Arrival of Young Talents: Send-down Movement and Rural Education in China

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Abstract

Understanding human capital spillovers is important for both theory of economic growth and public policy in education. However, empirical evidence is sparse. Convincing identification requires an exogenous relocation of a group of better-educated people. China's "sent-down youth" (SDY) movement serves as an excellent natural experiment. From 1962 to 1979, the government mandated the temporary resettlement of roughly 18 million urban youth to rural areas. Using a unique county-level data set compiled from over 3,000 local gazetteers, we estimate how rural children's exposure to those better-educated urban youth affects their educational attainment. Our identification strategy builds on two sources of variation. First, counties received different numbers of SDYs during the movement. Second, within the same county, children of different cohorts were exposed differently depending on how their schooling years overlapped with the movement. Empirical results suggest that the arrival of SDYs increases local rural children's education and improve their attitudes towards education. More interestingly, we find evidence that SDYs coming from far away exert greater externalities.

Keywords: Send-down-youth Movement, Rural Education, Human Capital Spillovers

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All those intellectuals who can go to the countryside should go there happily. The countryside is a vast universe where there is plenty to be done.

—Mao Zedong, 1955

1 Introduction

Economists have been long showing interest in understanding the spillovers of human capital. The idea that human capital accumulation serves as an engine of economic growth can be traced back to Marshall (1890). Starting from Lucas (1988), growth theorists have emphasized that greater skill possessed by one agent may raise the productivity of others whom they interact. Understanding the existence and magnitude of human capital spillovers is also important from a policy perspective. Education is an important category of government expenditure and schools are often heavily subsidized. According to World Bank (2017), in the year 2013, government spends on average 4.71% of GDP on education. In 2011, one secondary student on average costs government 20.6% of GDP per capita. Large public investment in education is rationalized by the positive externality of human capital and its optimal amount is determined by social returns to human capital instead of private returns.

However, empirical studies have not yet reached a consent whether there exist significant human capital spillovers. The main challenge is identification. The first attempt to estimate the human capital externalities is Rauch (1993). He used a Mincerian equation and evaluated how city-average human capital, which is proxied by average education and work experience, affects individual earnings after controlling for private human capital. One obvious limitation of such strategy is self-selection — people endogenously choose their residence cities according to their different personal characteristics. Follow-up studies use different instrumental variables for state or city average human capital to overcome the endogeneity.[1] However, there still remain at least two other challenges. The first is the endogeneity issue implied by a spatial equilibrium (Lange and Topel 2006). The approach investigating the effect of state/city-average human capital implicitly treats each state/city as separate economies. This is a strong assumption if there exists internal migration. Acemoglu and Angrist (2001) also admit in their paper that a drawback of their approach is "that it does not necessarily eliminate bias from state-specific wage shocks if there

[1]For example, Acemoglu and Angrist (2001) use variation in compulsory schooling laws over time in each state as an instrument for the state-average years of education. Moretti (2004a) uses the (lagged) city demographic structure and the presence of a land-grant college in a city as instruments for the share of college graduates.

is substantial interstate migration in response." When replicating the previous work of Rauch (1993), Acemoglu and Angrist (2001), and Moretti (2004a), Lange and Topel (2006) found the association between aggregate wages and schooling declines substantially when spatial equilibrium is taken into account. The second challenge is a downward sloping demand curve for human capital. Ciccone and Peri (2006) show that the Mincerian approach does not fully identify the human-capital externalities because it confounds positive externalities with wage changes due to a downward sloping demand curve for human capital. As a result, the Mincerian approach yields positive externalities even when wages equal marginal social products. Their point is echoed in Iranzo and Peri (2009), who try to reconcile the mixed findings that positive external effects of average education levels are hardly found (Acemoglu and Angrist 2001; Ciccone and Peri 2006), while positive externalities from the share of college graduates are more often identified (Moretti 2004a). After summarizing the relevant literature, Moretti (2004b) concludes "empirical literature provides some intriguing evidence on the existence of human capital externalities, but we are still far from a consensus on the magnitude of such externalities. The empirical literature on the subject is still very young and the econometric challenges are difficult to overcome. More work is needed."

