How Does a Hard Manual Labor Experience during Youth Affect Life Later?
The Long-term Impact of the Send-down Program during the Chinese Cultural Revolution

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Abstract

Under the send-down policy (1968–1978) during the Chinese Cultural Revolution, more than 16 million youths were forced to move to rural areas and carry out hard manual labor. This study analyzes the long-term impact of such an experience on income when these youths reached 40–55 years of age. Sent-down males were significantly more likely to upgrade their education after the Cultural Revolution, which caused education interruption for an entire generation. The IV estimates suggest that the sent-down males who upgraded their education earn a 10% higher income than non-sent-down males who also upgraded their education. Conditional on education upgrading, the sent-down males are also more likely to have computers at home. These findings are robust against a variety of family background. The send-down experience has had no significant impact on females.

JEL Classification: I20, N95, O15, O53

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1 Introduction

The adolescent and teenage years are important stages in the human lifespan. During these years, lifelong habits and personality traits are easily shaped or changed by the outside environment. A good environment fosters positive thinking, motivating individuals to perform to the best of their abilities, and to generate high returns for themselves (Borghans et al. 2008; Cunha and Heckman 2007). So far, most literature has focused on how a positive intervention could affect individual achievement later in life later(Rodríguez-Planas 2012; Schochet and McConnell 2008; Heckman and Kautz 2014). However, what if people undergo hard manual-labor experiences during adolescence?

During the 1960s and 1970s, under Mao Zedong's leadership, China underwent the famous Cultural Revolution. The government forced more than 16 million adolescents from urban areas to move to rural areas to carry out agricultural field work. This event is known as the "send-down" movement.[1] The sent-down youths were forced to engage in hard manual labor in the fields for as long as 12 hours a day, 7 days a week (Zhou and Hou 1999). Although the sent-downs were allowed to return to urban areas after the Cultural Revolution, they were scarred by their difficult experience—an experience not shared by non-sent-down urban youths. This study investigates the long-term impact of such a challenging manual-labor experience on these youths when they had reached the ages of 40 to 55.

One might expect that such experiences, which adolescents endured for approximately five years, would have some effect on life outcomes, whether positive or negative. Surprisingly, if we compare the income of those sent down with those not sent down, conditional on individuals having graduated from high school (including junior high) during the Cultural Revolution, we see virtually no income difference between the two. This paper finds that a very important step has been neglected by previous literature, one that reveals a significant effect of the send-down experience. This key step is the upgrading of education after the Cultural Revolution.

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[1]High school in this paper refers to a school comprising grades 7 through 12; it includes both junior and senior high schools.

For several years during the Cultural Revolution, many senior high schools and universities stopped admitting new students due to the government's education policy (Meng and Gregory 2002; Giles, Park, and Wang 2008; Han, Suen, and Zhang 2011).[2] This resulted in education interruption for teenagers graduating from junior and senior high schools during the Cultural Revolution. Han, Suen, and Zhang (2011) find that, after the Cultural Revolution, many of these individuals went back to school to reinvest in their human capital in order to compensate for their interrupted schooling. In this paper, I refer to this "re-schooling" movement as education upgrading. I find that, among individuals who graduated from high school during the Cultural Revolution, the sent-down males were more likely to have upgraded their education compared to the non-sent-down males. It appears that the hard manual labor experience has a strong positive effect on income. However, this effect is conditional on education upgrading. The sent-down males who upgraded their education earn a 10% higher income than non-sent-down males who also upgraded their education. However, for those who did not upgrade their education, the send-down experience negatively affects income because of the loss of years of urban work experience.

Furthermore, consistent with the finding in income, conditional on education upgrading, the sent-down males are more likely to have computers at home than non-sent-down males are. The social economic environment changed dramatically after the Cultural Revolution, with computers being one of the new high technologies favored by the rapid economic growth. Knowing how to operate a computer could have positive affect on one's income; however, it is not easy for individuals aged 40 or 50 to learn such a new technology. The education-upgraded sent-down males may have acquired skills during the send-down that helped them adjust to changes in their environment. The results are robust against the exclusion of individuals living with their children. Falsification test shows that both sent-down males and non-sent-down males are equally likely to own other major home appliances, such as color TVs, air conditioners, or video cameras.

It is natural to believe that agricultural field work in rural areas should have no direct relation to academic education or urban work experience. One interpretation of the results is that the expe-

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[2]In the first 2 years of the Cultural Revolution, not only senior high schools and universities but also elementary and junior high schools were shut down.

rience of years of forced hardship during their youth has helped the sent-down males develop an endurance or greater resistance to future adversity. Many documents have reported that the difficult send-down experience could have motivated these youths to study and work harder later in life (Yang 1992; Wang 2006; Liu 2012b; Tang 2012). These documents reported that sent-down youths learned that life is tough and, further, that hard manual-labor experience made them stronger, helping them gain the ability to face adversity. Appendix B provides a conceptual framework to explain the empirical finding that sent-down males are more likely to upgrade education, and-conditional upon education upgrading-why they earn higher incomes.

Almost every urban family had at least one child sent down (Bernstein 1977). The accumulated number of send-downs during the 1960s and 1970s was equivalent to 10.5% of the total non-farming population in 1979 (Pan 2002). During the Cultural Revolution, local governments had a quota of send-downs to fill every year (Pan 2002; Bernstein 1977; Singer 1971). The quota varied largely by year. Local government determined the send-down selection process based on the quota and the number of age eligible youths (junior or senior high school graduates in their graduation year). If the quota was high, all age eligible youths would be sent down. If the quota was low, the local government would allow families who had already sent away a proportion of their children to keep their current age eligible child.[3]

It has been well documented that parental social status or political capital did not prevent youth from privileged classes from being sent down, as Mao was enforcing social equality in China (Bernstein 1977; Singer 1971; Unger 1980; Zhou and Hou 1999; Xie et al. 2008). Some previous studies, however, have suggested that the send-down program might have discriminated against a group of children whose parents had college-level education.[4] In order to avoid potential bias induced by the selection of the policy, this study focuses only on children whose parents had less than or equal to 12 years of education. (Note that the results are robust when I restrict samples to those individuals whose parents had only equal to or less than 9 years of education.)

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[3]China had a huge baby boom after the war; the average number of children per family during the 1960s and 1970s was four (Zhou 2013; Banerjee et al. 2010).

[4]Mao thought that high education was a main source of social inequality (Pan 2002).

In estimating the send-down effect conditional on education upgrading, parents' education and job information are used to approximate individual's ability which is unobserved to econometricians. In addition, I estimate a differential effect by adopting a difference-in-differences type of specification, which is served to control for the general difference between the send-downs and the non-send-downs (i.e., the difference between the two groups regardless of education-upgrading status), as well as the difference between the education-upgraded group and the non-education-upgraded group (regardless of the send-down experience).

One may still have concerns that the above two strategies may not fully solve the endogeneity problem in education upgrading choice. In the robustness check, I further use the relative number of full-time teachers during the Cultural Revolution (which was determined by the education policies during the Cultural Revolution) as IVs to instrument education upgrading choice. The IV estimation results are consistent with the findings in the OLS estimations.

The positive effects of the send-down experience on education and incomes found in this study are robust and statistically significant even when I: (1) control for family connections; (2) drop all the send-down samples of those able to return to urban areas before the end of the Cultural Revolution; (3) eliminate individuals whose parents had capitalist tendencies (worked in private firms or owned private firms); and (4) focus on individuals from disadvantaged family backgrounds. The robust and significant results suggest that the findings in this paper are unlikely to be altered by the youths' family backgrounds.

Li et al. (2010) suggest that parents were allowed to choose which child to send away, and their empirical results suggest that parents chose to send away the child with the lower ability. If this were the case, the selection within family would cause a downward bias in the estimated send-down effect. Given the findings in Li et al. (2010), the estimated positive effect of the send-down experience suggested in this paper would be a lower bound. Li et al. (2010), however, discovered this parent selection effect from a twin study.[5] It is unlikely that the local government would have

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[5]Except for the first two years of the second stage of the send-down movement, the local government usually required at most only one child to be sent down from each family each year. Therefore, parents with twins had to choose one of the twins to be sent down.

allowed parents much freedom in planning and choosing which child to send if the children were not twins, given that the local government had a send-down quota to fill each year, which varied considerably from year to year.[6]

This paper contributes to a large body of literature including research on the send-down experience, military service, households in the conflict environment, education, and adolescent development. In the send-down literature, papers have focused on the outcome of the send-down experience from different perspectives. By using the fact that parents were forced to choose one of their twins to send down, Li et al. (2010) identify the roles of altruism, favoritism, and guilt in parents' behavior towards their children. Among sociologists, Zhou and Hou (1999) along with Chen and Cheng (1999) report that the traumatic send-down experience had a positive effect on the future income of those sent down. However, Xie et al. (2008) suggest that the send-down experience does not affect their income. This paper focuses on education attainment after the send-down movement and suggests that education upgrading was a key factor that led to a large positive outcome following the send-down experience.

