Desired Fertility and Education: Evidence From China *

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Abstract

This paper explores the causal effect of education on desired fertility. By Chinese General Social Survey (CGSS), I apply Instrumental variable strategy based on China's Nine Year Compulsory Schooling Law (CSL). In general, considering the diversity of implementing year of CSL and the average education level for all the provinces in China, I also use alternative instrumental variable called CSL intensity to empirically test the causal inference. Both IVs show similar results. I find decreased desired fertility with 0.6 kids on average due to the primary high school degree. For different gender, education has a stronger effect on men than women in terms of desired fertility. Also, urban people are more affected by education. CSL increase the chance of attending primary high school and completing primary high school with nearly 15 percentage points on average, with stronger effect on female and rural areas when I analysis separately. One important implication is primary education reform like CSL could be a better alternative for family planning program.

Introduction

It seems China is experiencing a demographic crisis when entering the second decade of 21 century. According to data from World Bank, the declining fertility rate has lasted since 2000 and remains in 1.7 for the recent 10 years in China, compared with the minimum rate 2.1 to maintain population, especially when considering China is not an immigration country.[1] In 2020, the number of new born babies in

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1. In short, fertility rate means the number of births per woman during their reproductive years

mainland was only 12 million, the lowest number since 1960. Consequently, a declining labor force is about to happen for the next decades and generation. Though a universal two-child policy and another universal Three-child policy are consecutively released, it barely helps.[2] .Moreover, several papers argue even back to last century, the fertility rate in China has already began to fall(Lavyly and Freedman, 1990;Cai 2010), and the controversial One-Child policy also reduced the completed fertility(Li et al., 2005)

In this paper, I explore the causal effect of education on people's desired fertility in China. By using the China's Nine-Year Compulsory Schooling Law, I construct an instrumental variable called eligibility index to measure to how much extent for one individual affected by this policy. Since the CSL is implemented in different years across each province, it can be considered as a natural experiment to test the causal effects.

Moreover, I employ another instrumental variable called CSL intensity to estimate my results. The CSL intensity variable is built on the interaction of CSL eligibility index and prior education level. Both results are quite similar. On average, the education with primary high school would decrease people's desired fertility at 0.6; the CSL would increase the chance of completing primary high school with around 15 percent points. Furthermore, education has a stronger effect on desired fertility for males compared with females and urban residents compared with rural people.

One concern about my strategy is there may exist other social or policy changes related to my outcome variable and people's education. A placebo test assuming the CSL happened 4 years and 6 years before is employed. The results show both the first and the second stage results are insignificant . So it is not likely other factors would threat the validity of my estimation. Other robustness check include testing the effects of education on gender, hukou type and rural/urban regions separately. All results are significantly not equal to zero. One caveat here is I only test education effect at primary high school level, it's possible when education reaches a comparatively high level, the effect could disappear or inverse. Actually, several papers discussed the U-shape about the effects of education on fertility(Zhan and Zhao, 2023;Chen, 2022).

Many researches try to explore the mechanism behind the fertility rate and education is regarded as one common factor. Essentially, the empirical evidence on the effect of education on fertility is mixed in different countries. Osili and Long (2008), Lavy and Zablotsky (2015) find negative relationship in Nigeria and Israel, while Braakmann (2011) shows it positive in some European regions,Fort et al. (2015) compares the case in England and European continent countries, which illustrates mixed effect.[3] still,

2. The two-child policy and three-child policy are announced in 2016 and 2021, analysts show pessimistic towards the effect of these policy and the data also agree.

3. The effect in England is negative, though, the European continent shows no effect.

other literatures assert no effect of education on fertility rate including Monstad et al. (2008), M. Fort, (2009), Gronqvist and Hall (2011), McCray and Royer (2011). However, the related research in China is limited. Li et al.(2005) uses CSL to employ a difference in difference strategy testing how one-child policy affects people's fertility behavior; Zhan and Zhao(2023) examine the causal effect of education on women's fertility rate. On the other side, desired fertility, also called fertility preference in many other papers, has been widely used.(e.g. Julia, 2015;Doepke and Tertilt, 2018). Jayachandran (2017) uses fertility preference to explore the relationship between desired fertility and unbalanced sex ratio due to son preference.

This paper contributes to the literatures investigating how education affects fertility behavior in east Asian region. The main results are consistent to conventional ideas that education would reduce the desired fertility for women ,the CSL did increase people's education and shows stronger effect in rural areas.Additional, My results show education also affects males desired fertility with stronger impact.

The rest of paper proceeds as follows. Section 1 gives the background of CSL. Section 2 describes the data and variables. Section 3 shows my empirical strategy. Section 4 gives the main results. Section 5 provides several robustness check. Section 6 discusses the pathways behind the results. Section 7 concludes.