Following the previous discussion, an ideal "experiment" that best helps us to understand the human capital spillovers should satisfy three conditions. First, the relocation of the better-educated population should be exogenous (to overcome the self-selection). Second, internal migration should be difficult (to overcome the spatial equilibrium). Finally, the migrants should not directly compete with the local incumbents (to overcome the downward sloping demand curve for human capital). In this paper, we exploit China's Sent-Down-Youth (which we will refer to as "SDY") movement from early 1960s to late 1970s as a natural experiment, which nicely satisfies the above conditions because of the special political regime during the Maoist era, to understand the human capital spillovers.

The Sent-Down-Youth movement is also known as "going up to the mountains and down to the villages" (*shangshan xiaxiang*), otherwise known as the "rustication movement." From 1962 to 1979, the government mandated the temporary resettlement of roughly 18 million urban youth to rural areas. The youths to be sent down were mainly junior high school and senior high school graduates. During that time, the majority of rural children completed primary school

at best,[2] not to mention the quality of schools in rural China were generally worse. Therefore, those sent-down urban middle-school-graduates were well-educated compared with the rural local incumbents.[3] They were called "educated youth" (*zhishi qingnian* or *zhiqing*) at that time. After the decease of Mao, the movement quickly came to an end. By the 1980s, the vast majority of the SDY returned to urban areas (Pan 2003). The question we wish to answer is, how does rural incumbents' temporary exposure to those better-educated SDYs during their schooling years affect their long-run performance?

The SDY movement is endowed with three unique features. First, the resettlement is mostly involuntary and the destination is determined by the government, not by SDYs themselves. If one refused to take part in the sent-down program, they could be accused of opposing the great strategy of Chairman Mao (Zang 2000; Pan 2002), which would result in severe consequences back then.[4] Second, migration is highly restrictive in China at that time because of the household registration system (*hukou*). People cannot migrate freely according to their wills. Although the first constitution of the People's Republic of China (PRC), which was issued in 1954, guaranteed citizens the freedom to migrate, the 1958 codification of the household registration system[5] decreed that all internal migration be subject to approval by the local government. The clause "freedom to migrate" was taken out in the first revision of the constitution in 1975. Finally, China was a planned economy during the 1960s and 1970s. Therefore, there was literally no "demand curve" during the sent-down period. After the Chinese government initiated its market-oriented reform in the 1980s, the majority of SDYs had returned to the urban areas. It is unlikely that the SDYs affect the local incumbents through a demand curve for human capital, whose role has been emphasized by Ciccone and Peri (2006).

To understand the spillovers of the SDYs to the local incumbents, we manually compiled a

[2] According to 1990 China Census of Population, 38.3% of rural people born between 1944 and 1956 (the control group we will refer to in the latter analysis) receive no schooling or did not complete primary school. 40.1% are primary school graduates. Only 3.9% pursue education beyond junior high school.

[3] In addition to fresh graduates, the rustication program also included government cadres, technically skilled person, workers, and jobless city dwellers (Pan 2003). We believe these people were also generally better educated compared with the rural incumbents.

[4] Zhou and Hou (1999) documented following vivid story for the experience of SDYs:

My family background was bad and my father was labeled a "rightist." So when Chairman Mao's instruction was announced, my father "voluntarily" applied for going to rural areas on behalf of his three children.... When he came home that day, he held the three of us in his arms and cried: "It is not that I don't want to keep you in the city. But I dare not do so...."

[5] "Regulations on Household Registration in the People's Republic of China" (*Zhonghua renmin gongheguo hukou dengji tiaoli*) was issued in January 1958.

county-level data set from over 3,000 book-length local gazetteers on the number of SDYs received by each county. Combining with the individual-level population census data, we evaluate how rural children's exposure to those better-educated urban youth affects their educational attainment. Our identification comes from two sources. First, different counties receive different numbers of SDYs. Moreover, some SDYs come locally from the urban area within the same county, while the others come from outside. We further investigate whether inflow-SDYs coming from outside the county carry more spillovers than local SDYs. Second, within the same county, children from different cohorts are exposed differently depending on how their schooling years overlap with the movement. Empirical results suggest that the arrival of SDYs increases local rural children's years of schooling. Additionally, they hold a more positive opinion of education, have a higher tendency to pursue higher level education, and more likely to work as teachers after graduation. Moreover, we find that SDYs coming from far away exert greater externalities. Our estimations are robust to a wide range of robustness checks and other contemporaneous historical events, including the Cultural Revolution and the Great Famine.