Because of the hardships induced by the send-down experience, the effects of the send-down experience might be comparable with the effect of military service on an individual. Studies suggest that military experience *combined* with financial support has a positive effect on education attainment for returning veterans (Bound and Turner 2002; Lemieux and Card 2001). On the other hand, there is mixed evidence across countries regarding the effect of military experience on income (Card and Cardoso 2011; Earnings and Records 1990; Joshua et al. 2011; Albrecht et al. 1999; Imbens and an der Klaauw 1995). This paper provides evidence that a forced hard experience might have a positive effect on education attainment without the financial support offered by associated programs, such as the "G.I. bill" in the US. Furthermore, the hard experience could have a positive effect on earnings depending on whether individuals upgraded their education after the hardship. Future research might seek to investigate the education-upgrading-dependent hetero-

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[6]Bernstein (1977); Singer (1971); Unger (1980); Zhou and Hou (1999); Xie et al. (2008) suggest that the number of send-downs varied largely from year to year due to the changes in send-down policies. Figure 1 illustrates this variation.

geneous effect of military service in other countries.

The remainder of this paper is constructed as follows. After providing background information and documentation on the send-down policy in the following section, I introduce the process of sample restriction in Section 3. Section 4 describes the education interruption during the Cultural Revolution, the education-upgrading movement after the Cultural Revolution, and the impact of the send-down experience on the choice to upgrade education. Sections 5 and 6 present the estimation results of the send-down effect on income and computer ownership, respectively. Section 7 provides the robustness check, and Section 8 concludes the paper.

2   Background

2.1   The Send-down Policy

The send-down movement is also known as the "rustication movement." In Chinese, it was called "Shang Shan Xia Xiang," meaning "going up to the mountains and down to the villages" (Bernstein 1977). The send-down program began in 1960 and ended around 1978.

Before 1967, the targets of the send-down program were workers, employees, and jobless city dwellers, as well as elementary and junior high school graduates. At this point, people were mostly persuaded—not forced—to go to rural areas. Voluntary send-down numbers dropped when urban people learnt more about the realities of rural life; they were troubled by the hardship of manual labor and the inability to support themselves (Pan 2002). Approximately one million individuals were sent down during this stage.

The second stage of the send-down movement was initiated by Mao's speech in 1968: "It is necessary for educated young people to go to the countryside to be reeducated by the poor and lower middle class peasants. Cadres and other city people should be persuaded to send their sons and daughters who have finished junior or senior high school, college, or university to the countryside"(Pan 2002). The second stage of the send-down movement came to be regarded as a political command. It was primarily forced rather than voluntary. More than 16 million individuals

were sent down between 1968 and 1978. From economic administrators, cadres to students and their parents, if one refused to take part in the send-down program, they could be accused of opposing the great strategy of Chairman Mao (Zhang 2000; Pan 2002).[7]

The massive send-down movement resulted in 10.5% of China's total nonfarming population in 1979 being sent down(Pan 2002), with almost every urban family having at least one child sent down (Bernstein 1977). Every year, local governments had a quota of send-downs to fill (Pan 2002; Bernstein 1977; Singer 1971). The quota varied largely by year. Local government determined the send-down selection process based on the quota and the number of age eligible youths (junior or senior high school graduates in their graduation year). If the quota was high, all age eligible youths would be sent down. If the quota was low, the local government would allow families who had already sent away a proportion of their children to keep their current age eligible child.[8]

The blue bar of Figure 1 indicates the number of individuals sent down each year in the China General Social Survey (CGSS) 2003 data (see data appendix for details). There was a substantial increase in the number of people sent down in 1968, the year Mao made his famous speech about the send-down policy. Statistics also show that the number of send-downs varied considerably from year to year—a variation caused by the differences in yearly send-down quotas (Pan 2002; Bernstein 1977; Singer 1971). The send-down policy was intensively executed throughout the country at the beginning of the second stage of the send-down. The number of sent-down youths decreased between 1970 and 1972 and reached another peak in 1974 and 1975.

The red line in Figure 1 indicates the total number of individuals sent down in each year, as reported in Pan (2002). The two data sources show a very similar tendency in the number of send-downs for each year. The send-down movement ended in 1978 when the new leadership of the Communist Party took control of the government and most of the sent-down youths were allowed to return to urban areas (Zhou and Hou 1999).[9]

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[7]Pan (2002) documented that Mao was essentially anti-urban, anti-intellectual, and pro-rural. This was at the root of his support for the send-down movement.

[8]China had a huge baby boom after the war; the average number of children per family during the 1960s and 1970s was four (Zhou 2013; Banerjee et al. 2010).

[9]In 1985, the government introduced a policy to compensate the sent-down youths, counting

2.2 Send-down Experience and Documentations

Being sent down was an extremely difficult experience for affected adolescents. Several studies (Zhou and Hou 1999; Bernstein 1977; Li et al. 2010) have reported that most of the sent-down youths were forced to carry out hard manual labor in the fields for as long as 12 hours per day and 7 days per week. On average, they were forced to stay in rural areas for about five or six years. Disdain for the send-down policy was widely documented following the Cultural Revolution.

However, the forced years of hard manual labor could have helped urban youth develop a kind of endurance for, or resistance against, future hardships. In rural areas, without parental support, youth were forced to acclimate to an entirely different environment. The process of overcoming difficulty and surviving in a harsh environment at a young age proved to be an important life experience. A substantial number of documents report that the sent-down youths developed a tough working spirit through the hard manual labor experience (Yang 1992; Wang 2006; Liu 2012b; Tang 2012). Wang 2006, for instance, reports as follows: *"Through the send-down experience in the rural area, we learned the spirit of hard work from peasants. We learned that life is tough. The hard experience made us stronger and trained us to have the ability to encounter difficulties ...."* Similarly, Liu 2012a documented a story of a sent-down individual who succeeded in later life. This sent-down male suggested that the hard training experience helped him to build a strong spirit for bearing hard work. China's current president Xi Jinping was also sent down and received education upgrading after his return to the urban area. Xi Jinping describes the send-down experience as having motivated him to have the courage to face difficulties later in his life (Xi 2003).

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their work experience in rural areas as work experience in their current job. The money would be added to their salaries for the rest of their careers. However, salary increase due to work experience was minimal. In 2003, for example, government occupations paid only 1 RMB (0.15 USD) per year of work experience. Thus, five years of the send-down experience only counted for 5 RMB, which is less than 1% of the average income. In calculating salaries, many companies do not account for experience beyond 10 years. Thus, the send-down compensation policy is unlikely to considerably affect people's income and employment.

3 Sample Restrictions

In order to estimate the send-down effect, it is necessary to first investigate the characteristics and family backgrounds of those who were sent down. The ideal comparison group for those who were sent down should be a group of individuals who were not sent down but had similar characteristics and family backgrounds to those who were sent down during the Cultural Revolution.

3.1 Treatment Group and Comparison Group

I only focused on the second stage of the send-down (1968–1978) because this was a forced movement and was announced without anticipation. The targets of the second stage of the send-down program were urban junior and senior high school students upon their graduation. Therefore, the comparison group consists of urban residents who had graduated from junior and senior high school during the Cultural Revolution.[10]

The youngest send-downs were born in 1963 (graduated from junior high school in 1978) and the oldest send-downs were born in 1948 (graduated from senior high school in 1966).[11] This calculation of the birth years of the send-downs is supported by Figure 2. The figure presents the proportion of urban high school graduates sent to rural areas by year of birth. As illustrated in Figure 2, in the peak year, almost 50% of high school graduates were sent down.

In order to avoid potential cohort and age differences between the treatment and comparison groups, I restricted the comparison group to individuals born between 1948 and 1963. Note that these individuals were between 40 and 55 years old in the CGSS 2003 data.

3.2 Family Background

The send-down movement during the second stage was forced and unavoidable. It has been well documented that parental social status or political capital did not prevent the youths in certain

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[10]Urban residents are defined as individuals with an urban resident card.