1 The Compulsory Schooling Laws in China

In 1986, The People's Republic of China promulgated the Nine-Year Compulsory Schooling Law[4] for the whole nation. The CSL is universal for the first time aimed at improving basic education and eliminate illiterates. In general, the CSL provide tuition waiver for all the students for 9 years which consists of 6 years of primary school and 3 years of primary high school (also known as junior secondary school) regardless of gender, race, minority.[5]This law declare it's not only people's right but obligation to get education.

One noteworthy aspect of the CSL implementation is that each province had the authority to schedule the specific timing of its enforcement. The implementation year of CSL varies, ranging from 1986 in certain provinces like Beijing and Zhejiang to 1991 in others such as Hunan and Guangxi. Generally, children commence their formal education at the age of 6 and complete primary and junior high school, typically ending at grade 9, by the age of 15. Table 1 establishes the details of implement year of each province in China, and the first wave basically means the cohorts affected by CSL born after that time point.(Cui et

4. many other literatures call it Nine-Year Compulsory Education Law

5. compared with U.S. education system, primary school covers grade 1 to 6 and primary high school covers grade 7 to 9. a note here is many schools will charge miscellaneous fees,though, usually small amount in terms of tuition fee

al. 2019).

[Table 1 Here]

2 Data and Variables

2.1 CGSS

The main sources of data comes from the Chinese General Social Survey(CGSS), which contain five waves of survey: 2010, 2012, 2013, 2015 and 2017. CGSS is the first national representative continuous survey project aimed to track the transition of Chinese society including the economic behavior and social attitude. The earliest survey was launched by the Renmin University of China and Hong Kong University of Science and Technology in 2003.There are hundreds of variables in this data including basic demographic information, education, social altitude, financial status, family composition, religious belief, migration information.I have gathered data from all five survey waves, encompassing birth years ranging from 1950 to 1995. This comprehensive timeframe covers the entire period of CSL implementation and ensures that individuals who are either too young or too old are excluded from the dataset. Although the questionnaire exhibits slight variations across different survey waves, I have maintained consistent variables throughout. These variables encompass demographic information, including gender, year of birth, hukou type, province of birth, and whether the respondent is a member of the CCP.[6]Finally, I include 37,157 samples after drop these with missing values.

2.1.1 Outcome Variable

The primary variable that captures desired fertility is derived from the following question:

If there were no policy restriction, how many children do you want?

This is important since back to 1982, the Chinese government released a national population plan called ”One Child Policy”. Essentially, the policy maker wants to reduce the rapid population growth by restricting many families to only one child. This controversial policy was implemented heavily during

6. I categorize hukou types into ’Agriculture’ or ’Non-Agriculture.’ It’s worth noting that after July 30, 2014, the Chinese government transitioned from the binary hukou system to a unified hukou type for all citizens. Fortunately, this survey contains detailed hukou registration data before the 2014 reform

last century, especially in late 1980s and eventually reduce at least 400 million births. So this question captures the true desired fertility ideally.
Another possible issue about this question is that how respondents treat this seriously. Therefore, after dropping the missing values, over 99.5 percent points of desired fertility from samples have less than 10 children. In Figure 2, nearly 99 percent points show less than 6 children and over 60 percent points of individuals want exact 2 kids.

2.1.2 Education

Since the CGSS survey asks about the highest degree of each individual and education status, I use these two to build the education variable. For people fully exposure to the CSL, they would be guaranteed to finish primary high school in most regions; for individuals partially exposure to the CSL, they can get educated a few more years until age 15, consequently, the ratio of people attending primary high school would rise. Thus, both the primary high school attendance(PHS) and primary high school graduation(PHSG) can be considered the direct result of CSL. Furthermore, the primary high school degree is consider as 9 years of education in China since the education process is unique for the first 9 years nationally. Finally, I use PHS and PHSG to indicate the education variable.

2.2 China's census 2000

In later robustness check part, I apply another instrumental variable called Intensity of CSL to test the causal effect of education on desired fertility. In this subsection, I want to briefly introduce another data resource which I will use later, China's census 2000.
The 2000 Chinese census, officially known as the Fifth National Population Census of the People's Republic of China ,was conducted by the government of the People's Republic of China, commencing on November 1, 2000, at midnight. The total population count was recorded as 1,295,330,000. This comprehensive census covered a range of demographic aspects, including population growth, household numbers, gender distribution, age distribution, ethnic diversity, educational levels, and the urban-rural population distribution. This dataset contains education information similar with the CGSS, people report their highest degree and graduation status. Subsequently, the official authorities would convert the educational attainment of individuals based on their highest degree. The conversion followed a standard framework, where individuals with completion of primary school were assigned 6 years of education, primary high school completion equated to 9 years of education, high school completion corresponded

to 12 years of education, and those with a college degree were credited with 16 years of education.[7]