Our study contributes to three strands of literature. The first strand of literature estimates the human-capital spillovers (Rauch 1993; Acemoglu and Angrist 2001; Moretti 2004a; Ciccone and Peri 2006; Iranzo and Peri 2009). We contribute to the literature by exploiting the natural experiment of the SDY movement, which nicely addresses the identification issue because of the special political regime in China back to 1960s. Moreover, existing studies of human capital spillovers predominantly focus on the United States. There are few studies looking at the developing world, including China.[6]

The second strand of literature looks at the impact of the relocation of the talented. There is a growing literature estimating how the flows of scientists affect the productivity of their collaborators (Azoulay, Graff Zivin, and Wang 2010), former colleagues (Waldinger 2012), students (Waldinger 2010), and incumbent scientists (Borjas and Doran 2012; Moser, Voena, and Waldinger 2014). The flows were driven by historical events, such as unexpected premature decease of academic superstars (Azoulay, Graff Zivin, and Wang 2010), scientists who left Germany during the Nazi era (Waldinger 2010; Waldinger 2012; Moser, Voena, and Waldinger 2014), and the influx of Soviet mathematicians after its collapse (Borjas and Doran 2012). There is also a recent study

[6]To the best of our knowledge, Liu (2007) and Fan, Ma, and Wang (2015) are the only two studies estimating the externalities of human capitals in China. They use a Mincerian approach and estimate how city-average years of education (Liu 2007) and provincial share of college graduate (Fan, Ma, and Wang 2015) affect individual earnings.

looking at how the flow of Chinese graduate students after the opening of China in 1978 affects their advisors' academic productivity (Borjas, Doran, and Shen 2017). The findings are quite mixed.[7] Our study differs from existing literature in two aspects. First, we study the internal migration within the same country, instead of international migration. Second, we study the spillover effect of those not-so-well-educated (junior or senior high graduates), if compared with the scientists in previous studies, on those even-worse-educated rural incumbents (primary school or below).

Finally, our research also contributes to the studies of China's sent-down-youth program. There is a large literature investigating how the experience of being sent-down affects the SDYs themselves in various aspects, including marriage (Song and Zheng 2016), education (Meng and Gregory 2002; Xie, Jiang, and Greenman 2008; Zhou 2014), income (Xie, Jiang, and Greenman 2008; Yang and Li 2011), inter vivos transfer (Li, Rosenzweig, and Zhang 2010), subjective well-being (Wang and Zhou 2017), beliefs and values (Gong, Lu, and Xie 2015), financial behavior (Fan 2017), and entire life course (Zhou and Hou 1999). However, much less is known about the impact of SDYs on the destination counties. Kinnan, Wang, and Wang (2017) argue that temporary migration due to the SDY program created lasting inter-province links, which results in increased access to migration decades after the SDY program ended. Xing and Zhou (2017) provide evidence that *zhiqing* became familiar to the residents living in regions where *zhiqing* are sent down. Henceforth, there are more bilateral trust and trade between the source province and the destination province. We complement their studies by providing evidence that the effects of SDYs go beyond inter-province links and migration opportunities. Moreover, both Kinnan, Wang, and Wang (2017) and Xing and Zhou (2017) look at inter-province flow of SDYs. Our data further go down to the county-level and also include the intra-province flow of SDYs, which account for 92.1% of total SDYs (Table 1).

To our knowledge, two studies that are closely related to our paper are Wantchekon, Klašnja, and Novta (2014) and Rocha, Ferraz, and Soares (2017). Wantchekon, Klašnja, and Novta (2014) track down the first students in regional schools in colonial Benin in the early twentieth century. They find large village-level human capital externalities — descendants of the uneducated in

[7] On one hand, there seem to exist strong positive spillovers among scientists who directly collaborate with each other (Azoulay, Graff Zivin, and Wang 2010; Waldinger 2010; Borjas, Doran, and Shen 2017). On the other hand, the spillovers seem to be negligible or even negative for scientists who are not directly related (Borjas and Doran 2012; Waldinger 2012; Moser, Voena, and Waldinger 2014). The negative spillovers are often explained by the competition for limited academic resources.

villages with schools perform better than those in villages without schools. The exogenous shock in their study originates from the establishment of colonial schools. Our study exploits the arrival of better-educated sent-down-youth from urban areas. Moreover, the scope of the event in our study is much larger. The movement reallocated 18 million people from cities to countryside. If taking into account sent-down-youth's families and the villages that accepted them, the potentially affected population is even larger. Rocha, Ferraz, and Soares (2017) study the persistent effect of state-sponsored settlements located in the Brazilian state of São Paulo in the late nineteenth and early twentieth century, which attracted immigrants with higher levels of schooling. They find the initial shock persisted all the way up to 2000 — municipalities that had received a state-sponsored settlement have higher average education and income. Our studies complement theirs by further highlighting the spillovers of the immigrants.[8] Additionally, immigrants attracted to Brazil were voluntary. In contrast, the majority of China's rusticated youths did not go to the countryside at their will.