[11]Because of the education interruption between 1966 and 1968, individuals sent down in 1968 included students who had graduated between 1966 and 1968 Meng and Gregory 2002.

privileged classes from being sent down (Bernstein 1977; Singer 1971; Unger 1980; Zhou and Hou 1999; Xie et al. 2008). The children of many communist party leaders and government officials were also sent down. The daughter of Deng Xiaoping (China's Chairman in the 1980s) and the nephew of Zhou Enlai (China's first Prime Minister who served between 1949 and 1976) were among the privileged children not given preferential treatment.

Almost every family in the affected generation had at least one child sent down (Bernstein 1977). The send-down selection was *not* based on children's personal traits; however, previous literature suggests that the send-down program discriminated against a group of children whose parents had college-level education, capitalist tendencies, were working for a private organization, or owned a private business (Bernstein 1977; Pan 2002; Zhou and Hou 1999).[12]

The CGSS 2003 provides a detailed set of information about both parents when the respondents were 18 years old, which is very close to the time the respondents would have been selected to be sent down. The information includes mother's and father's (1) years of education, (2) Communist Party membership status, (3) leadership status—whether they were chief officers of a branch of government or leaders in the Communist Party, and (4) capitalist tendencies—whether they worked in a private sector or owned a business.

Table 1 presents descriptive statistics on the family backgrounds of those sent down and those not sent down. The regression results are reported in Table 2). I divide parent education into three groups: (1) equal to or less than junior high school, (2) senior high school, and (3) college-level or above. Paternal education is the only statistically significant family background element on send-down probability, such that children whose fathers had college-level education or higher were more likely to be sent down (column 2 of Table 2). Note that, among parents with senior high school education, the proportion of send-downs and non-send-downs is equally distributed.

In order to avoid a potential correlation between parents' education and personal unobserved characteristics, in all further regressions, I focus only on individuals whose parents (both father and mother) had 12 or fewer years of education. Note that the results in this paper are robust to the

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[12]During the Cultural Revolution, university education was seriously criticized, as Mao believed high-level education to be a source of inequality.

exclusion of people whose parents had more than *9* years of education or capitalist tendencies (see Section 7).

In summary, I restrict samples to individuals who (1) were born between 1948 and 1963, (2) were junior high school or senior high school graduates between 1966 and 1978, (3) were sent down after 1967 if they were sent down, and (4) did not have parents with more than 12 years of education. Note that the restricted sample is used to conduct analyses henceforth.[13] Further sample restrictions are employed in the robustness checks.

4 Education

4.1 Education Interruption during the Cultural Revolution

The Chinese Cultural Revolution (1966–1977) caused a large-scale education interruption (Meng and Gregory 2002; Giles et al. 2008; Han et al. 2011). During the first two years of the Cultural Revolution, schools at all levels were closed and admission of new students was stopped. Although high schools were gradually reopened as of 1968, admission of students to universities resumed only after 1969 and on a small scale. Academics-based entrance examinations were not available for any level of school during the Cultural Revolution.

Table **??** shows the number of students by education level for each year.

The education policy during the Cultural Revolution significantly affected the number of students enrolled in universities and senior high schools. The student ratio of university to senior high school to junior high school was 1:2:9 in 1960 (i.e., for every 9 junior high school students, there were 2 senior high school students and 1 university student). This number jumped to 1:73:479 in 1970 and went back to 1:18:58 in 1978 when the Cultural Revolution ended. A substantial number of individuals lost the opportunity to go to university, and some could not even enter senior high

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[13]Nine individuals in the sample were able to return to school after entering the labor force *during* the Cultural Revolution. As returning to school *during* the Cultural Revolution was an uncommon event, I drop this sample for potential endogeneity, although the estimation results do not change when it is included.

school.[14]

4.2 Education Upgrading after the Cultural Revolution

After the Cultural Revolution, the education system resumed normal operation. Schools that were closed during the Cultural Revolution were reopened. There was high demand for reinvesting in education among individuals who had experienced education interruption because of the Cultural Revolution (Han et al. 2011). Based on this demand, China gradually increased the number of institutions offering degree programs to people in the labor force. Some programs, such as adult education, offered courses at night or on weekends to accommodate students' schedules. The degree programs included senior high school degrees and 3- and 4-year university bachelor degrees.[15] Many individuals utilized these options to go back to school to compensate for their lost opportunities.

In this paper, I refer to the reinvestment in education as "education upgrading." Specifically, education upgrading applies to individuals who left school during the Cultural Revolution but acquired a higher degree of education—senior high school or university—after the Cultural Revolution. According to the CGSS 2003 data, almost one-fifth of the affected generation upgraded their education after the Cultural Revolution.

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[14]The number of students in university, senior high school and junior high school was 962000, 1675000, 8585000 in 1960, 48000, 3497000, 22922000 in 1970 and 856000, 15531000, 49952000 in 1978, data source: Comprehensive Statistical Data and Materials on 50 years of New China. Note that due to the population expansion policy during the 1950s and 1970s, the number of individuals aged between 10 to 20 has increased from 140 million in 1960 to 235 million in 1978. The absolute number of students in elementary schools and high schools has also increased due to the expansion of population.

[15]Adult education initially started in China in the 1950s on a very small scale owing to low demand. During the Cultural Revolution, adult education, both general and technical, was regarded as heresy and nearly stopped entirely. After the Cultural Revolution, especially after 1980, it was restored and quickly came to be offered by large-scale institutions (Duke 1987). The length of the degree program offered in the adult education system was approximately equal to that of the normal degree program.

4.3 The Send-down Effect on Education Upgrading

In the restricted sample of the CGSS data (See Section 3), 24.1% of sent-down males upgraded their education, compared to 19.6% of the non-sent-down males (Table 3). For females, the difference between the two groups was smaller—15.9% of the sent-down group and 14.4% of the non-sent-down group upgraded their education. Conditional on education upgrading, on average, the sent-downs began upgrading their education in 1985, one year earlier than the non-sent-downs.

I use a probit model to test whether the send-down experience statistically raised the probability of upgrading one's education. The results are presented in Table 4.

$$EduUpgrade_i = \beta_0 Senddown_i + \beta_1 F_i + X_i\gamma + u_i \tag{1}$$

$EduUpgrade_i$ is a dummy variable that equals one if an individual's education was upgraded after the Cultural Revolution and zero otherwise. $Senddown_i$ is a dummy variable that equals one if an individual has been sent down and zero otherwise. X_i is a set of observed individual characteristics. It includes the number of years of education an individual received before 1978, age, years of Communist Party membership, and province dummies. The CGSS 2003 data reports individuals' full education history, including the start and end years of each education program. The education-upgrading and years of education before 1978 dummies are constructed from these education history data. Age represents the difficulty of returning to school because of biological reasons. The education system went back to normal in 1978 and gradually expanded thereafter. The older the individual, the more difficult it was to return to school. u_i is an error term clustered at the province level.

F_i is a measure of family background that controls individual i's unobserved ability. It is a linear function of both father's and mother's years of education, Communist Party membership, leadership status, and capitalist tendencies. The squared term of parents' years of education is also included. Note that, as long as send-down status is not correlated with family background or ability, excluding F_i from the regression should not affect the coefficient of $senddown_i$.

Columns 1 through 6 only use male samples. In the first column, none of the family background variables are controlled. The estimated result suggests that the send-down experience increased the probability of individuals receiving education upgrading by 10%. From columns 2 through 6, more and more family background variables are controlled. The send-down coefficient is highly significant. It is also fairly constant and close or equal to 10%. This suggests that the send-down selection is unlikely to be correlated with family background or ability in the restricted sample; otherwise, we would observe large changes in the magnitude of the send-down coefficient.

Several years of hard manual labor could have cultivated a strong motivation to avoid manual labor later in life among those sent down, thereby encouraging their pursuit of higher levels of education upon their return to urban areas. They knew that higher education could substantially increase their chances of avoiding hard manual labor.

In female samples (column 7), the coefficient is much smaller with a large standard error. The non-significance of the send-down coefficient among females can be explained as follows: when female send-downs returned to urban areas, they had already reached 23 years of age, a typical age for Chinese women to get married. Most of the females, therefore, spent more time looking to get married and raise children than to further their education. However, after they were married and had children, it became more difficult for them to go back to school than the males did.

5   The Send-down Effect on Income

The long-term send-down effect on income could be ambiguous. It could be positive because the hard manual labor experience could have motivated those sent down to work harder later in their lives. On the other hand, an average five-year loss of urban work experience and network connections could have a negative impact.

