The Impact of the Cultural Revolution on Intergenerational Mobility in China

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Abstract

This paper studies the impacts of the Cultural Revolution on intergenerational and multi-generational educational mobility in China. We use the difference-in-difference (DiD) method to show that the Cultural Revolution (CR) significantly reduced the advantage of having a more-educated father on a child's educational attainment. The impact of the CR on intergenerational mobility is identified by an index that measures for each individual the number of school years during which the CR restricted education access. The decline of the effect of father's educational level on children' college degree attainment was mediated through the likelihood of obtaining a high school degree, participating in the college entrance examination, and obtaining higher exam scores for those who took the exam. However, the Cultural Revolution did not eliminate the advantage of having a more-educated father on a child's educational achievement, nor did it reduce the effect of grandfather's schooling on a grandchild's educational achievement. We also present subsidiary analyses that examine the role of mother's education and father's occupation in the child's educational attainment process.

Key words: Education Inequality, Intergenerational Mobility, Cultural Revolution
JEL classification: I24, J62, N35

1 Introduction

China's Cultural Revolution (CR) of 1966-1976 instituted major changes in country's educational system, including closing schooling at all levels for three years, suspending the college entrance exam for ten years, altering the curriculum in all schoolings, and expanding primary and secondary schools in rural areas. People were publicly labeled based on their family backgrounds and personal opportunities were linked to group membership in order to achieve the stated egalitarian goals of the CR. Therefore, the opportunities of receiving education were also altered dramatically across family backgrounds, in addition to the general changes in the educational system that affected all students.

The impact of the Culture Revolution on educational opportunities, return to schooling, population beliefs, etc. have been wildly studied. Studies suggested that educational attainment in general was significantly decreased by the CR (Deng and Treiman (1997), Meng and Gregory (2002), Giles, Park, and Wang (2019)). In contrast, Han (2001) suggested that the CR promoted educational attainments for children who grew up in rural areas, based on his descriptive study of a local rural county in China. Zhang, Liu, and Yung (2007), Fleisher and Wang (2005) showed that the CR had little impact on the returns to schooling. Roland and Yang (2017) studied how people's beliefs were affected by the CR, finding that although people viewed effort as less valuable if they were affected by the CR, they invested more in their children. Several studies also focused on the impact of the CR on education by parental status. Deng and Treiman (1997) studied the impact of the CR on educational attainment for men who lived with their fathers. They showed that in the CR, people from educated or cadre families lost their advantages in obtaining higher educational achievements. Meng and Gregory (2002) (2007) used an urban sample to study similar question. In contrast to Deng and Treiman (1997), they suggested that although people who received their education during the CR were on average less likely to obtain a high school or college degree, the CR strengthened the ability of children from educated families to obtain a college

degree. Giles, Park, and Wang (2019) used a sample which covered several cities in China and concluded that, for children who were affected by the CR, their educational attainment was more closely related with whether their parents held administrative positions than with parental education.

In this paper, we extend the literature by providing new perspectives in studying the impact of the CR on intergenerational educational mobility. Our study differs from the previous literature by employing a sample which covers both urban and rural residents to provide a full picture of intergenerational educational mobility, in contrast with most prior studies, which covered urban residents only. In addition, we use a difference-in-difference (DiD) strategy to identify impacts of educational disruptions and policies associated with the CR on intergenerational educational mobility. The DiD method identifies the impact by comparing educational attainment for people with different family backgrounds and different years in which the CR impacted their schooling. We also explore the mechanism linking father's education with child's college attainment, as well as the impact of the CR on multigenerational mobility, the relationship between father's occupation and mother's schooling and child's educational attainment.

The paper is organized as follows: Section 2 describes the data used in this study. Section 3 provides a review of prior research and describes the impact of the Cultural Revolution on China's educational system. Section 4 describes the methods and models used in this paper. Section 5 presents the estimated results, and section 6 concludes the paper. The appendix of this paper is available at `https://zixinliu.weebly.com/research.html`.

2 Data

We use the 2013 Chinese Household Income Project (CHIP) to conduct our analyses. CHIP is a cross-sectional survey that covers urban and rural respondents in 14 provinces in China in 2012. The urban sample in the CHIP selects households that had a formal registered residential address in urban areas when taking the survey[1], and the rural sample covers households that had a formal registered address in rural regions.

The questions asked in this survey include basic demographic information of every person living in the surveyed households, such as gender, age, education, occupation. It also asked for the information about the parents and children of the main respondent and his/her spouse. In contrast to surveys that only provide information on parents living with their children (Deng and Treiman, 1997), it asked for information about the parents of the main respondent and spouse, without regard to whether the parents lived in the household. The detailed information on parents and children made the 2013 CHIP a suitable sample to study intergenerational mobility in China across time.

To check whether the CHIP represents Chinese demographics, we compare it with the Chinese yearbook 2013 (statistics for the year 2012), which is a national demographically representative summary covering 0.1% of the population in all provinces of China. The comparisons suggest that the CHIP is not a nationally representative sample. The CHIP under-sampled the urban population, the population of eastern provinces, and over-sampled the population of the central provinces (Table A1). Also, it over-sampled larger-size house-

[1]In China, the official household registration system is call "Hukou". It records the information of the registered household address and the Hukou type (either urban (non-agricultural) or rural (agricultural)). The type of Hukou depends on whether the household engages in agricultural on related work. It is possible for a household to change the address or the type of Hukou, but in order to do so, household members must satisfy certain requirements established by their local governments. The Hukou system is important in China since it is directly related to the walfare benefits (such as education, subsidy and pension) a person can receive from the local government. In 2013, a new type of Hukou called the "Resident Hukou" was created to replace the previous urban and rural Hukous. It has only been implemented in Henan province in 2013.

holds, 15-64 year-olds in central and western provinces, and under-sampled the migrant population[2] (Table A2 and Table A3). In terms of education, the CHIP over-sampled high school graduates and those with higher education in all age groups, under-sampled people with primary or middle school education, but over-sampled the population that were never educated among those older than 40 (Table A4).

Since the original CHIP sample is not a nationally representative one, it is essential to re-weight the CHIP in order to improve its representation of the population. We weight it by using the fraction of "urban", "rural", "migrant" [3] residents in each province, and also weight each CHIP province to represent the regional population, using the Chinese yearbook 2013. The details of our weighting procedure are described in Appendix section A1.

We compare the summary statistics of the weighted CHIP and the census in Tables A1-A4. We find that the weighting successfully eliminated the misrepresentation problems in regional population, size of households, migrant proportions, but it helped little in correcting the over-representation problem for educated people, nor did it solve the under-representation problem for people older than 40 with less than junior high school degrees. Since we are unsure of the reason for theses differences, we chose to use the sample based on this re-weighting rather than attempt to adjust for characteristics, which may risk inducing imbalance in characteristics among locations. The sample used here is clearly more representative than those used in prior analyses.

The descriptive statistics of respondents and their spouses who were older than 25 in the 2013 CHIP (after weighting) are listed in Table 1. There are 32,976 observations in our

[2]In this paper, "migrant" refers to people who changed their residence from that of their officially registered (Hukou) address.

[3]The "urban" group here refers to people who lived in urban areas and did not change their residential places outside of their registered residential streets. "Rural" group refers to people who lived in rural areas and did not change their residential places outside of their registered residential streets. "Migrant" group refer to people changed their residential places outside of their registered streets.

sample whose ages were older than 25 years old. 28% of the weighted CHIP sample had obtained at least a high school degree and 11% had obtained at least a college degree. The average years of schooling, high school degree attainment rate, college degree attainment rate, average years of father's schooling and average years of mother's schooling all increase for more recent cohorts. We also divide the sample into three categories by whether the years they would be in school were covered by the regime of Mao: pre-Mao (for those born before 1945), Maoist (for those born in 1945-1963), and post-Mao (born after 1963). It suggests that the average years of schooling increased by 1.1 years from the pre-Mao cohort to the Mao cohort, and it increased by 2 years from the Mao cohort to the post-Mao cohort. These statistics indicate that the human capital accumulation rate in the Mao cohort was slower than in the post-Mao period, which is likely related to the institutional changes in the Mao era.