3 Empirical Strategy

To identify the casual effect of education on desired fertility, the following equation is applied:

$$Y_{ibpt} = \beta_0 + \beta_1 Edu_{ibpt} + \beta_2 X_{ibpt} + \theta_b + \gamma_p + \omega_t + u_{ibpt} \quad (1)$$

Y_{ibpt} represents the desired fertility(DF) of an individual denoted by i who was born in year b, in province p, and during survey year t. Edu is a binary variable which is denoted by whether this person attained primary high school(PHS) or at least graduated from primary high school(PHSG). So β_1 is my interested coefficient which illustrates the causal effect of education on people's desired fertility. The X variable contains several control variables including hukou type, urban or rural regions, gender, whether China's Communist Party(CCP), ethnicity and income. The θ_b captures the birth cohort fixed effect and the γ_p shows the province fixed effect, also, The ω_t indicates the survey wave fixed effect..

The address the endogeneity problem, I apply instrumental variable(IV) method by employing the China's Nine-Year Compulsory Schooling Laws(CSL). As discussed before, the CSL in China is a national policy implemented from 1986 to 1991 depending on different provinces. I can use the CSL to consider it as a natural experiment to deal with the endogeneity problem, especially in terms of schooling(e.g. Duflo, 2001).

The key assumption of my strategy is the CSL affects the outcome variable only through education. It's possible that some unknown variables could be both correlated with CSL and outcome variable, especially when considering the various year of implement for each province(Cui et al. 2019). Therefore, I include another variable $Trend$ to deal with the potential concern. The $Trend$ variable is denoted by the interaction of birth-cohorts and province, it indicates the province-specific deviation from the national trend in desired fertility and education.

Then the first stage of my estimation is:

$$Edu_{ibpt} = \alpha_0 + \alpha_1 Eligibility + \alpha_3 X + Trendbp + \delta_b + \sigma_p + \varepsilon_t + v_{ibpt} \quad (2)$$

7. China also recognizes other equivalent education degrees. For instance, occupational high school and technical secondary school are considered to be equivalent in terms of education years to regular high school, and junior college is regarded at the same educational level as college.

The outcome variable here is Edu, which is PHS or PHSG and binary. the independent variable $Eligiblity$ means the exposure level of CSL for people. Due to the different CSL years for each province and the total years of education affected is 9 if fully eligible, I constructed the Eligibility variable into 9 categories like below:

$$Eligibility_index_{ipt} = \begin{cases} 1 & \text{if t} \geq \text{IY - 6} \\ 0 & \text{if t} \leq \text{IY -15} \\ \text{(15 - IY + t)/9} & \text{if IY -15<t <IY -6} \end{cases} \tag{3}$$

In which *IY* indicates the implement year, *t* means birth year. Furthermore, figure 1 shows the relationship between years of eligibility,which is $(15 - IY + t)$, and Eligibility index.

[Figure 1 Here]

One concern about this strategy is that people may migrate to another province, in that case, I may put them into incorrect group. However, in last century, it is quite hard for normal people to move to different provinces because of planning economy, people are quite restricted to certain regions due to hukou registration. The migration number starts to increase until late 1990s(Liang, 2001). Additionally, all my samples' birth years are before 1991.

Next, I estimate the following equation for my second stage:

$$Y_{ibpt} = \beta_0 + \beta_1 \hat{Edu}_{ibpt} + \beta_2 X_{ibpt} + Trend_{bp} + \theta_b + \gamma_p + \omega_t + u_{ibpt} \tag{4}$$

4 Results

Table 3 reports the causal interface results between education and desired fertility. In column (1), I use PHS to measure the education and PHS means the primary high school attendance. In column (2), PHSG is applied for the measurement of education, which is also a binary value indicating whether the individual graduated from primary high school. For these two, the control variables comprise gender, whether living in urban areas, whether CCP and ethnicity. Additionally, I apply birth year fixed effect, province fixed effect and survey year fixed effect. Both results are significant at 1 percent level. Moreover, the results say primary high school education would decrease people's desired fertility at 0.4281 and 0.3891

[Table 3 Here]

Column (3) and (4) exhibit the causal effect of education on DF with CSL eligibility instrument. Like first two columns,I use both primary high school attendance(PHS) and primary high school degree(PHSG) to proxy education, this also can be considered as part of robustness check. The results show attending primary high school would decrease 0.635 desired kids and primary high school degree would decrease 0.6096 desired children respectively. In this case, my results are somewhat larger than these in column (1) and (2). This is because the birth cohorts province specific trend have impacts on both CSL and DF. Therefore, for the next robustness check part, all of my estimation include this trend variable.

5 Robustness Check

5.1 Placebo Test

In my IV strategy, the validity of the identification relies on the presumption that eligibility of compulsory schooling law exclusively influence people's desired fertility through its impact on their primary high school attainment or graduation of primary high school. Potentially, there maybe other structural changes rather than compulsory schooling law that affect my outcome variable. Here, I run additional placebo test to support the key assumption.