Table 5 reports the average incomes of the send-down group and the non-send-down group by gender. If we only examine the numbers in the first panel of Table 5, it appears that the send-down experience had no impact on income for either gender. However, when I further divide income

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by whether individuals upgraded their education, there is a large difference between the income of those sent down and those not sent down. For males who upgraded their education, the average income of the send-down group is 1587 RMB, higher than the income of the non-send-down group by 343 RMB. In contrast, for those who did not upgrade their education, the sent-down males earn an income 165 RMB lower than the non-sent-down males.

The pattern of income difference in the female samples is similar to that in the male samples. However, the magnitude of the difference is not as large.

5.1 Identification

Given the income differences described in Table 5, which suggest a large positive effect of the send-down experience, conditional on education upgrading, I use the following regression model to estimate the send-down effect on income for males.

$$Income_i = \alpha_0 Senddown \times EduUpgrade_i + \alpha_1 Senddown_i + \alpha_2 EduUpgrade_i + \alpha_3 F_i + X_i\gamma + \epsilon_i$$

(2)

$Income_i$ is the log monthly income of the individual i. $EduUpgrade_i$ is an education-upgrading indicator dummy that is equal to one if one received education upgrading and zero otherwise. X_i is a set of individual characteristics that includes total work experience, total years of education, employment status, age, number of years of Communist Party membership, and province dummies. Same as in Equation 1, F_i is a function of family background that controls for unobserved ability.

Equation 2 is a difference-in-difference type regression model. α_1 estimates the general difference between send-downs and non-send-downs (i.e., the difference between the two groups regardless of education-upgrading status). For example, losing several years of urban work experience during send-down represents a common experience between education-upgraded and non-education-upgraded send-downs. Note that, if the send-down policy generated any other differ-

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ences between the send-downs and the non-send-downs, these differences are also captured by α_1. The difference between the education-upgraded group and the non-education-upgraded group (regardless of the send-down experience) is included in α_2. Note that the total years of education includes the years of education upgrading. Therefore, the dummy variable $EduUpgrad_i$ captures the additional premium of an individual having upgraded their education.

α_0 is the variable of interest. The income differences illustrated in the third row of Table 5 is captured by α_0. α_0 estimates the differential effect, which is the additional difference between send-downs and non-send-downs among only those who had upgraded their education.

5.2   Estimation Results

The OLS estimation results of Equation 2 are reported in Table 6. Column 1 includes Send-down, Education Upgrading, and their interaction term, without any additional controls. Column 2 through column 8 include controls for individual characteristics and family backgrounds to assess robustness.

Through columns 1–9, α_0, the coefficient of the interaction between send down and education upgrading is significant and stays around 0.2. The magnitude is also twice the magnitude of the negative send-down coefficient (columns 3–8). This suggests that, conditional on education upgrading, the send-down experience has a strong positive effect on income for males. It is worth noting that the conditional difference between the send-downs and the non-send-downs is robust even after controlling for occupation dummies (columns 7–8).

The send-down coefficient is negative and significant at 10% from columns 3–8. In column 9, where I excluded the years of send-down experience from total work experience, the negative coefficient for send-down becomes smaller and non-significant. This suggests that the negative effect of send-down could be driven by the loss of urban area work experience. In rural areas, the send-downs were usually assigned to do agricultural work. The agricultural-work experience would hardly contribute to an urban job.

The coefficient of the education-upgrading dummy is positive but non-significant. The results

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suggest that there is no additional premium for upgrading education among non-send-downs. This is not surprising, as the number of years of education upgrading is included in the total years of education. In addition, F_i controls for unobserved ability. The education-upgrading dummy might only capture the difference in education quality before and after 1978. The education quality after the Cultural Revolution was, in general, higher than that during the Cultural Revolution. However, if we account for the fact that when those individuals upgraded their education, they had already reached the age of 30 and likely had a daytime job, we might not observe a substantial increase in return to education among non-send-downs.

Column 8 adds a government-related work place indicator and its interaction term with send down. After the Cultural Revolution, if the government provided any informal compensation for people who were sent down, sent-down individuals who work in a government-related workplace would be more likely to have a higher income. The non-significance of the send-down by government interaction term suggests that it is unlikely that the government compensated the sent-down people in any informal manner. Similar to the estimation results in Table 4, the send-down experience does not have a significant effect on females (column 10).

6 The Send-down Effect on Computer Ownership

After the Cultural Revolution, China had a series of economic reforms. The social economic environment changed dramatically. As an example, computers are one of the new technologies favored by rapid economic and technological growth.

Knowing how to use a computer could have potentially benefited individuals during the period of socioeconomic and technological growth. However, learning to use a computer might have been a challenge for both the send-down and the non-send-down groups. Computers made their presence in China in the early 1990s and came to prevail only after 2000. It takes time and effort to learn to use a computer even for the young, let alone for individuals who are 40 or 50 years old. Owning a computer could serve as an indicator of an individual's ability to quickly adapt to

technological change.

The CGSS data ask respondents various home appliances they own: computers, color TVs, air conditioners, and video cameras. Unlike computers, home appliances such as color TV, air conditioners, and video cameras require little or no learning skills and bring almost no benefit to an individual's earnings or employment opportunities. As the send-down experience should have no effect on ownership of these non-skill-related appliances, I estimate this effect using falsification tests in my investigation of the send-down effect on computer ownership.

Panel A of Table 7 presents the statistics of the dummy variable computer ownership by gender, send-down experience, and education-upgrading status. In the education-upgraded male samples, the sent-down group has 20% more individuals have computers than the non-sent-down group. There is a similar tendency in the female sample; however, the difference is much smaller. In panel B, the estimation results suggest that, conditional on education upgrading, the sent-down males own more computers than non-sent-down males do. However, there are no significant differences in ownership of other major household appliances.

One may have a concern that computers are used by the children of respondents rather than the respondents themselves. In order to limit this bias, I restricted the samples to individuals who are not living with their children or do not have children. The regression results are presented in the last column of Table 7. The estimation results are consistent with the finding in column 1, although the standard errors increased because of the small sample size.

7 Robustness Check

7.1 IV

A potential concern in the identification strategy is that parents' education and job information can not fully control for unobserved ability, and in addition, the difference-in-difference type of specification can not fully control for the general difference between education upgraded group and non-education upgraded group. If this is the case, it would result in endogeneity in education-

upgrading choice. For this reason, I use exogenous variation from the school closure policy during the Cultural Revolution to instrument the education-upgrading choice. Introducing IVs helps solve the endogeneity problem; the trade-off is that it only identifies a local effect.

Individuals upgraded their education because their education was interrupted during the Cultural Revolution. During the Cultural Revolution, at least two exogenous factors determined whether a senior high school student could move on to university after having graduated: the number of full-time teachers employed at the university and the number of senior high school students. The former measures the number of universities or schools that had not been closed; the latter measures the number of individuals that could potentially compete for admission. The number of full-time teachers was exogenous because it was determined by education policies during the Cultural Revolution, such as school closures. The number of students can be considered exogenous because it was affected by the education policy as well as by the population expansion policies during the 1950s and 1960s.[16]

I divide the number of full-time university teachers by the number of senior high school students to measure the possibility of education interruption that a senior high school student could have experienced education interruption during the Cultural Revolution. If there were relatively fewer full-time university teachers for the number of senior high school students in the region in which the senior student graduated, it would be more likely that this student's education was interrupted. The student would, therefore, be more likely to have sought education upgrading after the Cultural Revolution. It might seem plausible to divide number of university teachers by the population to calculate the per capita number of teachers, rather than dividing the number of teachers by the number of senior high school students. Note, however, that only a subset of the population had possibility of attending university; only senior high school students could potentially have this opportunity. Therefore, dividing the number of university teachers by the number of senior high school students would better capture competitiveness.

By the same logic, I use the ratio of senior high school teachers to junior high school students

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[16]The Chinese government introduced population expansion policies during the 1950s and 1960s, which resulted in substantial population growth.

to measure the probability of a junior high school student experiencing education interruption. The teacher-student ratios varied across province and years. I match the teacher-student ratio with the individuals' end-of-schooling year (during the Cultural Revolution), the level of schools these individuals could potentially attend (either university or high school), and the province in which they lived. For example, the measure for XiaoMing, who graduated from a senior high school in Shanghai in 1972, is the university teacher to senior high school student ratio in Shanghai in 1972, while the measure for HaiLiang, who graduated from a junior high school in Beijing in 1969, is the senior high school teacher to junior high school student ratio in Beijing in 1969. In the rest of the paper I refer to this instrument as "Teacher Ratio."