3 Background

3.1 The Intergenerational Mobility in 20th Century China

A low level of intergenerational mobility implies less opportunity for people from poor families to improve their social status during their lifetime and a lower likelihood that those from rich families will move down. Thus, it is an important measure of inequality of opportunity. Variations in the level of the intergenerational mobility in a region can be explained by the changes of the regional return to human capital, policy, and demographic structure (Solon, 2004). In the 20th century, China experienced major institutional transitions. In the first two decades of the 20the century, the last feudal dynasty, the Qing, was replaced by a republican government. After the Second Sino-Japanese War and the Chinese Civil War, the People's Republic of China was established in 1949. This was followed by several political movements, including the most radical one, the Cultural Revolution (1966-1976).

After Mao's death in 1976, China returned to a more traditional merit-based educational system. The institutional changes of 20th century brought social chaos, but they also provided opportunities for people at the bottom of society.

Chen et al. (2015) used the Chinese Urban Household Education and Employment Survey (UHS) of 2004 to measure the intergenerational educational mobility in the 20th century China. They found an inverted U-shape pattern over time for intergenerational educational mobility in 20th century China. The level of mobility in China was low for those who received schooling in the pre-Mao era (people born before the mid-1940s), reached its highest level in the Mao-era (for those born in the mid-1940s to the mid-1960s), and returned to a low level in the post-Mao era (for those born after the mid-1960s).

We replicate the analyses in Chen et al. (2015) to estimate the trend of the intergenerational educational mobility of 20th century China. Our replication uses the weighted CHIP sample (described in the data section) which covers both urban and rural residents and is representative in geographic levels, in contrast to the urban sample used in Chen et al. (2015). Rural residents make up a large proportion of the Chinese population. They accounted over 80% of the population during the CR, and still accounted for 42% of the population in 2017. Therefore, using a representative sample that covers this population provides us more valid results for the national population.

The replication results for the intergenerational schooling coefficients for five-year birth cohorts in 1920-1985 are plotted in Figure 2 (the estimated numbers are reported in appendix Table A5). As can be seen from the graph, the estimated intergenerational schooling coefficients exhibit a U-shape pattern, indicating that the intergenerational mobility exhibit an inverted U-shape pattern in the 20th century. We confirm the pattern in Chen et al. (2015) for the combined urban and rural population. The intergenerational schooling mo-

bility reached its highest level for those born around 1960. People born around 1960 almost all experienced the Cultural Revolution (1966-1976) during the times when they would have been attending school. We also plot the intergenerational coefficients of schooling rank, and the intergenerational schooling correlations in appendix Figures A1 and A2. Both exhibit an inverted U-shape pattern for the measure of intergnerational educational mobility. The estimated results for these alternative regressions are listed in Table A6 and Table A7.

To check whether the observed pattern holds for different demographic groups, we plot the trends of the intergenerational schooling coefficients by current residential areas (urban or rural) in appendix Figure A3, by gender in appendix Figure A4, and by birth areas (urban or rural) in appendix Figure A5. Although different groups exhibit different levels of intergenerational mobility, they all show an inverted U-shape pattern of the intergenerational mobility.

3.2 The Changes of Educational System in the Cultural Revolution

Our replication of Chen et al. (2015) suggests that people received their education during the Cultural Revolution had the highest level of intergenerational educational mobility. This may relate to the severe changes of the educational system in China during the CR.

The national college entrance exam was suspended over the entire period of the CR from 1966 to 1976. At the same time, the government relaxed the standard for people from lower levels of family background to attend colleges. In the later period of the CR (1972-1976), people with lowest socioeconomic backgrounds, or those who showed their passion and loyalty to the party and government were enrolled into college based on recommendations of local leaders. The college entrance exams were resumed in 1977 [4].

[4]In the first four years after the CR, the government allowed those who had not been able to take the

The curriculum taught in schools was also changed greatly in the CR. Beginning in 1968, students were taught agricultural and factory skills rather than the standard academic curriculum in school, a practice that continue to 1972. Although students learned little of the standard curriculum in this period, they were still given academic diplomas if they satisfied a school's attendance requirement. Thus, the quality of education in almost all schools declined significantly.

Due to frequent political activities, schools were closed for many years during the CR. In the beginning of the CR (1966-1968), almost all schools (primary, secondary, tertiary) were closed and many qualified teachers were forced to leave their teaching positions. Some students who were forced to leave schools were not able to come back to continue their education after 1968. For example, the "Down to the Countryside Movement" sent urban high school students (those who were in high school in 1968) to rural areas to do farm work, and they were not allowed to come back to cities until the 1970s.

At the same time, primary and secondary education were greatly expanded in the rural areas of China. According to Andreas (2009), the number of senior high schools in rural areas increased from 604 to 50,916 during the CR, and the number of junior high schools increased from 8,628 to 131,265. The primary and secondary enrollment rates increased dramatically as a result. Since most illiterate populations were in rural areas, the school expansion in the CR also significantly decreased the illiteracy rate (Bramall, 2009).

In summary, the Cultural Revolution suspended the college entrance exams, changed the regular curriculum, closed schools for years and sent urban students to the countryside.

exams during the CR to take them regardless of age. This policy compensates those who delayed their entrance to college due to the CR. But from 1981 to 2001, people who were older than 25 were prohibited from taking the exam.

According to Du (2003), the CR caused a decrease in human capital accumulation of 14.3% based on average years of schooling. Meanwhile, primary and secondary education were expanded in rural areas and children from lower family background levels were able to be enrolled in college through recommendation. We thus hypothesize that the alternation of China's educational system in the CR reduced the advantage of having a higher status family background on personal educational attainment.

4 Methods

In this paper, we use the DiD method to identify the impacts of the Cultural Revolution on intergenerational and multi-generational mobility. We measure the degree of influence of the CR on individuals using indexes of the affected years which vary by people's birth year. We compare the individual differences (measured by the CR indexes) in educational attainment for people with different parental backgrounds.

People who received their education during the CR were not affected in a uniform manner. For instance, those who were in the last year of high school studies in 1966 may have been affected by the CR because they lost the chance to take the college entrance exam at the usual age; but for those who were in middle schools in 1966, they were also affected by the closure of school, changes in curriculum, and the "Down to the Countryside" movement. Therefore, we assume the impact of the CR differed by years during schooling ages a person was affected. Specifically, Meng and Gregory (2002) construct a measure of the number of affected years for people pursuing education in the CR period (see Column 3 in Table 2). The "affected years" in this measure includes both the years of school closure and the years in which schools did not follow standard academic curricula. Alternatively, Zhou (2014) measured the affected years in a different way (see Column 4 in Table 2). His version of

"affected years" includes only the years of school closure. Both measures of the CR-affected years display an unique inverted U-shape pattern for those born in 1948-1963.

Using these measures of affected years, we first model the impact of the CR on the intergenerational educational mobility:

$$EDU_i = \sum_{j=1}^{3} \beta_j (Ftype_{i,j} \times YA_i) + \beta_4 YA_i + \sum_{j=1}^{j=3} \beta_{j+4} Ftype_{i,j} + \gamma \mathbf{X_i} + \delta_t + \epsilon_i \qquad (1)$$

EDU_i is a dummy variable indicating whether person i obtained at least a high school degree (HS_i), or a college degree (CD_i). FS_i is the years of father's schooling. YA_i is the index for the number of years person i was affected by the radical educational interventions during the CR, using either Meng's or Zhou's measure (see Table 2). YA_i equals 0 for those who received their prime education in periods other than the CR. $Ftype_{i,j}$ is father's education, which is categorized into four levels ($j = 1, 2, 3, 4$, correspondingly): at least high school degree, middle school degree, primary school degree and no education (the base group). X_i are control variable vector including gender, age, age squared, father's age and father's age squared. δ_t is a birth cohort fixed effect, which is a dummy for those born in the pre-CR cohorts. β_4 measures the impact of duration of the CR disruption for the base group. β_5, β_6 and β_7 measure the effects of the levels of a father's education on children's educational attainment for children whose schooling was not affected by the CR. β_1, β_2, and β_3 measure the impact of duration of the CR for people with three different levels of father's education, relative to those who had uneducated fathers. These three coefficients are of primary interest to us since they estimate the DiD effect of the CR on the relative advantage of having a father with different level of education.