In my placebo test, I pretend the CSL implement year 4 years and 6 years earlier than the actual year for all provinces. The eligibility index variable is constructed with the same way in equation (3). Then I add this treatment variable to equation (2), which is the first stage estimation. Moreover, I include the actual treatment variable in my equation because of systematic overlaps between placebo and genuine reforms for certain cohorts. Ideally, the placebo eligibility variable should have no impact on people's education outcome and consequently does not affect people's desired fertility significantly.

[Table 4 Here]

5.2 Alternative Instrumental Variable

Huang(2015) and Ma(2019) use regional education level before compulsory schooling law implement year to construct another IV. Similarly, I employ the CSL intensity as my instrumental variable. To build this IV, the overall ratio of people who do not have primary high school experience or fail to graduate from primary high school is derived from China's census 2000. The Table 5 essentially reports the density of CSL for each province in China. Huang(2015) uses the proportion of educated less than 9 years for specific birth cohorts to measure the potential power of China's Nine-Year Compulsory Schooling Law. Following this idea, since the primary high school is officially considered as 9 years of education, I use the ratio of people having no primary high school experience(PHS) or primary high school degree to stand for the density of CSL. For the selected birth cohorts, I opt for those born five years prior to the initial wave influenced by this policy to establish the density. Additionally, I include cohorts born five years before the first wave and the subsequent 15 years. This corresponds to the cohorts born 20 years before the implementation year of the CSL for each province.

[Table 5 Here]

The column (1) and (2) in Table 5 shows the density under PHS and PHSG measurement for all provinces, all values are in percentage points. Since if you finished primary high school, you must have primary high school experience. We can see the value for PHSG is always larger than the one in PHS column, the differences between these two are considered the drop rate of primary high school. The drop rates range from less than 1 percent point to a little more than 5 percent point in Fujian province. Also, the corresponding density in each region varies from 4.88 percent point for Beijing to 62.39 in Yunan province. One pattern here is that eastern and coastal province basically show higher education level due to wealth level, for mid-western regions, the education level is comparatively lower.

The column (3) and (4) show similar patterns when considering regional education gap. Moreover, the differences between PHS and PHSG within provinces are much larger. This is because many people of the birth cohorts in these two columns are partially eligible to CSL. The individuals in these cohorts will benefit several years of additional education but when they exceed 15 years old, they are too old to fit in the CSL, as a result, we see a larger gap between my two density measurements.

Next, I apply the density value too build my intensity instrumental variable. The intensity IV is constructed as the interaction of eligibility index and density value for everyone in each province:

$$Intensity_{ibp} = Eligibility_{ibp} \times Density_{ibp} \tag{5}$$

Then similarly, my first stage of estimation is:

$$Edu_{ibpt} = \alpha_0 + \alpha_1 Intensity_{ibp} + \alpha_3 X + Trendbp + \delta_b + \sigma_p + \varepsilon_t + v_{ibpt} \tag{6}$$

Lastly, I use the estimated education in terms of PHS and PHSG to fit in the equation (4).

Table 6 reports my results using alternative instrumental variable. I include birth cohorts fixed effect, province fixed effect, survey year fixed effect and the birth-province specific trend in my estimation. Panel A shows the reduced form results for all cases and the first stage results are given in panel B. Column (1) and (2) are under my first way to construct density, which is 5 years before the CSL exclusively and Column (3) and (4) are using my second method, which contains both 5 years before the CSL and the cohorts partially affected. All results are significant at 1 percent level for both first and second stages. Besides, the results do not vary too much ranging from -0.5427 to -0.5928.

[Table 6 here]

5.3 Estimation by gender and rural/urban

To provide more supportive evidence, I divide my samples by gender and rural/urban regions. Essentially, Table 7 reports the results by gender. All coefficients are significant for both men and women. To put it into nutshell, the men are more affected by education than women, and CSL influences women than men in terms of education.

[Table 7 here]

Table 8 shows the results by rural/urban areas. Still, all variables are significant.However, it appears that education has a more pronounced impact on individuals in urban areas compared to those in rural regions. For the increased education level, stronger effects happen in rural areas than urban areas which coincides with the fact that one main goal of CSL is to reduce the education gap between rural and urban areas.

[Table 8 here

6 Pathways

To better understand the relationship between education and desired fertility, I give several channels to explain.

6.1 Quantity and quality channel

Becker(1960) firstly employs an economic framework to analyze the factors determining fertility. In his paper, the decision of fertility is based on cost and return for children. Becker and Tomes(1976) proposed a quantity and quality model to explain the fertility decision within household. One reason for the decreased desired fertility could be the increased education level lead to better social level for parents, to sustain the social level, parents need to invest more on children given limited financial budget. As a result, they tend to have fewer children in exchange for investing more in the quality of each child (Becker and Lewis 1973;Becker and Tomes, 1976). Moreover, the number of children would directly affects the overall achievements of kids(Hannushek, 1992).