The variation is based on the differences in Teacher Ratio across the years within each province. Note that province dummies are included in all regressions in this paper. They control for all provincial-level time-invariant factors.

Because the Teacher Ratio measures the probability of students having gone to upper degree schools during the Cultural Revolution, the smaller the Teacher Ratio, the more likely an individual's education was interrupted during the Cultural Revolution, and therefore, the more likely an individual would have chosen to upgrade their education after the Cultural Revolution. That is, we would expect Teacher Ratio to have a negative effect on education upgrading.

I also interact Teacher Ratio with age and use it as the second instrument variable. As shown in Section 4.3, age is also an important factor affecting education upgrading. When the education system resumed normality, the older the individual, the higher the cost of education upgrading. This could be due to both biological reasons and family reasons, such as raising children. As they grow older, individuals would be less likely to upgrade their education. Therefore, the "lost opportunity" effect might diminish with age. In the first stage, therefore, we would expect the coefficient of the interaction between teacher ratio and age to have an opposite sign to the teacher ratio coefficient.

Table 8 reports the IV estimation results. Birth year dummies are included to control for co-

hort effects.[17] In column 1, the coefficient for $TeacherRatio$ is negative and its interaction term with age is positive. This is consistent with what I expected: individuals who graduated in a low provincial teacher ratio year during the Cultural Revolution were more likely to have experienced education interruption; therefore, they would have been more likely to upgrade their education after the Cultural Revolution. This lost opportunity effect diminishes if the individual was older.

I further divide samples by non-send-down and send-down (columns 2 and 3) instead of reporting the regression results of the interaction between send-down and education upgrading. Thereby, we can gain a better understanding of how the teacher ratio, the ("lost opportunity"), affects each group. Section 4.3 suggested that the harsh manual-labor experience induced the sent-downs to upgrade their education. Similarly, the estimation results in columns 2 and 3 suggest that the sent-downs were more affected by the "lost opportunity" than were the non-sent-down individuals. The size of the coefficient for teacher ratio within the send-down group is much larger than that of the non-send-down group.

The second stage estimation results are consistent with the OLS results. Conditional on education upgrading, sent-down males earn significantly more income and are more likely to own a computer than those who also received education upgrading but had not been sent down. The size of the IV estimates is larger than that of the OLS estimates. The estimation results in column 3 indicate that an education-upgraded sent-down male will earn a 35% higher income compared to one who also received education upgrading but had no send-down experience (subtract 0.18 from 0.53 in column 4).

The IV estimates are more than two times greater than the OLS estimates. One reason is that the instruments identify a local average treatment effect. People might upgrade their education for many reasons, such as new schools opening near their home. However, the compilers in the IV strategy are those who upgraded their education only because of the education interruption. The compilers likely would have been qualified to go to upper-level school had there been no Cultural Revolution. Compared to those who would have been disqualified for higher education regardless

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[17]CGSS 2003 is a one year individual level data, therefore birth year dummies are equivalent to age dummies.

of the education policies, the compilers potentially have a higher return to education. They had been denied the opportunity to achieve their desired level of education. In addition, by going to rural areas to carry out hard manual labor, they were set back significantly. The joint experience of education interruption and hard manual labor could have motivated some send-downs to upgrade their education and work harder once they regained the opportunity to do so.

7.2   Other Robustness Checks

Social networks play an important role in affecting individuals' wage and employment opportunities in China (Wang 2013). Several years away from urban areas could have potentially weakened the network of connections among sent-downs, thereby causing an income discrepancy compared with non-sent-downs. The first robustness check exercise adds a family connection indicator in the regression to control for any potential correlation between the sent-downs and social networks. The indicator comes from the survey question "How many of your relatives or friends helped get you your job?" The estimation results are presented in panel A of Table 9. The coefficients of both Senddown alone and its interaction term with EduUpgrade remain nearly unchanged from corresponding estimations in previous tables. This suggests that family connections are unlikely to affect our estimation results.

Early in the 1970s, the government began allowing some sent-down youths to return to urban areas if they could find a job or if they were accepted at a school in an urban area. Li et al. (2010) and Zhou and Hou (1999) suggest that well-connected families were able to get their children back to urban areas earlier than others. Thus, it is possible that controlling the family connection indicator may not fully solve the problem here. In order to avoid the potential endogeneity problem resulting from early return events, I dropped all sent-down individuals who were able to return to urban areas before the end of the Cultural Revolution.[18] These results are presented in panel B of Table 9. The results suggest that family connections and early returns are unlikely to have affected the estimated send-down effects. The coefficients for send-down and its interaction term remain

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[18]This accounts for 29% of the total male send-down population in the data.

statistically significant and the sizes approximated those previously estimated.

I further tested the send-down effect among individuals with different family backgrounds. Specifically, I focused on the following family backgrounds: (1) parents who did not work in a private firm and did not own a private business (i.e., did not have capitalist tendencies); (2) parents who were not Communist Party members; (3) parents with only junior high school education or lower; (4) father who worked in nongovernment sectors; and (5) father who was in an unskilled white collar or blue collar occupation. In (4) and (5), I do not restrict by mother's work place or occupation because relatively few individuals had a working mother when they were 18 years old.

Samples (2) through (5) include individuals with "disadvantaged" family backgrounds. Children from these family backgrounds likely had less political power, less government-related connections, and/or less motivation for higher education. From the estimation results in the previous sections, we generated several significant positive effects for the send-down experience: sent-down males are more likely to have upgraded their education and, conditional on education upgrading, they earn higher incomes and are more likely to have computers at home. Therefore, I focus on individuals with "disadvantaged" family backgrounds, investigating whether the positive effects of the send-down experience could be driven by differences in family backgrounds.

The results are reported in the remaining panels in Table 9. All the coefficients in Table 9 have the correct sign, and all of them are not statistically different from the regression results in the previous sections. Overall, the results reported in Table 9 suggest that the send-down effects are robust against various types of family backgrounds.

8 Conclusion

The forced send-down movement affected more than 16 million urban youths in China. Several years of manual labor experience in rural areas were undeniably hard on those urban youths who were, on average, only 17 years old when they were sent down. The loss of years of urban work experience caused a negative effect on income. However, the estimation results suggest that the

hard manual labor experience induced those urban youths to upgrade their education after the Cultural Revolution, and conditional on upgrading education, the send-downs earn higher incomes than the non-send-downs.

In the current political environment, no policy makers would consider initiating a similar send-down movement again. However, the send-down event might elucidate some important factors in the education of teenage children. Hard mental and physical training might not be as detrimental as once thought. Children experiencing difficulties and overcoming these difficulties independently might become stronger and work harder in their later life, just as numerous send-downs have described how the hard send-down experience had cultivated in them a strong spirit (Yang 1992; Wang 2006; Liu 2012b; Tang 2012). More evidence is needed to understand how adversities could affect youth and shape their path in the future. Future study could focus more on the effect of adversity during adolescence or childhood. It would also be interesting to compare the short term and long term effect of adversities.

Appendix

A. Data

The main data used in this paper are the China General Social Survey (CGSS) 2003. The CGSS 2003 data are also part of the East Asian General Social Survey. The data were collected jointly by the Hong Kong University of Science and Technology Survey Research Center and the Sociology Department of People's University of China. CGSS 2003 was an individual level survey and was conducted in city areas. It covered 24 provinces and four municipalities. Only three autonomous provinces were not included in the survey: Tibet, Qinghai, and Ninxia.[19] The survey was conducted based on a probabilistic sample and stratified design.

B. Conceptual Framework

Upgrading education is a time- and energy-consuming endeavor for individuals who are already 30 years old. Such individuals often have a job during the day and a family to take care of at home. However, as suggested by numerous documents, such as Yang (1992); Wang (2006); Liu (2012b); Tang (2012), the send-down experience improved their capability to bear such hardships. Therefore, for the send-downs, exerting effort toward upgrading education is not as costly as it might be among non-send-downs. Because of the low cost of exerting effort, send-downs are more likely to upgrade education and exert more effort toward further studies. If the return to education depends on the effort put into study, we would also find that send-downs who upgraded education would on average earn higher incomes compared to non-send-downs who also upgraded their education. The following simple model illustrates the above idea.

e_i is the effort an individual i put into study when upgrading their education. e_i is non-negative; it equals 0 if individual i choose not to upgrade their education. An individual chooses the level of effort to maximize his/her utility.

$$max_{e_i} w(e_i, a_i) - C(e_i) \tag{3}$$

The wage function $w(\cdot)$ depends on an individual's effort in study and his ability $a_i \in A$, where A is the space of ability. Both send-downs and non-send-downs draw a from same distribution F(.). The wage function satisfies properties $w_a > 0, w_e > 0, w_{ea} > 0$. The last condition indicates that the return to effort is increasing in ability. There is a trade-off in exerting effort: exerting effort towards studying can increase wages; however, exerting such effort is costly. Denote the cost function as $C(e_i)$ of effort. This satisfies the condition $C_e(\cdot) > 0$ and $C_{ee}(\cdot) > 0$. For the sent-down group, providing additional effort is less costly. A simple cost function for send-downs could be $C(e_i) - \theta e_i$ with $\theta > 0$. For simplicity, the wage function does not depend on experience. (We can think of this is as a case in which we compare individuals with identical years of experience.)