We also study the differences in the impacts of the CR on intergenerational mobility for

people who grew up in rural and urban areas:

$$EDU_i = \beta_1 YA_i + \beta_2 Rural_i + \sum_{k=1}^{3} \beta_{3k} Ftype_{i,k} + \beta_4 (YA_i \times Rural_i) + \sum_{k=1}^{3} \beta_{5k} (YA_i \times Ftype_{i,k}) + \sum_{k=1}^{3} \beta_{6k} (Ftype_{i,k} \times Rural_i) + \sum_{k=1}^{3} \beta_{7k} (YA_i \times Ftype_{i,k} \times Rural_i) + \gamma \mathbf{X_i} + \delta_t + \epsilon_i \quad (2)$$

$Rural_i$ is a dummy for people who were born in rural areas. Since rural-urban migration was extremely low in the Maoist period (1949-1976), we assume people grew up and received most of their education in the same type of areas where they were born. YA_i is the index for the years affected by the CR using Meng's measure. All the other variables are the same as those in the equation (1). β_4 estimates the difference in the impact of the CR on those who grew up in rural areas, relative to those who grew up in urban areas; $\beta_{6,1}$ $\beta_{6,2}$, $\beta_{6,3}$ estimate the differences in effect of parental education for rural-born people relative to urban-born people. $\beta_{7,1}$, $\beta_{7,2}$ and $\beta_{7,3}$ estimate the differences in the impact of the CR by parental education for people born in rural areas, relative to those born in urban areas.

We then study the impact of the CR on multi-generational educational transmission. Specifically, we study whether the transmission pattern between grandfather and grandchild changed if the father was affected by the CR:

$$EDU_i = \beta_1 (GFS_i \times YA_i) + \beta_2 YA_i + \beta_3 GFS_i + \gamma \mathbf{X_i} + \delta_t + \epsilon_i \quad (3)$$

$$EDU_i = \alpha_1 (FS_i \times YA_i) + \alpha_2 YA_i + \alpha_3 FS_i + \gamma \mathbf{X_i} + \delta_t + \epsilon_i \quad (4)$$

$$EDU_i = \omega_1 (GFS_i \times YA_i) + \omega_2 (FS_i \times YA_i) + \omega_3 YA_i + \omega_4 GFS_i + \omega_5 FS_i + \gamma \mathbf{X_i} + \delta_t + \epsilon_i \quad (5)$$

EDU_i is educational dummies for whether a grandchild (child of the main respondent) obtained at least a high school degree (HS_i), or a college degree (CD_i). GFS_i and FS_i are the years of schooling for the grandfather (father of the main respondent) and the father (the main respondent), respectively. YA_i is the index for the years the father (the main

respondent) was affected by the CR using Meng's measure. Control variable X_i includes grandchild's gender, age, age squared in equations (3)-(5), and it also includes grandfather's age, grandfather's age squared in equations (3) and (4), and father's age and its squared in equations (4) and (5). δ_t in these three equations denotes the birth cohort fixed effect for the grandchild (dummies of birth cohorts: before 1962, 1962-1967, 1968-1972, 1973-1977, 1978-1982). The estimates of β_1 show us whether the relationship between a grandfather's schooling and grandchild's schooling was weakened by the CR either directly or indirectly. Equation (4) estimates whether the CR has any effect on the next generation. If having a father affected by the CR reduces the advantage of having a more educated father for the next generation, we would expect to find negative estimate of α_1 in equation (4). Finally, we include both the grandfather's and the father's years of schooling in the model in equation (5), which estimates how the CR altered the direct effect of both the grandfather's education on grandchild's education through ω_1.

Next, we study the mechanism behind the father's education and child's college degree attainment by decomposing the process into three parts: obtaining a high school degree, participating the college entrance exam (CEE), and obtain a high scores on the CEE:

$$COL_i = \beta_1(FS_i \times YA_i) + \beta_2 YA_i + \beta_3 FS_i + \alpha A_i + \gamma \mathbf{X_i} + \delta_t + \epsilon_i \tag{6}$$

A_i denotes the step indicators of college degree attainment. We add one step indicator in each of the four model specifications, which we label (i) through (iv): Model (i) includes none of these indicators, so it estimates the overall effect of father's schooling on college degree attainment; model (ii) includes HS_i; model (iii) includes HS_i and CEE_i; model (iv) includes HS_i, CEE_i, and $CEEscore_i$. The control variables X_i in model specifications (i), (ii) and (iii) are the same as in equation (1). In model specification (iv), it also includes a control for the year when the person took the CEE and its squared and cubic forms, the province where the CEE was taken, the type of CEE exam (art, science, or other types).

To allow comparability across different model specifications in equation (6), we assign the scores on the CEE for those who did not report their scores the sample average score and create a dummy for this missing group. Similarly, we assign the year of taking the CEE for those who did not report it to be the year when they were 19 years old and create a dummy for those people. We also add a dummy for people who did not report the province where they took the CEE and a dummy for the type of CEE exam taken. All the other variables in equation (6) have the same definition as in equation (2).

Comparing the the estimated coefficients of β_1 across model specifications allows us to identify the direct effect and indirect effects of father's schooling on child's college degree attainment. We also identify the direct and indirect impacts of the CR on college degree attainment through each of the step indicators by comparing the changes in estimated coefficients of β_2 and β_3.

The last set of estimates use occupation as a proxy for father's status to examine whether the impact of the CR on intergenerational mobility changes for this alternative status proxy. Also, we study the effect of mother's schooling on child's educational attainment and the impact of the CR on this relationship using:

$$EDU_i = \beta_1(MS_i \times YA_i) + \beta_2 YA_i + \beta_3 MS_i + \gamma \mathbf{X_i} + \delta_t + \epsilon_i \tag{7}$$

$$EDU_i = \alpha_1(FS_i \times YA_i) + \alpha_2 YA_i + \alpha_3 FS_i + \gamma \mathbf{X_i} + \delta_t + \epsilon_i \tag{8}$$

$$EDU_i = \omega_1(MS_i \times YA_i) + \omega_2(FS_i \times YA_i) + \omega_3 YA_i + \omega_4 MS_i + \omega_5 FS_i + \gamma \mathbf{X_i} + \delta_t + \epsilon_i \tag{9}$$

where MS_i denotes years of mother's schooling, and FS_i denotes years of father's schooling. All the other variables in equations (7)-(9) have the same definition as in equation (2). The control variables X_i includes the mother's age and age squared in equations (7) and (9), and it includes father's age and age squared in equations (8) and (9). Equation (9) identifies

the direct effect of mother's schooling on child's educational attainment ω_4, and how the CR changed this relationship ω_1.

5 Results

5.1 The Impact of the CR on Intergenerational Educational Mobility

5.1.1 General Impact of the CR on Intergenerational Educational Mobility

Genetic factors and environmental factors are the most frequently cited factors in explaining the intergenerational transmission. Several studies have found empirical evidence supporting the importance of the genetic heritability in the intergenerational transmission process (Mazumder (2008), Bjorklund, Jantti, and Solon (2005), Clark (2014)). The importance of the environmental factors has also been highlighted in the literature on intergenerational mobility (Dahl and Lochner, 2005). Analyzing the impact of the Cultural Revolution on intergenerational mobility provides new empirical evidence for this topic since the CR is a radical environmental change.

We estimate the impact of the Cultural Revolution (CR) on intergenerational educational mobility using a DiD structure as described in equation (1). The estimated coefficient of the measured CR-affected years, as well as the coefficients of the interaction terms between the CR-affected years and parental educational types, allow us to identify such impact.

Table 3 lists the estimated coefficients in equation (1). We use Meng's measure of years affected by the CR in columns (1) and (3), and Zhou's measure in columns (2) and (4). In the specification that uses Meng's measure of CR-affected years, we observe that having a father

who graduated from high school helps to improve the child's probability of obtaining both high school and college degrees. Specifically, having a father with a high school degree (or above) increases the likelihood of the child obtaining a high school degree by 59.1 percentage points and increases the likelihood of obtaining a college degree by 43.9 points, relative to those with an uneducated father. Using Zhou's measure generates similar estimated results.