6.2 Social norms

China boasts a rich history spanning over 5,000 years, heavily influenced by Confucianism. In traditional Confucian culture, it conveys the notion that the number of children you have can define your success in certain aspects of life.Additionally, previous generations regarded having offspring as an obligatory duty, as the old saying goes: the greatest guilty of people is not having children. However, when people get more education in China, they are less bounded by the traditional culture. Younger people nowadays in China would like to try everything new and less likely to consider multiple kids. The rising labor participation for women due to education increase would lead to the reduction in fertility plan(Doepke et al., 2022)

6.3 Social Structure Change

As individuals reap the rewards of increased human capital through higher education, the opportunity cost of fertility concurrently rises. Additionally, the education would lead to late marriage, consequently lead to lower fertility(Chari et.al, 2017; Iqramul, 2018). Last but not least, the rising house price plays an important role here. Higher education often leads people to migrate to large cities for higher income. When a new couple get married, the men usually needs to pay for the mortgage loan for a new apartment, they consequently show less desired fertility due to the loan pressure. This is a main reason why men are more affected by education in terms of desired fertility compared with women, and why urban individuals show stronger effect of education on desired fertility.

7 Conclusion and Discussion

Massive papers have discussed the relationship between education and fertility. Martin(1995) found the diversity exists between upper and lower education level in developed countries for women. Kravdal and Rindfuss(2008) found the same effect of education on family size preference for men. However, the evidence for the causal effects of education on fertility and desired fertility is mixed(Osili and Long, 2008; Zavy and Zablotsky, 2011; Fort, M., 2009; Monstad et al., 2008; Gronqvist and Hall, 2011; MacCrary and Royer, 2011; Braakmann, 2011; Geruso et al., 2011; Kamila and Miriam, 2013).

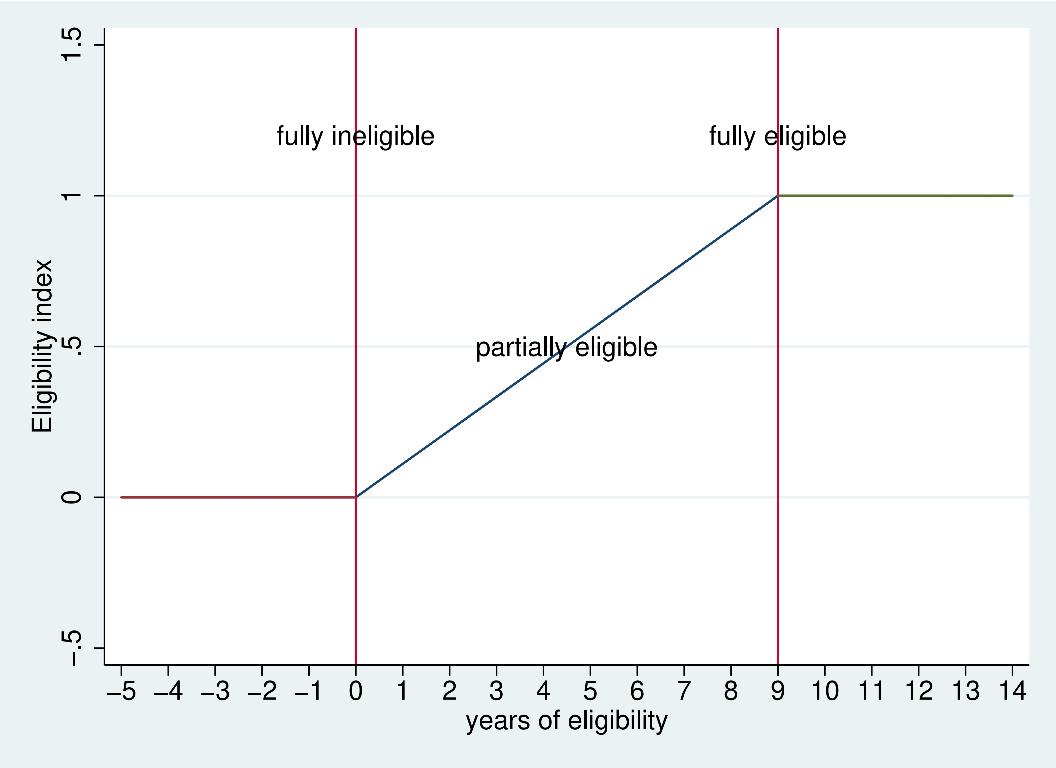
My paper basically contributes to the literature about the causal effect of education of family size preference in China. Moreover, the education would also affects men's fertility preferences, considering the rare papers discussing about the case for men. Using the CGSS data, this paper applies the China's Nine-Year Compulsory Schooling Law(CSL) implemented in late 1980s to examine the impact of education on people's desired fertility. My primary findings indicate that completing primary school or the initial nine years of education is associated with a decrease in people's desired fertility by a value of 0.6 on average. Also, men are much more affected by the increased education than women, indicates the China's social structure influence the tastes of desired preference for gender. The CSL did increase people's education year and show more impacts on women and individuals in rural areas. Overall, the ratio of primary high school degree in China irises around 15 percentage points due to the CSL.