The first-order condition of Equation 3 is

$$w_e(e_i, a_i) = C_e(e_i) \quad \forall a_i \in A \tag{4}$$

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[19]Qinghai is a province next to Tibet. Ninxia is another minority province located in inland China. The 2003 survey was conducted in October and November.

Let a^{*NS} where a^{*S} denotes the ability of the marginal individual who is indifferent to upgrade education for the non-send-down group, NS and the send-down group, S respectively. This satisfies

$$w_e(0, a^{*NS}) = C_e(0)$$

$$w_e(0, a^{*S}) = C_e(0) - \theta$$

We have $a^{*S} < a^{*NS}$, since $w_e(0, a^{*S}) < w_e(0, a^{*NS})$ and $w_{e_i, a_i} > 0$. Thus, for any increasing CDF of a, F(.)

$$1 - F(a^{*S}) > 1 - F(a^{*NS})$$

That is, more people in the send-down group upgraded their education.

Denote the solution of the first-order condition as $e_i^S(a_i)$ for send-down group and $e_i^{NS}(a_i)$ for non-send-down group. Combine first-order conditions with the assumption that send-downs have lower marginal cost of effort, we have

$$w_{e_i}(e_i^{NS}(a_i), a_i) > w_{e_i}(e_i^S(a_i), a_i) \quad \forall a_i > a^{*S}$$

Thus, for a given ability, send-downs earn higher income than non-send-downs

$$w(e_i^{NS}(a_i), a_i) < w(e_i^S(a_i), a_i) \quad \forall a_i > a^{*S}$$

For individuals who do not upgrade education, their incomes are same (given same years of experience).

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Figure 1: Number of Youth Sent to Rural Areas by Year
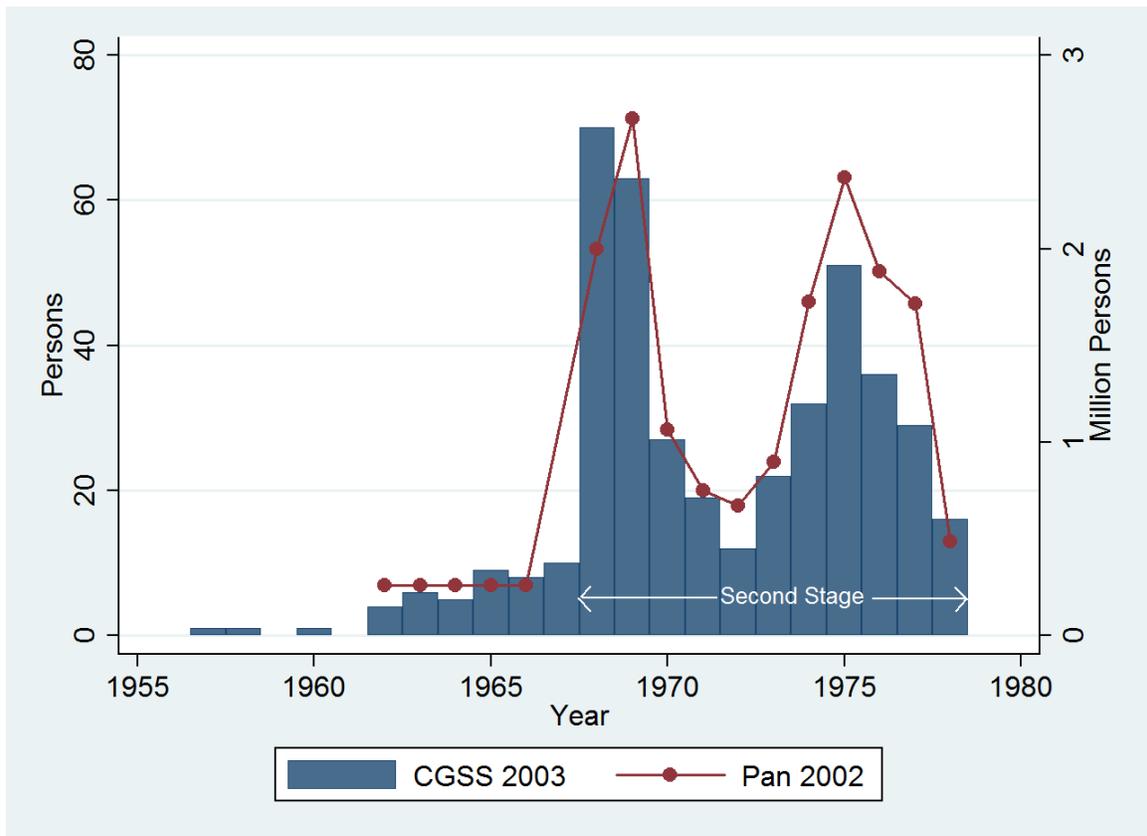
Note: The blue bars shows the number of individuals were sent to rural areas each year reported in the individual level survey data, China General Social Survey 2003. The red line shows the total number of individuals were sent to rural areas each year. It is calculated by author based on the data reported in Pan (2002).

Figure 2: Send-down Proportion by Year of Birth
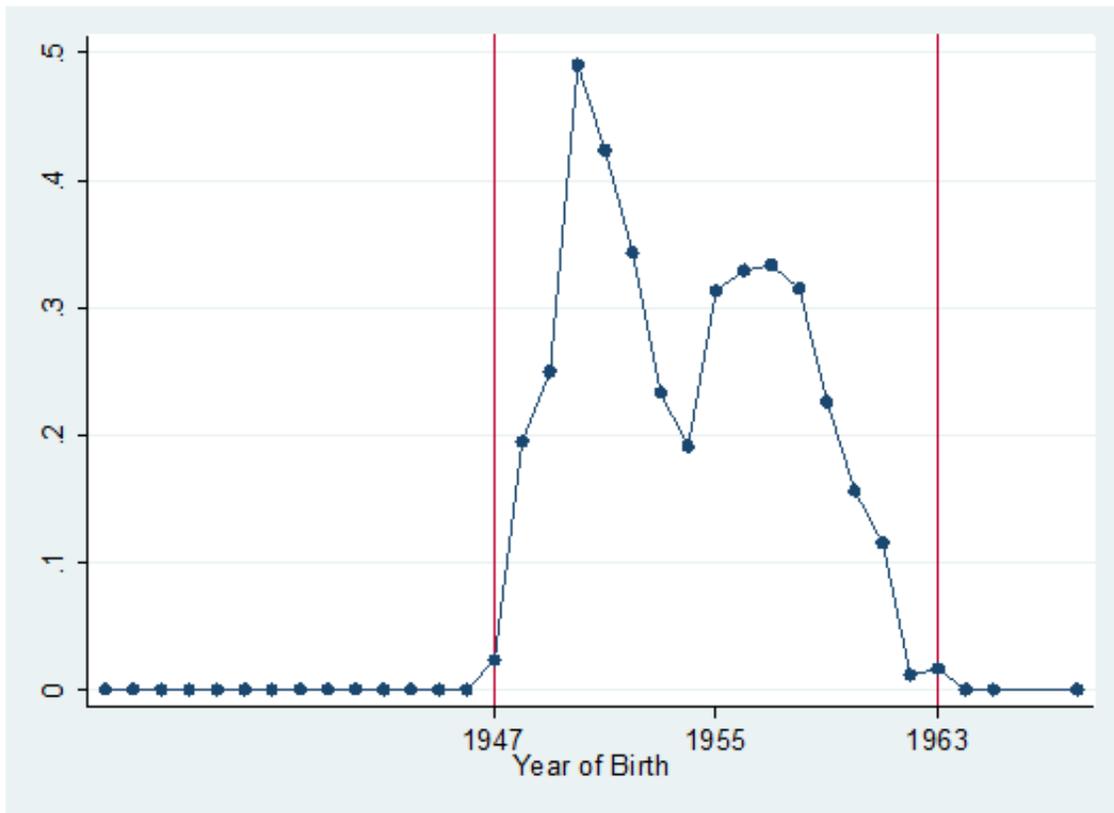
Note: The proportion is among junior high school and senior high school graduates in urban areas.
Data sources: China General Social Survey 2003.

