations do not affect men. The estimation based on pooled data could capture the power relations among married men and married women. In summary, pooled data could help capture variation both in the matching process and power relations among married couples. The results in the pooled data give credits to the additional IV.

	Exposure to marriage			
	Low		High and Middle	
	Men	Women	Men	Women
	(1)	(2)	(3)	(4)
exposure to marriage	$-0.942^{**}$	$-0.984^{**}$	-13.990	-7.955
	(0.450)	(0.384)	(40.133)	(9.313)
Cragg-Donald Statistic (F-stat)	17.87	12.92	0.10	0.62
Kleibergen-Paap Statistic (F-stat)	19.7	13.3	0.12	0.73
Wu-Hausman test (p-value)	0.005	0.002	0.003	0.000
Individual controls	Yes	Yes	Yes	Yes
FE of province	Yes	Yes	Yes	Yes
FE of survey year	Yes	Yes	Yes	Yes
FE of province * year	Yes	Yes	Yes	Yes
Observations	$6,\!661$	7,021	$3,\!597$	4,046
R <sup>2</sup>	0.756	0.811	-10.479	-2.995

Table 20: The effects of marriage on gender role attitudes, by gender and family background

*Notes:* All sample are married individuals born after 1960 and before 1993. There is one instrumental variable, the impact of the law on oneself, in all the columns. Individual controls include age, age squared, ethnicity, hukou, years of schooling of spouses. Standard errors are adjusted for clustering at the province \* survey year. The null hypothesis of the Wu-Hausman test is that the OLS estimates are consistent. Significance: \*p<0.1; \*\*p<0.05; \*\*\*p<0.01. Data source: CGSS 2010, 2012, 2013, 2015, 2017

## Robustness Check: measurement of gender role attitudes by principle component analysis

Table 21 is the principal component analysis for these five attitudes. Only principal components (PCs) which has eigenvalue larger than 1 should be kept, so I only use first two principal components. According to panel A in table 21, these two PCs could explain 61.39% variations of the all variables of gender role attitudes, with PC 1 40.93% and PC2 20.46%. Besides, according to panel B, PC 1 is highly corrected to attitudes of career, marry, ability and work, while PC 2 is highly corrected to attitude of housework. According to the results in Table 6, the effect of exposure on gender role attitudes of housework is insignificant, so I predict that the result of PC 2 would also not be significant. Results in Table 22 are consistent with the predictions.

	Eigenvalue	Percent of variance	Cumulative percent
Principal Component 1	2.05	40.93	40.93
Principal Component 2	1.02	20.46	61.39
Principal Component 3	0.75	14.98	76.37
Principal Component 4	0.68	13.54	89.91
Principal Component 5	0.50	10.09	100.00

Table 21: Principal Component Analysis for 5 gender role attitudes

Panel B: Loadings of Principal Component 1 and 2

**Eigenvalues and Variances** 

Panel A:

		Principal Component 1	Principal Component 2
Attitude:	Housework	-0.02	0.96
Attitude:	Career	0.76	-0.04
Attitude:	Marry	0.70	-0.08
Attitude:	Ability	0.79	0.08
Attitude:	Work	0.58	0.34

Table 22: The effects of marriage on two principle Components of gender role attitudes, low educated families

	PC 1		PC 2	
	Men (1)	Women (2)	$\frac{\mathrm{Men}}{(3)}$	Women (4)
exposure to marriage	-0.003 (0.012)	$-0.097^{**}$ (0.044)	-0.002 (0.010)	-0.013 (0.032)
Cragg-Donald Statistic (F-stat)	537.8	64.8	537.8	64.8
Kleibergen-Paap Statistic (F-stat)	266.2	54.7	266.2	54.7
Hausman test (p-value)	0.821	0.105	0.707	0.697
individual controls	Yes	Yes	Yes	Yes
FE of province * year	Yes	Yes	Yes	Yes
Observations	$6,\!661$	7,021	$6,\!661$	7,021
$\mathbb{R}^2$	0.098	0.145	0.057	0.063

Notes: All sample are married individuals born after 1960 and before 1993 and with low educated parents. Standard errors are adjusted for clustering at province \* survey year. Individual controls include age, age squared, ethnicity, hukou, years of schooling of oneself and her/his spouse. Significance: \*p<0.1; \*\*p<0.05; \*\*\*p<0.01 Data source: CGSS 2010, 2012, 2013, 2015, 2017