Last but not least, China's CSL provides only basic nine years of education. This could increase people's human capital return to some extent. Related papers(e.g. Hazan and Zoabi,2015;Baudin et al., 2015) indicate the U-shape of the effect of education on fertility. This is due to the declining income elasticity for fertility when people entering middle class. The unique social structure in China leads to lower desired fertility for men, especially in large cities. For example, males would be more likely to face the pressure of buying a house, covering the household expenditure.

Next, one important implication is that education can work as an alternative way to replace the family planning program. Back to last century after 1970s, the Chinese released a controversial One-Child policy to reduce the seemingly fast population growth. However, education could be the better way to fulfill the goal to control the growing population.

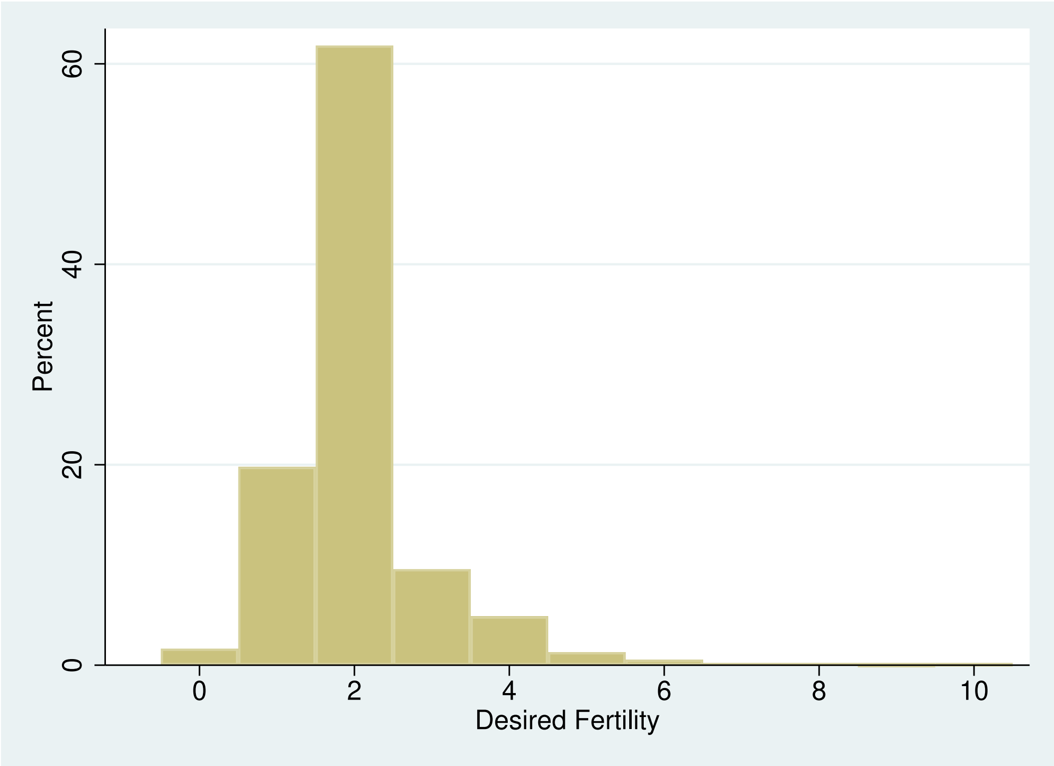
8 Tables and Figures

Figure 1: CSL eligibility function



Notes: the x-axis is how many years each individual is affected by the Compulsory Schooling Laws, it's calculated by "years of eligibility = year of birth - year of CSL + 15". The y-axis is the eligibility index which measures how much people get affected by CSL. Basically, the index equals to 1 when this person is fully eligible, 0 when this individual is fully ineligible and a linear function is applied for these people in between .

Figure 2: Distribution of Desired Fertility



Notes: derived from CGSS 2010, 2011, 2013, 2015 and 2017.