The remainder of this paper is organized as follows. Section 2 briefly reviews the relevant institutional background. In Section 3, we introduce the data set used in this study. Section 4 discusses the econometric set ups and Section 5 reports the main results. Section 6 discusses the possible mechanisms as well as confounding factors. Section 7 concludes.

2 Institutional Background

This section provides a brief overview of the sent-down-youth movement and we concentrate on the institutional details that are most relevant to the human capital spillovers of the SDYs. The first subsection reviews the timeline of the SDY movement, whose scope and purpose vary in different stages. The remaining subsections answer three questions. Who were those SDYs? Where were they sent to? What did they do in rural China? Those are important questions for understanding the exogeneity of the SDY flows and their possible externalities in the destination counties.

2.1 Sent-Down Movement: A Brief History

The sent-down-youth movement began in 1953, reached its height during the Cultural Revolution (1966–1976), and ended only in 1980. The official goal of the rustication program was two-fold:

[8]The size of attracted immigrants was about twice the initial population in their study.

solving the urban unemployment and developing rural areas (Pye 1986). In the early 1950s, the newly founded People's Republic of China faced severe urban unemployment problems. In response, starting from 1953, the government began to encourage rural school-leavers to go back to their home villages instead of staying in the urban areas.[9] The program was enthusiastically supported by the Chairman Mao Zedong, who commented in December 1955 that "All those intellectuals who can go to the countryside should go there happily. The countryside is a vast universe where there is plenty to be done." (Kau and Leung 1986). The *Guangming Daily* on 11 September 1957 reported that there had been two million middle school graduates who did not go on to a higher level of education and joined the agricultural production in their home villages. These people were called "returned youth" (*huixiang qingnian*).[10] From 1953 to 1961, very few youth originated from urban areas were sent to rural sites. The estimated number is only about 15,000 (Liu 2009).

The large-scale rustication program that targeted urban youth began in 1962, after the Great Leap Forward in 1958–1961. With the disastrous great famine, the government was aware of the failure of the Great Leap Forward and decided to adjust its policy. One measure was to reduce the number of industrial workers and send people to the countryside to reduce the burden of providing food to non-agricultural population. About 20 million people were sent back to the countryside (Liu 2009). The urban youths were also affected by a reinforced rustication program. There were two important forms of enforcement. First, the organization was transferred from local governments to the central government. Second, the political significance of the program was emphasized. The media stressed more that the movement as a great social revolution to bridge three major differences, between town and countryside, workers and peasants, and mental and manual labor (Liu et al. 1995). Between 1962 and 1966, the rustication program sent an estimated 1.29 million urban youths to the countryside (Bernstein 1977). At this stage, the urban youths going to the countryside were still mostly voluntary.

Figure 1 plots the number of SDYs from 1962 to 1979. In total, 17.7 million urban youth were sent to the rural areas during this period. Before 1966, only 1.3 million were sent and the vast majority were sent between the year 1967 and 1979. The SDY program reached its

[9] This happened before the official issuance of the household registration system, which came into effect in 1958. After that it became very hard for rural students to pursue education in urban areas.

[10] "Returned youth" usually refers to those rural students who received education in urban areas and went back to rural areas after their graduation. "Educated youth" (*zhiqing*) refers to those students who originated from urban areas.