The results in Table 3 also show that the advantages of having a high school degree (or above) decreased significantly for a child who experienced more years of the CR intervention in education. Each year affected by the CR decreased the advantage of having a father with a high school degree by about 2.4 percentage points in terms of the probability of high school degree attainment. Therefore, for those affected by the CR, on average the advantage of having fathers with high school degrees declines by 7.6 percentage points (the average years affected by the CR is 3.2), which shrinks the advantage by about 13% [5] compared with those born in non-CR cohorts. For college degree attainment, the advantage of having a father with a high school degree decreases on average about 22%. People with uneducated fathers were 0.7 percentage points more likely to obtain a high school degree and 0.3 points more likely to obtain a college degree per year affected by the CR, relative to those received their educations in other periods. Results are in general similar when using Zhou's measure, except that the impact of the CR for people with an uneducated father was negative in terms of finishing high school. The difference between Meng's and Zhou's measures is that Zhou only measures years of school closure while Meng also considers the change in curricula. Thus, we conclude that the school closure reduced educational attainment for all family backgrounds, but the change of curricula may benefit people from the lowest family backgrounds.

The advantage of having a more educated father was reduced more for college degree attainment than for high school degree attainment, suggesting that the advantage of having

[5] This was obtained by using the average decrease rate in the advantage, 7.6, divided by the advantage of having a high school degree fathers in other cohorts, 59.1.

a more educated father for college degree attainment is more likely to be affected by the observed interventions than the advantage for high school degree attainment.

Although the CR successfully reduced the advantage of having an educated father, the advantage of having a more-educated father was not eliminated. For example, even when a person experienced the maximum possible disruption during the CR (7 years), having a father in the highest education category increased the chance of receiving a high school degree by 42 percentage points relative to those with uneducated fathers, 25 points relative to those with fathers with primary school education, and 3 points relative to those with fathers with middle school education. Similarly, for people affected by the CR for the maximum possible years, those with a high school educated father were still 23 percentage points more likely than those with an uneducated father to obtain a college degree, 18 percentage points more likely than those with a primary school education father, and 1 percentage points more likely than those with a father with a middle school education.

One concern of a potential bias in our results is that elder respondents may be a selected sample since they survived and were able to take the survey. As a result, they may be more advantaged relative to others born in the same cohort. Thus, we omit people who were older than 67 years of age from the sample (in other words, we omit the pre-CR group), and re-estimate equation (1), leaving about 94% of the full sample. The estimated results can be seen in the Table A13, which are similar to our estimates in Table 3.

As a second check on the results, we fit the model with both a Logit and a Probit model. The estimated results are presented in Table A14. The estimated results for high school attainment are similar with the results in Table 3, but there are discrepancies between estimated results for college degree attainment. The magnitude of the decline in the advantage of having a father with a high school degree or higher is much smaller using the Logit or

Probit than OLS. Also, we see a smaller advantage in having a more educated father for obtaining a college degree attainment. This may due to small sample for people with college degrees. Nevertheless, the basic patterns we observe in Table A14 are similar to those of the OLS.

Finally, we use years of father's schooling as a measure of father's education to study the impact of CR-affected years on educational attainment. The results in Table A15 confirm our estimated results in Table 3.

5.1.2 Differential Impacts of the CR on Intergenerational Mobility in Rural and Urban Areas

During the Cultural Revolution, primary and secondary schools were greatly expanded in rural areas. We explore whether this expansion reflects in the impact of the CR on intergenrational mobility we observed in Table 3. Equation (2) examines whether the impact of the CR on educational mobility differed by rural and urban areas.

The results are presented in Table 4. In order to present the results more clearly, we report the estimated coefficients for people born in rural areas, people born in urban areas, and the differences between each estimated coefficient for these two group separately. The estimated effects for people who grew up in rural areas are obtained by adding the estimated effects for people in urban areas to the differential effects. Columns (1) to (3) summarize the estimated coefficient for rural-born people, urban-born people, and their differences, respectively, in terms of high school degree attainment. Columns (4) to (6) lists the results of rural-born people, urban-born people, and their differences in terms of college degree attainment.

Comparing the coefficients of father's educational level ($Ftype_1$, $Ftype_2$, $Ftype_3$) between the rural and urban people, we see that the advantage of having a more educated father is significantly smaller for people who grew up in rural areas than those grew up in urban areas. For example, the probability of obtaining a college degree increases by 44 percentage points for a person born in an urban area who has a father with a high school degree relative to a father with no education; while if the person grew up in a rural area, he/she is only 25 percentage points more likely to obtain a college degree than those with an uneducated father. An exception is that the advantage of having a father with a high school degree in obtaining high school attainment is almost the same for people who grew up in urban areas and those who grew up in rural areas.

For people who were born in rural areas and had an uneducated father, the probability of obtaining a college degree increased by 0.5 percentage points per year affected by the CR. This result supports our hypothesis that the CR benefited children who grew up in rural areas with the least educated fathers. And the positive effects of the CR on both the high school and college degree attainment for those people are significantly greater for people with similar background but who grew up in urban areas.

Whereas the CR benefited people who grew up in rural areas with the least educated fathers, it decreased the advantage of having a more-educated father for those who grew up in rural areas. For example, the advantage in terms of high school degree attainment of having a father with a high school degree rather than no schooling for those who were born in rural areas decreased by 17% (-0.07/0.42) per year affected by the CR; in terms of college degree attainment, it decreased by 15% (-0.04/0.25). In contrast, the CR had insignificant impacts on the high school degree attainment for people who had educated fathers and grew up in urban areas, although it also decreased the advantage of obtaining a college degree for those people.

In summary, we find that the CR significantly reduced the advantage of having a father with high school (and above) degree and benefited rural-born people with uneducated fathers in terms of high school and college degree attainment. However, the advantage of having a relatively more educated father and the disadvantage of having an uneducated father did not disappear as a result of the CR.

5.2 The Impact of the CR on Multi-Generational Mobility

Multi-generational mobility is the variation of status across more than two generations within a family. Since the most widely-used empirical model assumes the intergenerational process to be AR(1), if this assumption holds, we expect the multi-generational correlation to die out at a geometric rate. Many studies have provided empirical evidence to support this assumption, showing that the direct correlation between grandfather's social status and grandchild's social status is weak (Ridge (1973), Behrman and Taubman (1985), Warren and Hauser (1997), Lucas and Kerr (2013)). However, Stuhler (2012) argues that estimating the multi-generational correlation using such a simple assumption is an "iterated regression fallacy". Grandparents' status may also have an important direct impact on grandchildren's status. Zeng and Xie (2014) found that the grandfather's schooling had a significantly positive effect on a grandchild's educational achievement when grandparents have co-residence in rural China. Solon (2015) suggested that the discrepancies in the literature implied that there was not a universal pattern for multi-generational mobility.

We estimate the direct and indirect effects of the grandfather's schooling on grandchild's education, as well the impact of the CR on these effects in equations (3)-(5). One of the issues we face is that the CHIP does not have complete, three-generation information for the rural sample, as it lacks information on children living outside of the household for rural

households. Complete information is only available for urban respondents. However, if we only use data on urban residents, it may cause estimation bias. Fortunately, we found in Figure A3 that the patterns of intergenerational mobility are similar for the urban and rural samples. Thus, we have at least some confidence that the results for the multi-generational relationship using the urban sample will be similar to that for full population. We also compare the intergenerational results using the full sample to the results using only the urban sample and the urban sample of families with children in Table A12. We expect the results to be similar using the urban sample to those using full sample if it were available.

Table 5 provides results for equations (3)-(5) using the urban sample: Columns (1), (2), (3) for high school degree attainment, and columns (4), (5), (6) for college degree attainment. First, we conclude that each year of grandfather's schooling increases the probability of obtaining a high school degree by 2 percentage points, and increases the grandchild's probability of obtaining a college degree by 2.3 percentage points. Adding father's schooling to the model in columns (3) and (6) suggests that the direct effect of the grandfather's schooling on grandchild's educational attainment is significantly positive. Only about 10% of the effect is mediated through father's schooling, in terms of both high school and college degree attainments. The large and significant direct effect of grandfather's education indicates that the AR(1) assumption of the intergenerational transmission process may not hold in China's case, which is consistent with Zeng and Xie (2014). Also, the father's experience in the CR did not change the advantage of having an educated grandfather, as can be seen from the estimated coefficients of the interaction terms between the grandfather's schooling and the years a father was affected by the CR.