Table 1: CSL implement year and first wave

Province	Year	First Wave	Province	Year	First Wave
Beijing	1986	1971	Tianjin	1987	1972
Hebei	1986	1971	Shanxi	1986	1971
Liaoning	1988	1973	Jilin	1987	1972
Heilongjiang	1986	1971	Shanghai	1987	1972
Jiangsu	1987	1972	Zhejiang	1986	1971
Anhui	1987	1972	Fujian	1989	1974
Jiangxi	1986	1971	Shandong	1987	1972
Henan	1987	1972	Hubei	1987	1972
Hunan	1991	1976	Guangdong	1987	1972
Guangxi	1991	1976	Chongqing	1986	1971
Sichuan	1986	1971	Guizhou	1988	1973
Yunnan	1987	1972	Shaanxi	1988	1973
Gansu	1991	1976	Qinghai	1988	1973
Neimeng	1988	1973			

Implement year from Education year book of China

Table 2: Statistics Summary

	(1)	(2)	(3)	(4)	(5)
Variables	Obs	Mean	Sd	Min	Max
Desired fertility	35207	1.86	0.75	0	10
PHS	37157	0.76	0.43	0	1
PHSG	37157	0.70	0.46	0	1
Urban	37157	0.55	0.49	0	1
$Hukou_{na}$	36697	0.39	0.49	0	1
female	37157	0.52	0.50	0	1
CCP	37157	0.40	0.49	0	1
Han ethnicity	37157	0.92	0.26	0	1
age	37157	40.84	10.60	17	61

Notes:$Hukou_{na}$ here means non-agricultural hukou type. There are two types of hukou including agricultural type and non-agricultural type. Until July 30, 2014, the Chinese authority begins to use this system and all citizens are in the same residents type of hukou.

Table 3: Empirical Results

	(1)	(2)	(3)	(4)
Panel A: Reduced form results				
	PHS	PHSG	PHS	PHSG
Education	-.4281***	-.3891***	-.6350***	-.6096***
	(.1618)	(.1516)	(.1410)	(.1399)
Number of Obs	35207	35207	35207	35207
Birth year FE	✓	✓	✓	✓
Province FE	✓	✓	✓	✓
Survey year FE	✓	✓	✓	✓
Trend			✓	✓
Panel B: First stage results				
Eligibility	.1322***	.1454***	..1456***	.1517***
	(.0210)	(.0210)	(.0206)	(.0207)
Number of obs	35207	35207	35207	35207
IV F-Statistics	39.69	48.28	49.91	53.66
p value of weak IV	0.000	0.000	0.000	0.000

Notes:Data source is from CGSS . Robust standard errors clustered at birth-province level are reported in parentheses. Control variables are the same for all columns. Control variables include binary variable for urban or rural, gender, CCP, ethnicity. Panel A reports the second stage estimation and Panel B accounts for the first stage regression. All coefficients interested are 1% level significant. $***p < 0.01$, $**p < 0.05$,$*p < 0.1$

Table 4: Placebo Test

	4 years earlier		6 years earlier	
	(1)	(2)	(3)	(4)
	PHS	PHSG	PHS	PHSG
Education	-2.670	-1.877	4.683	3.514
	(3.415)	(2.057)	(6.328)	(3.938)
Number of Obs	35207	35207	35207	35207
Birth year FE	✓	✓	✓	✓
Province FE	✓	✓	✓	✓
Survey year FE	✓	✓	✓	✓
Trend	✓	✓	✓	✓
Panel B: First stage results				
Placebo Eligibility	.0387	.0550	-.0264	.-.0352
	(.0478)	(.0562)	(.0347)	(.0371)
Eligibility	.1173***	.1113**	.1572***	.1671***
	(.0393)	(.0469)	(.0260)	(.0269)
IV F-Statistics	0.66	0.96	0.58	0.90
p value of weak IV	0.425	0.337	0.454	0.352

Notes:Data source is from CGSS . Robust standard errors clustered at birth-province level are reported in parentheses. Control variables are the same for all columns. Control variables include binary variable for urban or rural, gender, CCP, ethnicity. Panel A reports the second stage estimation and Panel B accounts for the first stage regression. All coefficients for placebo test are not significant. $***p < 0.01$, $**p < 0.05$,$*p < 0.1$