peak in the year 1968, which was directly related to the outbreak of the Cultural Revolution in 1966. The Cultural Revolution severely disrupted the function of educational institutions and government agencies. All schools were shut down for 2–3 years at the beginning of the Cultural Revolution. College entrance exam was suspended for 11 years. Moreover, with the national-wide turmoil, fresh graduates from middle school were almost impossible to get jobs in the urban areas, which were previously assigned by the government. China's economy also suffered greatly, with its industry output fell by 13.8% in 1967 and 4.2% in 1968. As a result, unemployment soared in the urban areas. That is to say, urban students graduated during the years 1966–1968 had neither opportunities of continuing education nor employment. "Going up to the mountains and down to the villages" became their only option. In Chinese, there is a special term for the graduating classes of 1966, 1967, and 1968 — "three old classes" (*laosanjie*). In 1967, some Red Guard[11] students volunteered to go to rural areas to help peasants work in the fields, and were quickly officially endorsed (Deng 1993). The large-scale send-down movement was made official in December 1968, when Chairman Mao stated in a speech that "it is very necessary for the urban educated youth to go to the countryside to be re-educated by the poor farmers!" (*People's Daily* on 12 December 1968). Figure 1 shows that about 4.7 million urban youth were sent down within three years from 1967 to 1969. After three years' intensive mobilizations, the government allowed a larger proportion of the middle school graduates to enter the urban labor force. The large-scale movement during the cultural revolution period fulfilled three purposes: to discharge the Red Guards, to reduce unemployment in urban areas, and to increase agricultural productivity (Pan 2003).

There was ample narrative evidence that most SDYs at the time were reluctant to go (Bernstein 1977; Unger 1979; Gold 1980; Chen and Cheng 1999; Zhou and Hou 1999).[12] The reason is simple. The *hukou* system categorized people into urban or rural based on parents' place of origin and directly tied social welfare to their *hukou* status. It has been well documented that urban *hukou* holders enjoyed significantly better social welfare at that time (Bian 2002; Wu and Treiman 2004).

[11]The Red Guard organization was formed by teenagers, most of whom were junior or senior high school students. The Red Guards were used as a political weapon to fight those persons opposed to Mao's policies during the first few years of the Cultural Revolution.

[12]Although many youths were claimed to go "voluntarily" to the countryside. However, many of them were overwhelmed by the severe social pressure. During the Cultural Revolution, the movement was no longer just an economy issue trying to alleviate the urban unemployment. It became a more political issue. People belonging to the "red class" wanted to show their loyalty to Mao, even if that meant being rusticated. On the other hand, youth in the "black classes" also wanted to seize the opportunity to make a break from their parents class (Pan 2003).

After Chairman Mao's decease in September 1976, the ideological pressure for continuing the SDY program vanished gradually. In 1978, the new central leadership began considering to end the program. Meanwhile, there were large-scale protests from the SDYs, who were motivated by their endeavor to return home, exerting severe pressure on the government. The protests began in Yunnan in late 1978 and were quickly spread to Xinjiang, Shanghai, and other places (Deng 1993). Eventually, in September 1980, the central government decided to discontinue the movement (Gu 2009). The vast majority of the SDY returned to urban areas afterward. Only about 5 percent of SDYs never returned because they were married to local farmers or were assigned nonagricultural local jobs (Liu et al. 1995).

2.2 Who are Those SDYs

The 17.7 million SDYs account for about one-third of the new urban middle-school graduates during the period. Therefore, not every urban youth was sent down. The rustication prioritized those households considered "bad classes",[13] including those headed by intellectuals, businessmen, landlords, rich peasants, and those with relatives in Taiwan or the United States (Bernstein 1977). Interestingly, many of the "bad classes" back then generally possess more human capital from the current perspective.

The rustication program also targeted more developed urban areas, especially three municipalities directly under the central government — Beijing, Tianjin, and Shanghai. Table 2 summarizes the total number of youth sent by each province. With only 3.4% of the national population in 1966 (National Bureau of Statistics of China 2010), Beijing, Tianjin, and Shanghai together accounted for 13.3% of the total SDYs. More surprisingly, the three municipalities composed almost exclusively the part that was sent outside their home province. Among the 17.7 million SDYs, only 1.4 million were sent outside the province. Figure 2 Panel A shows the distribution of source province of those inter-province SDYs. The three municipalities account for 87.3% of it (0.87 million).[14]

Youths with different family background not only have different probabilities of being rusti-

[13] During the Cultural Revolution, households were categorized according to their political identities. There were "five red classes" and "five black classes" (*wuhong wuhei*). Five red classes include: revolutionary cadre, revolutionary soldier, revolutionary martyr, worker, and poor & lower-middle peasant. Five black classes include: landlord & rich peasant, counter-revolutionaries, bad elements, rightists, and capitalists.

[14] Another reason is that those three cities were more urbanized. Therefore, their rural areas were not large enough to absorb the urban youth.

cated, but their timing of being called back to the urban areas also varies conditional on being sent down. There were narrative evidence suggesting that high-rank cadres succeeded in getting their children back early to urban areas through various "back-door" channels (Shi 1996). Using a survey data on the SDYs, Zhou and Hou (1999) find that there were significant effects of social origins on the probability of returning early to urban areas.