Comparing columns (2) and (3), and (4) and (5), we see that only about 3%-5% of the apparent effect of the father's schooling is actually due to the direct impact of grandfather's schooling on child's educational attainments. We also estimate the effect of the CR inter-

vention for the father's generation on the child's educational attainment. Interestingly, the results suggest that a father's experience in the CR increased the probability of his child obtaining a college degree, given father's education. It is possible that those who lost opportunities to receive education tended to invest more on their children's education, which is consistent with the findings in Roland and Yang (2017). They may treat such investment as a compensation to their own loss from the CR. Alternatively, the positive coefficient may imply that parents whose own education was reduced because of the CR had unmeasured advantages that they could pass on to their children, independent of their own educational achievement.

To summarize, we find that grandfather's schooling and father's schooling significantly and positively influence children's education. Also, we do not find evidence for declines in the ability of grandfathers or fathers to pass on the educational advantage to their grandchildren or children when the father's generation was affected by the CR. In contrast, the advantage of having a more educated father in attaining a college degree is even stronger for people who had a father with more schooling years affected by the CR.

5.3 Potential Mechanisms

We have shown that the CR reduced the educational advantage of having a more educated father for those facing interruptions during their principal school ages. But we are still not clear about the mechanism behind the reduced advantage. We study this question using equation (6) as the regression model by decomposing the impacts of father's schooling on child's college degree attainment. It also allows us to identify how the CR affect the intergenerational transmission through each of the step factors.

In normal time, the path to a college degree in China is established by national standards.

Admission to either a three-year or four-year college requires a person first obtain a high school diploma. If the person pursues a four-year college degree, he/she needs to take the national college entrance exam (CEE)[6]. College acceptance depends on scores on the CEE[7]. Thus, several key issues jointly determine whether a person can obtain a college degree: obtaining a high school degree, taking the CEE, obtaining sufficient scores on the CEE to meet the admission requirement of a specific college, and finishing all college course requirements to obtain the college degree. We plot a process graph of the hypothesized causal mechanism of how the parental background may affect the college degree attainment through these key elements in Figure 2. As shown in the graph, parental background can directly affect the probability of children obtaining a college degree, as well as indirectly affecting the probability by affecting each step in the process. When a radical political intervention occurs, like the Cultural Revolution, it may weaken the direct or the indirect links between a person's parental background and their college degree attainment. As noted above, this process was modified in important respects by the CR, as the CEE was suspended during the CR, and universities were shut down. In periods when the universities were open, nonacademic admission standards were in place. In addition, changes in curriculum in primary and secondary schools due to the CR may have influenced college attendance for cohorts that did not directly experience disruptions in higher education.

In the CHIP sample, there are 32,976 father-respondent pairs. Among them, 9,182 respondents are at least high school graduates, which is about 28% of the sample. 3,364 respondents reported that they had taken the CEE, which is 11% of the full sample and 37% of all high school graduates. 2,697 people reported their scores on the CEE, which amounts to 8% of the full sample and 80% of people who took the CEE. Finally, 3,620 people had

[6]The exam was administered annually beginning in 1952 but as noted above was suspended in 1966-1976. The exam can be taken more than once but in 1981-2001, it was open only to high school graduates who were younger than 25.

[7]A small number of students are enrolled in college through other channels, for example, students who win awards in math, physics, chemistry or biology contests and students admitted for outstanding athletic or artistic accomplishments.

college degrees (three-year and above) in the sample, which is about 11% of the full sample. The number of college graduates exceeds the numbers of CEE takers, because some three-year colleges do not require the scores on the CEE for admission.

One of the potential biases in conducting this analysis is the possibility that the CEE participation rate and scores in our sample may not be representative of the population of test takers. Since respondents were asked to report whether they took the CEE, and what score they received, many years after the fact, especially for older respondents, non-respond bias could be of importance. We first compared some demographic statistics by respondents' answers on "Whether you ever took the CEE?" in Table A16. Then, we ploted the CEE participation rate across years for 19-year-olds in our sample and compared it with the CEE participation rate obtained from an administrative file and the 2000 Census[8] in Figure A6. These comparisons suggest that CEE participation in the CHIP is similar to that of the population based on administrative data.

The estimated results of the four model specifications of equation (6) are presented in Table 6. First, we observe that the coefficient of father's schooling is decreasing as we add more step indicators into the model. For instance, when there is no step indicator, the coefficient is 0.03, which suggests an additional year of father's schooling improves the probability of obtaining a college degree by 3 percentage points. When all of three indicators are added to the model, it drops to 0.8 percentage points. The result suggests these three step indicators we propose in Figure 2 can jointly explain about 72% of the association between father's schooling and the college degree attainment of children. Specifically, high school completion explains about 55% [9] of the association, the decision to take the CEE explains an additional

[8] "Table 3-1 Number of Population by Age Group and Gender" "Table 6-1 Number of Death Population by Province and Age Group and Gender (1999.11.1-2000.10.31)", the Fifth Chinese Census(2010), `http://www.stats.gov.cn/tjsj/pcsj/rkpc/5rp/index.htm`, last visit: May 8, 2018. "Number of People Took CEE and College Acceptance Rate in 1949-2012", Baidu Wenku (in Chinese), `https://wenku.baidu.com/view/e4a5434b2b160b4e777fcf04.html`

[9] This was calculated using the coefficient of the father's schooling in model (ii), 0.013, minus the coeffi-

14%, and obtaining a higher scores on the CEE explains another 3%, leaving about 28% of the coefficient unexplained by these three step indicators.

At the same time, we observe that the advantage of having a more educated father was reduced for people who were affected by the CR. When no step indicator was included, the reduction of advantage per year of father's schooling is 7% (-0.002/0.029), per year affected by the CR, and when we include all of the step indicators into the model, the reduction of the advantage drops to 5% (-0.0004/0.008), suggesting that the CR also reduced the advantage of having a father with more schooling through these three step indicators. On the other hand, the results suggest that those with uneducated fathers benefited from these procedures if they were affected by the CR. Their probability of obtaining college degrees increased by 1 percentage points each year affected by the CR, relative to people born in other cohorts. However, after controlling all of these three indicators in the model, the effect of the CR on those with uneducated fathers becomes negative, indicating that almost all of the benefit on college degree attainment brought by the CR for those with uneducated fathers can be explained by these three factors. We also estimate the impact of the CR on high school degree attainment, the CEE participation, and the CEE scores in Appendix A3.

5.4 Extensions

5.4.1 The Intergenerational Association between Parental Occupation and Child's Education

To this point, we have measured the intergenerational relationship between parental education and their children's education. One of the unique features of the CR is that people were classified by their parental occupation, which largely determined how the government

cient of father's schooling 0.029 in model (i) and divided by 0.029. The method estimates the contribution of high school completion to the association between father's schooling and child's college attainment.

and others treated them in the CR period[10]. The normally "advantaged" types of parental occupation became "inferior" ones during the CR, and that may have made it difficult for the children of business people and professional who were in schooling during the CR to obtain education. This subsection discusses the impact of the father's and grandfather's occupations on child's educational attainments. We re-estimate equations (2), (4), (5), (6), and change the main explanatory variables to be dummies for four types of parental occupations: 1. Principal, manager, technician or professional; 2. Clerk, commercial and service personnel; 3. Farmers or manufacturing related personnel; 4. Other types of occupations. We also include their interactions with the CR.

The results of models that estimate the associations between child's educational attainment and father's occupation, and between child's educational attainment and grandfather's occupation are shown in Tables A9 and A10. In Table A9, we find a similar pattern with the educational measure in Table 3 that having a higher-status occupation father helps in obtaining high school and college degrees. Also, when children were affected by the CR, the advantage of having a father with a higher-status occupation on child's educational attainment was significantly reduced. One interesting difference between the results in Table A9 and Table 3 is that in Table A9 we observe a significant decline due to the CR in the advantage of having a father who was in the second or the third occupational categories.