Table 1: Individual Characteristics and Family Background during the Cultural Revolution

Variable	Send-down Mean (1)	Standard Deviation (2)	Non-send-down Mean (3)	Standard Deviation (4)
Family Backgrounds at Age 18				
Father:				
Years of Education	6.22	4.66	5.09	4.45
Proportion of Junior High School or below	0.84	0.37	0.88	0.326
Proportion of Senior High School	0.08	0.27	0.08	0.26
Proportion of College or above	0.08	0.28	0.05	0.21
Proportion of Leader	0.05	0.21	0.03	0.17
Proportion with Communist Party Membership	0.31	0.46	0.28	0.45
Proportion with Capitalism Traits	0.02	0.13	0.02	0.15
Mother:				
Years of Education	3.37	4.29	2.84	4.05
Proportion of Junior High School or below	0.92	0.27	0.94	0.23
Proportion of Senior High School	0.05	0.23	0.04	0.18
Proportion of College or above	0.02	0.15	0.02	0.14
Proportion of Leader	0.01	0.08	0.00	0.06
Proportion with Communist party membership	0.07	0.26	0.06	0.23
Proportion with Capitalism Traits	0.01	0.11	0.01	0.08
Send-down Duration	5.33	3.41		
Age (in 2003)	48.46	3.46	46.64	4.27
Female	0.55	0.50	0.46	0.50
Proportion Junior High School Graduates	0.66	0.47	0.65	0.48
Obs.	333		970	

Note: I restrict samples to individuals who (1) were born between 1948 and 1963, (2) were junior high school or senior high school graduates between 1966 and 1978, (3) were sent down after 1967 if they were sent down.

Table 2: Probit Estimation of Send-down

	Dependent Variable: Send-down	
	(1)	(2)
Family Backgrounds at Age 18		
Father:		
Years of Education	0.01***	
	(0.003)	
Senior High School		0.01
		(0.05)
College or above		0.16*
		(0.10)
Leader	0.04	0.07
	(0.06)	(0.07)
Communist Party Membership	0.02	0.02
	(0.03)	(0.04)
Capitalism Traits	-.08	-.06
	(0.10)	(0.11)
Mother:		
Years of Education	0.002	
	(0.003)	
Senior High School		0.09
		(0.07)
College or above		-.09
		(0.07)
Leader	-.03	-.03
	(0.14)	(0.14)
Communist Party Membership	0.01	0.03
	(0.07)	(0.07)
Capitalism Traits	0.10	0.08
	(0.20)	(0.19)
Obs.	1203	1203
Pseudo R^2	0.11	0.11

Note: Marginal effects are reported. Dependent variable Send-down is a dummy variable equal to one if an individual were sent down, 0 otherwise. All regressions control for age, gender, education degree during the Cultural Revolution and province dummies. I restrict samples to individuals who (1) were born between 1948 and 1963, (2) were junior high school or senior high school graduates between 1966 and 1978, (3) were sent down after 1967 if they were sent down. Province dummies are included. Standard errors in parentheses are clustered at the province level. *** statistically significant at 1% , ** statistically significant at 5%, * statistically significant at 10%.

Table 3: Education Upgrading

	Male		Female	
	Send-down	Non-Send-down	Send-down	Non-Send-down
Proportion Edu Upgrade	24.1%	19.7%	15.9%	14.4%
among junior high	20.2%	16.4%	14.8%	12.3%
among senior high	31.9%	25.3%	17.9%	18.7%
Age Upgraded	31	30	31	29
Year Upgraded	1985	1986	1985	1986

Note: I restrict samples to individuals who (1) were born between 1948 and 1963, (2) were junior high school or senior high school graduates between 1966 and 1978, (3) were sent down after 1967 if they were sent down. (4) did not have parents with more than 12 years of education.

Table 4: Probit Estimation: the Impact of Send-down Experience on Education Upgrading

| | Dependent Variable: Education Upgrade | | | | | | |
| | Male (1)-(6) | | | | | | Female |
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Send-down	0.10***	0.09***	0.09***	0.09***	0.09***	0.10***	0.02
	(0.04)	(0.03)	(0.03)	(0.03)	(0.03)	(0.04)	(0.05)
Years of Education Before 1978	-.01*	-.02**	-.02**	-.02**	-.02**	-.02**	-.01
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Age	-.01***	-.01***	-.01***	-.01***	-.01***	-.01***	-.06
	(0.004)	(0.01)	(0.01)	(0.01)	(0.01)	(0.004)	(0.06)
Parents Education		Y	Y	Y	Y	Y	Y
Parents Education Squared			Y	Y	Y	Y	Y
Parents Communist Party				Y	Y	Y	Y
Parents Leaders					Y	Y	Y
Parents Capitalism						Y	Y
Obs.	618	618	618	618	618	618	562
Pseudo R^2	0.20	0.21	0.22	0.22	0.22	0.23	0.20

Note: Marginal effects are reported. The dependent variable is a dummy indicator equal to one if an individual upgraded education after the Cultural Revolution, zero otherwise. All regressions control for years of communist party member and province dummies. I restrict samples to individuals who (1) were born between 1948 and 1963, (2) were junior high school or senior high school graduates between 1966 and 1978, (3) were sent down after 1967 if they were sent down, (4) did not have parents with more than 12 years of education. Province dummies are included. Standard errors in parentheses are clustered at the province level. *** statistically significant at 1% , ** statistically significant at 5%, * statistically significant at 10%.

Table 5: Descriptive Statistics of Monthly Income by Gender and Education Upgrading

	Send-down		Non-send-down	
	Mean	Standard Deviation	Mean	Standard Deviation
	(1)	(2)	(3)	(4)
Male	1011	762	1023	1043
Female	757	593	792	624
Male				
Education Upgraded	1587	1034	1244	711
Not Education Upgraded	795	485	960	1113
Female				
Education Upgraded	1181	830	1067	531
Not Education Upgraded	659	476	733	627

Note: I restrict samples to individuals who (1) were born between 1948 and 1963, (2) were junior high school or senior high school graduates between 1966 and 1978, (3) were sent down after 1967 if they were sent down, (4) did not have parents with more than 12 years of education. Unit: RMB.

Table 6: The Impact of Send-down Experience on Income

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	Female (10)
					Male(1)-(9)					
Send-down × EduUpgrade	0.2*	0.2*	0.2**	0.19**	0.19**	0.19**	0.2**	0.2**	0.2**	-.09
	(0.1)	(0.1)	(0.1)	(0.09)	(0.09)	(0.09)	(0.09)	(0.1)	(0.09)	(0.11)
Send-down	-.03	-.07	-.10*	-.10*	-.10*	-.09*	-.09*	-.09	-.04	-.02
	(0.08)	(0.06)	(0.06)	(0.06)	(0.06)	(0.05)	(0.05)	(0.05)	(0.05)	(0.09)
Edu Upgrade	0.42***	0.07	0.07	0.07	0.07	0.06	0.05	0.05	0.05	0.13
	(0.07)	(0.08)	(0.08)	(0.08)	(0.08)	(0.08)	(0.09)	(0.09)	(0.09)	(0.1)
Send-down × Government								0.00		
								(0.2)		
Total Years of Education		0.06***	0.05***	0.05***	0.05***	0.05***	0.05***	0.05***	0.05***	0.08***
		(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)	(0.02)	(0.02)	(0.02)
Experience		0.02***	0.02***	0.02***	0.01***	0.01***	0.02***	0.02***		0.02***
		(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)		(0.01)
Parents Education			Y	Y	Y	Y	Y	Y	Y	Y
Parents Communist Party				Y	Y	Y	Y	Y	Y	Y
Parents Leaders				Y	Y	Y	Y	Y	Y	Y
Parents Capitalism					Y	Y	Y	Y	Y	Y
Occupation Dummies							Y	Y	Y	Y
Government								Y		
Experience w/o SD Years									Y	
Obs.	583	583	583	583	583	583	571	571	571	505
R^2	0.07	0.41	0.42	0.43	0.43	0.43	0.45	0.45	0.45	0.39

Note: All regressions control for years of communist party member, employment status and province dummies. Column 9 uses experience, which excludes send-down years. Government is a dummy variable which equals to one if an individual works in government related work place or state-owned firms. I restrict samples to individuals who (1) were born between 1948 and 1963, (2) were junior high school or senior high school graduates between 1966 and 1978, (3) were sent down after 1967 if they were sent down, (4) did not have parents with more than 12 years of education. Standard errors in parentheses are clustered at the province level. *** statistically significant at 1% , ** statistically significant at 5%, * statistically significant at 10%.