Table 5: Density of CSL for each province in percentage points

	(1)	(2)	(3)	(4)
	5 years before exclusively		5 years earlier inclusively	
Province	PHS	PHSG	PHS	PHSG
Beijing	4.88	5.39	2.73	7.89
Tianjin	14.19	17.00	9.07	22.21
Hebei	21.68	22.53	13.75	23.86
Shanxi	21.30	22.07	15.54	21.33
Liaoning	18.12	19.26	14.42	28.08
Jilin	26.24	28.56	20.14	31.21
Heilongjiang	24.17	26.21	18.50	25.71
Shanghai	6.49	7.55	2.48	11.93
Jiangsu	18.67	20.49	12.31	22.05
Zhejiang	31.98	35.59	18.20	24.55
Anhui	39.63	41.67	25.91	36.72
Fujian	36.11	41.21	24.74	45.03
JIangxi	40.06	43.74	26.49	34.18
Shangdong	25.25	26.04	16.96	27.95
Henan	22.36	23.35	15.77	26.82
Hubei	29.10	32.02	19.96	31.86
Hunan	21.31	24.75	29.88	47.33
Guangdong	26.43	28.42	17.57	33.41
Guangxi	31.26	32.98	39.78	55.85
Chongqing	42.26	44.69	31.82	38.31
Sichuan	43.31	45.28	33.45	39.14
Guizhou	60.29	62.80	51.55	64.83
Yunnan	62.39	63.81	52.47	61.42
Shaanxi	28.51	29.85	24.05	41.00
Gansu	44.36	45.93	47.98	62.54
Qinghai	49.78	51.51	46.52	56.94
Neimeng	28.69	31.20	21.93	36.42

Notes: Derived from China's census 2000. This table reports the density of CSL for each province. The density of CSL comes from the idea that the proportion of people who are educated less than 9 years. Since In China, primary high school is officially considered as 9 years of education. Therefore, I use the primary high school attainment(PHS) and primary high school graduation to stand for the 9 years of education.

Table 6: Alternative IV Using CSL Intensity

	(1)	(2)	(3)	(4)
Panel A: Reduced form results				
	PHS	PHSG	PHS	PHSG
Education	-.5427***	-.5452***	-.5653***	-.5928***
	(.1168)	(.1241)	(.1291)	(.1449)
Number of Obs	35207	35207	35207	35207
Birth year FE	✓	✓	✓	✓
Province FE	✓	✓	✓	✓
Survey year FE	✓	✓	✓	✓
Trend	✓	✓	✓	✓
Panel B: First stage results				
Intensity	.4762***	.4564***	.5901***	..4414***
	(.0889)	(.0895)	(.1293)	(.0853)
IV F-Statistics	28.71	26.00	20.85	26.80
p value of weak IV	0.000	0.000	0.000	0.000

Notes:Data source is from CGSS and China's census 2000. Robust standard errors clustered at birth-province level are reported in parentheses. Control variables are the same for all columns. Control variables include binary variable for urban or rural, gender, CCP, ethnicity. Panel A reports the second stage estimation and Panel B accounts for the first stage regression. All coefficients interested are 1% level significant. $***p < 0.01$, $**p < 0.05$,$*p < 0.1$

Table 7: Results by gender

Variables	(1)	(2)	(3)	(4)
	Male	Male	Female	Female
Panel A: Reduced form results				
	PHS	PHSG	PHS	PHSG
Education	-.8506***	-.7793***	-.4722**	-.4711**
	(.3274)	(.3217)	(.2290)	(.2305)
Number of Obs	16766	16766	18441	18441
Birth year FE	✓	✓	✓	✓
Province FE	✓	✓	✓	✓
Survey year FE	✓	✓	✓	✓
Trend	✓	✓	✓	✓
Panel B: First stage results				
Eligibility	.1161***	.1267***	.1827***	.1832***
	(.0252)	(.0273)	(.0252)	(.0233)
IV F-Statistics	21.23	21.53	52.63	61.56
p value of weak IV	0.000	0.000	0.000	0.000

Notes:Data source is from CGSS . Robust standard errors clustered at birth-province level are reported in parentheses. Control variables are the same for all columns. Control variables include binary variable for urban or rural, gender, CCP, ethnicity. Panel A reports the second stage estimation and Panel B accounts for the first stage regression. All coefficients interested are 1% level significant. $***p < 0.01$, $**p < 0.05$,$*p < 0.1$

Table 8: Results by urban/rural

Variables	(1)	(2)	(3)	(4)
	Rural	Rural	Urban	Urban
Panel A: Reduced form results				
	PHS	PHSG	PHS	PHSG
Education	-.3489*	-.3383*	-.1.018***	-.9635***
	(.2073)	(.2017)	(.3100)	(.2747)
Number of Obs	15821	15821	19388	19388
Birth year FE	✓	✓	✓	✓
Province FE	✓	✓	✓	✓
Survey year FE	✓	✓	✓	✓
Trend	✓	✓	✓	✓
Panel B: First stage results				
Eligibility	.2152***	.2219***	.1014***	.1071***
	(.0284)	(.0260)	(.0223)	(.0248)
IV F-Statistics	57.23	73.06	20.59	18.72
p value of weak IV	0.000	0.000	0.000	0.000

Notes:Data source is from CGSS . Robust standard errors clustered at birth-province level are reported in parentheses. Control variables are the same for all columns. Control variables include binary variable for urban or rural, gender, CCP, ethnicity. Panel A reports the second stage estimation and Panel B accounts for the first stage regression. All coefficients interested are at least 10% level significant. $***p < 0.01$, $**p < 0.05$,$*p < 0.1$

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