In Table A10, we study the impact of grandfather's occupation on child's educational attainment. Having a grandfather who held a higher-status occupation helps the grandchild

[10]As noted in Deng and Treiman (1997): I. Good-class origins, also referred to as the "five red kinds": 1. Revolutionary cadres; 2. Revolutionary army soldiers; 3. Revolutionary martyrs (the orphans of men who died in the revolutionary wars); 4. Pre-liberation industrial workers and their families; 5. Former poor and lower-middle peasant families; II. Middle-class origins: 1. Families of pre-Liberation peddlers and store clerks, etc.; 2. Former middle-peasant families; 3. Families of pre-liberation clerks, teachers, professionals, etc.; III. Bad-class origins: 1. Families of former capitalists; 2. Families of "rightists" (a label denoting those who were outspoken in the Hundred Flowers campaign of 1957); 3. Pre-liberation rich peasant families; 4. Families of "bad elements" (a label denoting "criminal" offenders); 5. Pre-liberation landlord families; 6. Families of counterrevolutionaries.

in obtaining both high school and college degrees. However, we find that having a grandfather who worked as a clerk or commercial personnel helped the grandchild to obtain a high school or a college degree more than having a manager or technician grandfather. But the advantage of having a clerk or commercial personnel grandfather was significantly decreased if the father's generation was affected by the CR. This result is different from our conclusion using education as proxy for grandfather's status, suggesting that the transmission of grandfather's advantage to grandchild was significantly reduced for people with a father who worked as a clerk or as commercial or service personnel.

5.4.2 The Intergenerational Educational Association between Mother's Schooling and Child's Education

Heckman and Hotz (1986), Schultz (1994) and Thomas, Schoeni, and Strauss (1996) found that the mother's schooling was more important for children than the father's schooling. Other studies, like Behrman and Rosenzweig (2002), suggest that the observed association between the mother's schooling and the children' achievement may due to heritability and assortative mating. We use the CHIP sample to analyze the impact of the mother's schooling on the high school and college degree attainment of child, the effects of the CR, and the role of assortative mating in explaining the intergenerational association between mother and children in equations (7)-(9).

The results are reported in Table A11. We observe similar effects of mother's schooling and father's schooling when considered alone on high school and college degree attainment. The importance of assortative mating is also similar, accounting for about 40% of the total effect of either the mother's or the father's schooling on child's educational attainment. The estimated negative impact of the CR on the direct effect of mother's schooling on educational attainment disappears when controlling father's schooling. This suggests that the decrease

of the advantage of having a more educated mother on college degree attainment in the CR is mainly because people with a more educated mother are also more likely to have a more educated father. The different effects of the CR for the mother's and father's schooling is likely related to policies during the CR, which directly targeted people with higher status fathers rather than higher status mothers.

6 Conclusion

In this paper, we study the impact of the Cultural Revolution on intergenerational educational mobility, and multi-generational mobility, and analyze the mechanisms behind observed effects. Using survey data that covers both the urban and rural population in China and weighting it to be geographically representative at the national level, we obtain more reliable estimates than previous studies. We confirm the results in Chen et al. (2015) that the intergenerational educational mobility exhibits an inverted U-shape pattern in 20th century China, with the highest mobility occurring for those who received education in the years of radical changes in the educational system.

Then, we study the impact of the CR on high school and college degree attainment, and how the impact differed across levels of parental education. We find that the advantage in high school or college achievement of having a high school educated father was reduced by 5%-7% for a child for every year the child was affected by the CR; and people from the least educated families were more likely to obtain a high school or a college degree than those born in other cohorts. Although the CR decreased the advantage of having an educated father on a child's educational attainment, the advantage of having an educated father was not eliminated. By decomposing the process of obtaining a college degree, we find that the advantage of having a more educated father helps a person in obtaining a college degree

through obtaining a high school degree, participating in the College Entrance Exam (CEE), and obtaining a high scores on the CEE. The CR reduced the advantage of parental education on child's college degree attainment through affecting these channels.

We study the impact of the CR on multi-generational transmission of educational status. Grandfather's schooling has a direct positive impact on a grandchild's educational attainment even after father's education is controlled. Having a father who received his education in the CR did not reduce the advantage of having an educated grandfather on the grandchild's education. Interestingly, we find that, given father's education, the longer a father received education in the CR, the higher the probability of his children obtaining a college degree.

Consistent with other studies, we use occupation type as a proxy for father's status and find that having a father with a higher-status occupation helps a person to obtain a high school or college degree. Similar to the advantage of higher parental education, the advantage from higher status parental occupation was significantly reduced for people who were affected by the CR. The CR benefited people whose fathers worked as farmers or manufacturing workers in obtaining college degrees. We also estimate the effect of maternal schooling on people's educational attainments. The effect of mother's schooling is similar in magnitude to the effect of father's schooling on high school and college degree attainments of children. Assortative mating explains about 40% of the observed relationship with either father's or mother's education on the child's educational attainment. We do not observe any significant decline in the advantage of having an educated mother for those affected by the CR once father's schooling and its interaction with the CR are controlled.

The Cultural Revolution marked a radical change in China's educational system. It shut down many previous educational resources and decreased the quality of education, but it

also provide new educational opportunities to rural children and children from the least educated family backgrounds. Prior to the CR, most people in China were illiterate, as only those from higher socioeconomic family backgrounds could afford education. Therefore, the destruction of the previous educational system in the CR had large negative impact for those from better family backgrounds, but had little impact for others. Meanwhile, the policies in the CR benefited people in rural areas and those from poor family backgrounds, increasing their access to education, altering the prior process of intergenerational educational transmission.

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Table 1: Descriptive Statistics of the Weighted CHIP Sample

	Mean (1)	Std (2)	Min (3)	Max (4)	N (5)
Panel A: Pre-Mao Cohort (Born before 1945)					
Age	75.09	4.59	70	98	1,915
Male	0.58	0.49	0	1	1,915
Yrs. of Schooling	6.39	4.28	0	19	1,915
High School Degree Attainment	0.17	0.38	0	1	1,915
College Degree Attainment	0.06	0.24	0	1	1,915
Yrs. of Father's Schooling	2.05	3.30	0	19	1,915
Yrs. of Mother's Schooling	0.77	2.07	0	15	1,915
Panel B: Maoist Cohort (Born in 1945-1963)					
Age	58.45	5.20	51	69	13,568
Male	0.52	0.50	0	1	13,568
Yrs. of Schooling	7.47	3.59	0	20	13,568
High School Degree Attainment	0.23	0.42	0	1	13,568
College Degree Attainment	0.06	0.23	0	1	13,568
Yrs. of Father's Schooling	2.86	3.69	0	19	13,568
Yrs. of Mother's Schooling	1.43	2.82	0	19	13,568
Panel C: Post-Mao Cohort (Born after 1963)					
Age	41.16	6.21	25	50	17,493
Male	0.49	0.50	0	1	17,493
Yrs. of Schooling	9.74	3.53	0	21	17,493
High School Degree Attainment	0.33	0.47	0	1	17,493
College Degree Attainment	0.16	0.36	0	1	17,493
Yrs. of Father's Schooling	5.74	4.23	0	19	17,493
Yrs. of Mother's Schooling	4.09	4.01	0	19	17,493
Panel D: All Sample					
Age	49.98	11.77	25	98	32,976
Male	0.50	0.50	0	1	32,976
Yrs. of Schooling	8.66	3.78	0	21	32,976
High School Degree Attainment	0.28	0.45	0	1	32,976
College Degree Attainment	0.11	0.31	0	1	32,976
Yrs. of Father's Schooling	4.40	4.21	0	19	32,976
Yrs. of Mother's Schooling	2.86	3.69	0	19	32,976

Table 2: Measures of Affected Years in the Cultural Revolution

Birth Year	Age in 1966	Meng and Gregory (2002)	Zhou (2014)	Primary and Secondary Schooling Missing Patterns (Affected Birth Years)	College Entrance Delay Patterns (Affected Birth Years)
(1)	(2)	(3)	(4)	(5)	(6)
1947	19	0	0.5	–	College Closed (1947-1954)
1948	18	1	1	Missing Senior High school Only (1948-1950)	
1949	17	2	1		
1950	16	3	4		
1951	15	4	4	Missing Junior and Senior High School (1951-1953)	
1952	14	5	6		
1953	13	6	6		
1954	12	7	6	Missing primary, junior and senior High School (1954-1955)	
1955	11	8	4		Recommendation Only (1955-1958)
1956	10	6	4	Missing Primary and Junior High School (1956-1958)	
1957	9	6	1		
1958	8	6	1		
1959	7	5	0.5	Missing Primary School Only (1959-1963)	No Delay Entrance but Faced Intense Competition (1959-1963)
1960	6	4	0		
1961	5	3	0		
1962	4	2	0		
1963	3	1	0		

This table shows the schooling missing patterns during the CR and measures of "years affected by the CR on education" in Meng and Gregory (2002) and Zhou (2014). Column (1) shows each of the birth year for people were in their prime schooling years during the CR; column (2) lists the age of those people at the beginning of the CR (1966); column (3) lists the "affected years" in the CR for those people using Meng's measure by birth year; column (4) lists the "affected years" in the CR using Zhou's measure by birth year; columns (5) and (6) list possible schooling missed patterns in the CR using Meng's measure, the birth years of the affected population in each pattern are listed in parentheses. Column (5) shows the missed patterns of primary and secondary school, and Column (6) lists the possible delay patterns of college entrance, with affected birth year listed in parentheses.