Table 7: The Impact of Send-down on Having Computers

	Panel A: Descriptive Statistics of Computers at Home			
	Male		Female	
	Send-down	Non-send-down	Send-down	Non-send-down
Education Upgraded	0.59	0.39	0.50	0.45
	(0.09)	(0.05)	(0.10)	(0.06)
Not Education Upgraded	0.21	0.24	0.31	0.29
	(0.04)	(0.02)	(0.04)	(0.02)
	Panel B: Regression Results of Home Appliances				
	Computers	Color TVs	Air Conditioners	Video Cameras	Computers
Send-down × EduUpgrade	0.24**	0.028	-.050	0.033	0.396*
	(0.115)	(0.027)	(0.083)	(0.037)	(0.209)
Send-down	-.031	0.007	0.067	0.005	-.005
	(0.029)	(0.016)	(0.056)	(0.018)	(0.068)
Edu Upgrade	0.043	-.015	0.047	-.026	-.097
	(0.046)	(0.023)	(0.061)	(0.017)	(0.187)
Obs.	619	619	619	619	136
R^2	0.31	0.21	0.33	0.20	0.54

Note: Standard deviations are presented in parentheses of panel A. The regression in the last column of Panel B uses only individuals who are not living with children or they don't have children. All regressions control for household income, number of children, age of the youngest child, presence of female children, one digit occupation dummies, years of education, experience, years of communist party member, employment status, family backgrounds. I restrict samples to individuals who (1) were born between 1948 and 1963, (2) were junior high school or senior high school graduates between 1966 and 1978, (3) were sent down after 1967 if they were sent down, (4) did not have parents with more than 12 years of education. Province dummies are included. Standard errors in parentheses are clustered at the province level in panel B. *** statistically significant at 1% , ** statistically significant at 5%, * statistically significant at 10%.

Table 8: The Impact of Send-down Experience on Males' Income and Computer Ownership (IV)

| | 1st Stage | | | 2nd Stage | | | | |
| | EduUpgrade | | | Income | Income | Income | Income | Computer |
	All	Non-Send-down	Send-down	(4)	(5)	(6)	(7)	(8)
Teacher	-.05**	-.05***	-1.52**					
	(0.02)	(0.02)	(0.63)					
Teacher × Age	0.0009**	0.0009**	0.03**					
	(0.0004)	(0.0004)	(0.01)					
Send-down × Teacher	0.02							
	(0.02)							
Send-down × EduUpgrade				0.75***	0.69***	0.84***	0.69***	1.266
				(0.22)	(0.22)	(0.23)	(0.21)	(0.948)
Send-down	0.03			-.22***	-.15*	-.22**	-.19**	-.301*
	(0.03)			(0.08)	(0.09)	(0.09)	(0.09)	(0.167)
Send-down × Government							-.33	
							(0.23)	
Edu Upgrade				-.32	-.31	-.62	-.26	0.512
				(0.47)	(0.46)	(0.53)	(0.47)	(1.316)
Obs.	603	465	138	543				
Experience w/o SD Years					Y			
Occupation Dummies					Y	Y		Y
Government							Y	
All Family Backgrounds	Y	Y	Y	Y	Y	Y	Y	Y
F-Statistics	15.92	9.22	3.68					
Obs.	603	465	138	543	543	533	543	581

Note: All regressions control for total years of education, age, years of communist party member, employment status, province dummies and birth year dummies. Only male sample are used. Column 5 uses experience, which excludes send-down years. Government is a dummy variable which equals to one if an individual works in government related work place or state-owned firms. I restrict samples to individuals who (1) were born between 1948 and 1963, (2) were junior high school or senior high school graduates between 1966 and 1978, (3) were sent down after 1967 if they were sent down, (4) did not have parents with more than 12 years of education. Standard errors in parentheses are clustered at the province level. Anderson-robin weak IV robust 90% confidence intervals were presented in square parentheses. *** statistically significant at 1%, ** statistically significant at 5%, * statistically significant at 10%.

Table 9: Other Robustness Checks

	Education Upgrade	Income (IV)	Computers (IV)
	Dependent Variables		
	Education Upgrade	Income (IV)	Computers (IV)
	(1)	(2)	(3)
Panel A. Family Connection Controlled			
Send-down × EduUpgrade		0.73***	1.27
		(0.21)	(1.02)
Send-down	0.10***	-.23***	-.30
	(0.04)	(0.08)	(0.18)
Obs.	617	539	581
Panel B. Early Return Dropped			
Send-down × EduUpgrade		0.69**	1.37
		(0.27)	(1.27)
Send-down	0.11**	-.22**	-.32
	(0.05)	(0.09)	(0.25)
Obs.	577	505	541
Panel C. Parents Working in Private Firms Dropped			
Send-down × EduUpgrade		0.72**	1.17
		(0.21)	(0.88)
Send-down	0.10**	-.22**	-.26
	(0.04)	(0.08)	(0.16)
Obs.	600	524	566
Panel D. Parents Non-communist Party Member			
Send-down × EduUpgrade		1.14**	1.36
		(0.51)	(1.56)
Send-down	0.09*	-.30***	-.27
	(0.05)	(0.12)	(0.24)
Obs.	417	403	433
Panel E. Parents with Junior High Education or Below			
Send-down × EduUpgrade		1.01***	1.43
		(0.32)	(0.96)
Send-down	0.08**	-.22**	-.26
	(0.04)	(0.08)	(0.20)
Obs.	550	495	536
Panel F. Father in Non-government Sector Only			
Send-down × EduUpgrade		0.71**	1.16
		(0.24)	(0.86)
Send-down	0.09**	-.19**	-.26
	(0.04)	(0.07)	(0.17)
Obs.	590	506	562
Panel G. Father Non-skilled White or Blue Color Occupation			
Send-down × EduUpgrade		1.11**	1.51
		(0.49)	(1.08)
Send-down	0.09*	-.27**	-.24
	(0.05)	(0.14)	(0.15)
Obs.	428	394	420

Note: Only male samples are used. All regressions control for age, years of communist party member, employment status, family backgrounds and province dummies. In addition, column 1 controls for years of education during the Cultural Revolution; column 2 and 3 controls for total years of education, experience and birth year dummies; Column 3 further controls for personal household income, number of children, age of the youngest child, presence of female children, one digit occupation dummies. Column 1 reports the marginal effect of the probit model. I restrict samples to individuals who (1) were born between 1948 and 1963, (2) were junior high school or senior high school graduates between 1966 and 1978, (3) were sent down after 1967 if they were sent down, (4) did not have parents with more than 12 years of education. Standard errors in parentheses are clustered at the province level. *** statistically significant at 1% , ** statistically significant at 5%, * statistically significant at 10%.

Appendix Table: Summary Statistics

Variable Name	Mean	Std. Dev	Obs
Income (monthly)	776.77	785.64	1227
Total Years of Education	10.98	2.03	1227
Education Upgrading	0.18	0.38	1227
Years of Education before 1978	10.34	1.69	1227
Experience	25.06	6.91	1227
Age	47.14	4.17	1227
Female	0.47	0.50	1227
Government (work place)	0.06	0.24	1227
Computers	0.30	0.46	1227
TVs	0.96	0.18	1227
Air Conditioners	0.48	0.50	1227
Video Cameras	0.03	0.16	1227
Father's Years of Education	4.79	3.95	1227
Father was a Leader in Government	0.03	0.17	1227
Father was a Communist Party Member	0.28	0.45	1227
Father Worked in a Private Firm or Own a Private Firm	0.02	0.15	1227
Mother's Years of Education	2.56	3.59	1227
Mother was a Leader in Government	0.00	0.06	1227
Mother was a Communist Party Member	0.05	0.21	1227
Mother Worked in a Private Firm or Own a Private Firm	0.01	0.09	1227
Teacher Ratio	1.49	9.45	1227
Teacher Ratio×Age	77.24	497.48	1227
One-digit Occupation Dummies:			
Management	0.07	0.25	1201
Skilled (white or blue color)	0.16	0.37	1201
Non-skilled, white color	0.09	0.29	1201
Service	0.08	0.27	1201
Agriculture	0.01	0.08	1201
Non-skilled, blue color	0.18	0.39	1201
Police or Armed Force	0.00	0.05	1201