Table 3: Estimated Coefficients of the Impact of Affected Years in the CR on High School and College Degree Attainments: Based on Equation (1)

	High School Degree		College Degree	
	(1)	(2)	(3)	(4)
Ftype1*YA	-0.024***	-0.027**	-0.030***	-0.026***
	(0.006)	(0.010)	(0.007)	(0.011)
Ftype2*YA	0.006	0.001	0.003	-0.007
	(0.005)	(0.010)	(0.004)	(0.007)
Ftype3*YA	0.003	-0.002	-0.002	-0.004
	(0.002)	(0.003)	(0.002)	(0.003)
YA	0.007**	-0.005**	0.0029*	0.0024
	(0.003)	(0.002)	(0.0016)	(0.0014)
Ftype1	0.591***	0.586***	0.439***	0.428***
	(0.016)	(0.017)	(0.027)	(0.028)
Ftype2	0.356***	0.360***	0.200***	0.205***
	(0.020)	(0.019)	(0.020)	(0.020)
Ftype3	0.153***	0.156***	0.066***	0.066***
	(0.016)	(0.015)	(0.007)	(0.007)
Measure	Meng	Zhou	Meng	Zhou
R^2	0.1870	0.1866	0.1833	0.1819
N	32,976	32,976	32,976	32,976

This table reports the regression results for obtaining high school and college degrees based on equation (2). $Ftype1$ denotes whether the person i has a father with high school degree; $Ftype2$ denotes whether father has middle school diploma; $Ftype3$ denotes whether father has primary school diploma. YA is the measure of years of schooling affected by the CR, using either Meng's measure or Zhou's measure. Control variables include child's birth cohort dummies, gender, age and age squared, father's age and father's age squared (results were not shown in this table); The standard errors were clustered at the child's residential province level.

Table 4: Estimated Coefficients of the Impact of the CR on High school and College Degree Attainments by Birth Area (Rural and Urban): Based on Equation (2)

	High School Degree			College Degree		
	Rural	Urban	Difference	Rural	Urban	Difference
	(1)	(2)	(3)	(4)	(5)	(6)
Ftype1*YA	-0.069***	-0.001	-0.068***	-0.037***	-0.023**	-0.014
	(0.011)	(0.009)	(0.015)	(0.007)	(0.010)	(0.011)
Ftype2*YA	-0.003	0.002	-0.005	-0.011***	0.005	-0.016**
	(0.007)	(0.010)	(0.015)	(0.003)	(0.007)	(0.007)
Ftype3*YA	0.001	-0.006	0.007	-0.004***	-0.003	0.001
	(0.002)	(0.005)	(0.006)	(0.001)	(0.004)	(0.003)
YA	0.002	-0.013*	0.015**	0.005***	-0.005	0.010**
	(0.003)	(0.006)	(0.005)	(0.001)	(0.004)	(0.004)
Ftype1	0.417***	0.435***	-0.018	0.254***	0.444***	-0.210***
	(0.015)	(0.025)	(0.032)	(0.025)	(0.026)	(0.026)
Ftype2	0.203***	0.341***	-0.138***	0.097***	0.274***	-0.198***
	(0.020)	(0.016)	(0.030)	(0.013)	(0.024)	(0.021)
Ftype3	0.087***	0.189***	-0.102***	0.036***	0.113***	-0.087***
	(0.012)	(0.019)	(0.018)	(0.006)	(0.019)	(0.017)
AgriHK	-0.310***	–	-0.310***	-0.115***	–	-0.115***
	(0.017)		(0.017)	(0.013)		(0.013)
R^2			0.3033			0.2521
N			32,976			32,976

This table reports the regression results of equation (4). $Ftype1$ denotes whether the person i has a father with high school degree; $Ftype2$ denotes whether father has middle school diploma; $Ftype3$ denotes whether father has primary school diploma. YA is the measure of years of schooling affected by the CR, using Meng's measure. Columns (1)-(3) list the results for high school degree attainment; and columns (4)-(6) list the results for college degree attainment. Columns (1) and (4) summarize the regression results for people born in rural areas; columns (2) and (5) summarize the regression results for people born in urban areas; columns (3) and (6) summarize the differences between the coefficient estimates for people born in rural and urban areas. The standard errors were clustered at the child's residential province level.

Table 5: Estimated Coefficients for the CR Impacts on Multi-Generational Association between Grandfather's Schooling and the High School and College Degree Attainments of Grandchild: Based on Equations (3), (4), (5)

	High School Degree			College Degree		
	(1)	(2)	(3)			
GFS*YA	-0.002	-	-0.002	-0.001	-	-0.001
	(0.001)		(0.002)	(0.002)		(0.002)
FS*YA	-	0.001	0.001	-	0.0024**	0.0026**
		(0.002)	(0.001)		(0.0009)	(0.010)
YA	0.024	0.007	0.036	-0.008	-0.008	0.003
	(0.031)	(0.018)	(0.039)	(0.033)	(0.009)	(0.030)
GFS	0.020**	-	0.018**	0.023**	-	0.019*
	(0.007)		(0.006)	(0.010)		(0.009)
FS	-	0.037***	0.036***	-	0.044***	0.042***
		(0.006)	(0.006)		(0.004)	(0.004)
N	4,680	4,680	4,680	4,680	4,680	4,680
R^2	0.080	0.1657	0.1701	0.1165	0.2183	0.2241

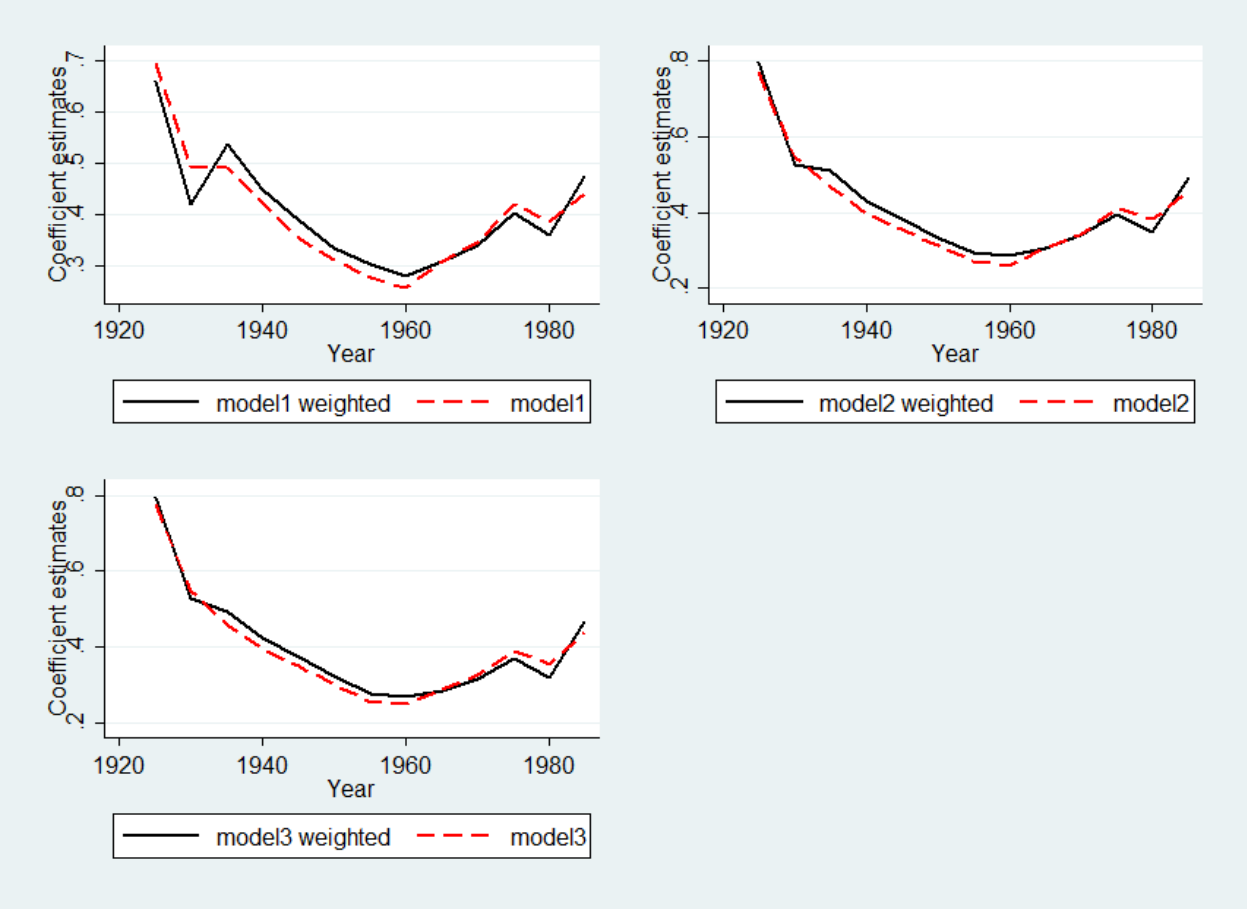
This table reports the regression results of equation (3) (corresponding to columns (1),(4)), equation (4)(corresponding to columns (2),(5)), and equation (5)(corresponding to columns (3),(6)) in terms of high school degree and college degree attainments of grandchildren. YA_i denotes years fathers affected by the CR; FS denotes years of father's schooling; GFS denotes years of grandfather's schooling; In column (1), we control the grandchild's gender, age, age squared, grandfather's age, grandfather's age squared; in Column (2), we control the grandchild's gender, age, age squared, father's age, father's age squared; in column (3), we includes all controls in (1) and (2). The standard errors were clustered at the grandchild's residential province level.

Table 6: Decomposition of the Effect of Father's Schooling on the College Degree Attainment by Step Factors: Based on Equation (6)

	No Controls	Add HS	Add CEE Participation	Add CEE Score
	(i)	(ii)	(iii)	(iv)
FS*YA	-0.0020***	-0.0015***	-0.0009**	-0.0004
	(0.0003)	(0.0003)	(0.0003)	(0.0003)
YA	0.010***	0.003**	0.002**	-0.0003
	(0.002)	(0.001)	(0.001)	(0.001)
FS	0.029***	0.013***	0.009***	0.008***
	(0.002)	(0.001)	(0.001)	(0.001)
HS	–	0.378***	0.234***	0.230***
		(0.018)	(0.019)	(0.019)
CEE	–	–	0.421***	0.162**
			(0.022)	(0.101)
CEE score	–	–	–	0.002***
				(0.0001)
R^2	0.1648	0.3728	0.4826	0.5229
N	31,356	31,356	31,356	31,356

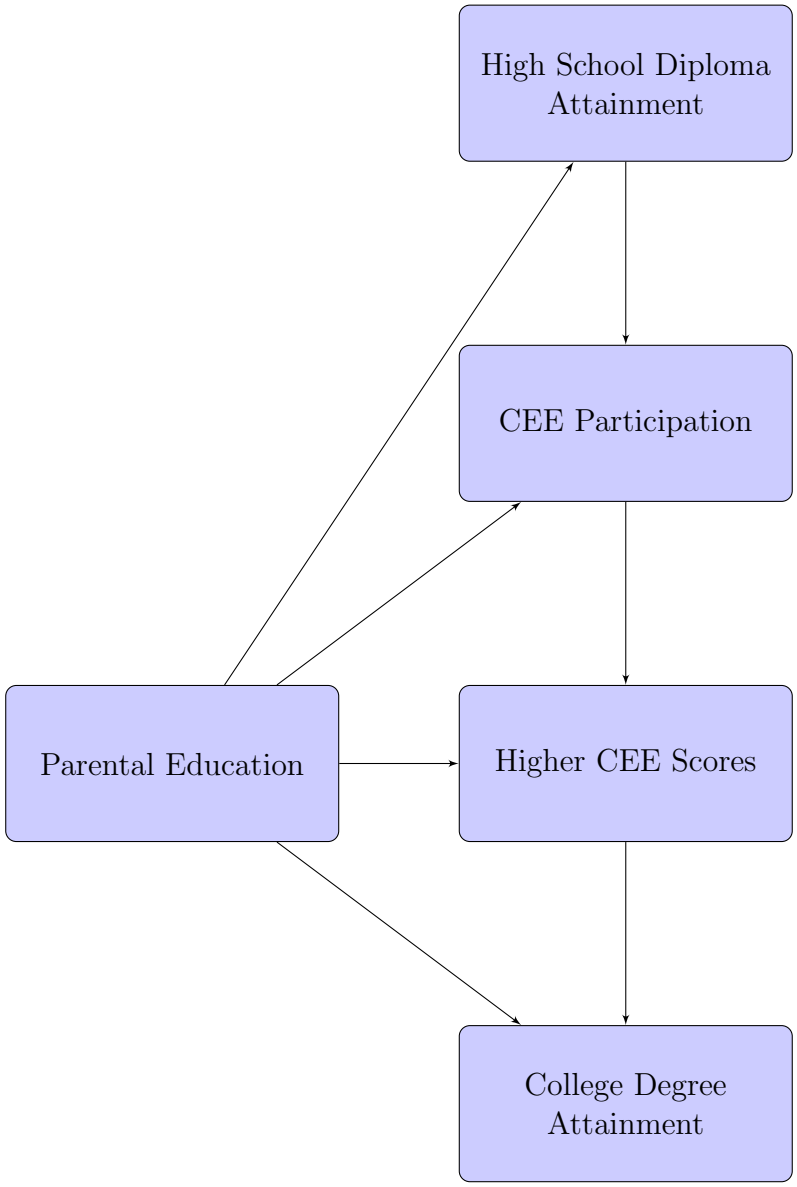
The table reports the regression results for the four specifications of equation (6). FS denotes years of father schooling; CR denotes whether the person was affected by the CR;HS denotes whether the person obtained a high school degree; and CEE denotes whether the person took the CEE;$CEEscore_i$ is defined as the CEE score. Control variables for specification i to iii are: age, age squared, gender, father's age and father's age squared; for specification iv are: age, age square, gender, year when took CEE, province where took CEE, CEE exam types and the missing dummies for those variables. The standard errors were clustered at the child's residential province level.

Figure 1: Estimated Intergenerational Educational Coefficients in 1925-1985: Replication from Chen et al. (2015)



These graphs were plotted based on the estimated intergernational schooling coefficients for the three model specifications in Chen et al. (2015). The regression model in that paper is: $EDU_{i,t} = \sum_{t=1}^{13} \beta_t FS_{i,t} + \gamma X_{i,t} + \delta_t + \epsilon_{i,t}$. $EDU_{i,t}$ is years of schooling of a person i born in cohort t, which is one of the five-year cohorts from 1925 to 1989 (1925-1929,...1985-1989, 13 cohorts in total). $FS_{i,t}$ is years of father's schooling. δ_t is a full set of 5-year birth cohort dummies from 1925 to 1989. In model specification 1 (upper left), $X_{i,t}$ is an empty set; in model specification 2 (upper right), $X_{i,t}$ contains cohort-specific effects of gender, cohort-specific effects of father's age, father's age squared, age, and age squared; in the model specification 3 (lower left), $X_{i,t}$ contains all controls in model 2, and it also includes the cohort-specific effects of living in a coastal province. The solid lines are estimated intergenerational coefficients weighted by the weights described in appendix section A1, and the dash lines are estimated coefficients without weighting.

Figure 2: Hypothesized Mechanism of How the Parental Status Affects the College Degree Attainment of Children



**The appendix section of this paper can be found at

`https://zixinliu.weebly.com/research.html`.