To summarize, we believe those who were sent are relatively better-educated among their peers because they are more likely (1) from families with high socioeconomic status (based on the current standard) and (2) from large cities. It is also noteworthy that after China resumed its college entrance exam in 1977, which had been suspended for 11 years because of the Cultural Revolution, people with the experience of being sent-down were more likely to upgrade their education (Zhou and Hou 1999; Zhou 2014).[15]

2.3 The Destination of the SDYs

For the majority of the SDYs, neither had they the choice of whether being sent-down, nor could they choose where to be sent. Some sent-down youths were sent to rural areas near their home city. But others, especially those from large cities, were sent to other provinces, sometimes thousands of kilometers away. For example, there were 1.26 million SDYs sent from Shanghai, 0.72 million were sent outside Shanghai. Among those SDYs, some were sent to provinces close to Shanghai (e.g., 150 thousand were sent to Anhui, a province about 300 kilometers away), while others were sent very far away, such as Yunnan (60 thousand, 4,000 kilometers away), Heilongjiang (170 thousand, 1,700 kilometers away), and Xinjiang (100 thousand, 3,900 kilometers away) (Gu 2009).

The destination of the SDYs was also partially related to a military purpose because of China's intense international relationship with the Soviet Union, Mongolia and Vietnam from the late 1960s to early 1970s. From Table 2, we see that four provinces — Inner Mongolia, Heilongjiang, Yunnan, and Xinjiang — received 0.75 million out of the 1.42 million (53%) inter-province relocated SDYs. One common feature of those four provinces is that they are on the border of the country. Many of the SDYs there worked in army farms on the frontiers (Shi and He 1996).

[15]Current research has not reached a consent that whether this observation is driven by the selection of SDYs or by the causal effect of the rustication program. For example, Zhou and Hou (1999) commented on their findings of a positive effect of sent-down experience that "the rural experience may have fostered sent-down youth's determination to improve their social location." Their results are later questioned by Chen and Cheng (1999) and Xie, Jiang, and Greenman (2008).

In addition to the border provinces, two other types of provinces also received many inter-province SDYs, as shown in Figure 2 Panel B: (1) major grain producing provinces (Anhui, Sichuan, Jiangsu, and Hunan) (2) old liberated provinces (Shannxi and Jiangxi). The former type of provinces are able to secure the food need of the extra population and the latter serves the purpose of political re-education.

2.4 What did SDYs do in Rural China?

There were three major approaches that the SDYs are resettled: to rural villages (also known as *chadui*), to collective farms, and to state farms. Rural villages absorbed the majority of the SDYs (12.8 million out of 17.7 million). 2.0 million SDYs were sent to collective farms and 2.9 millions were sent to state farms (Gu 2009). Before the revolution of the household contract responsibility system in the early 1980s, agricultural production in rural China took the form of production teams (*shengchandui*). The size of one production team was generally small (less than 100 persons) and was unable to arrange many SDYs. Therefore, the SDYs are disassembled and put in different production teams. In the production teams, people earn "work points" according to their amount of farming work. At the end of the year, the production team shares food and income according to the work points.

Life was hard for the majority of SDYs because they grew up in urban areas and had never worked as farmers before. Chen and Cheng (1999) wrote that "To many urban youth, including us, the send-down episode remains among the most difficult experiences in our lives — we suffered from a lack of material supplies, removal from our families, an unfamiliar environment, harsh physical labor, and so on." Despite the hard life, SDYs still could not earn enough work points to feed themselves because of the lack of experience in the agricultural production.

Because of such reality, SDYs started to be assigned more technical jobs instead of manual jobs. From 1962 to 1972, about 11.7% of the SDYs (0.65 million)[16] were assigned such type of jobs. The share grew steadily during the rustication movement. For example, Liu (2009) documented that in Spring 1976, Huaide county in Jilin province reported that 7,000 SDYs were taking cultural or technical jobs, accounting for 70% of total SDYs in that county. Gu (2009) documented that in the year 1975, 32,421 SDYs in Jilin province worked as study counselors, agricultural

[16]The number is from a report published by the Office of Intellectual Youth (*zhiqingban*) under the State Council titled "Summary of the National Sent-Down-Youth from 1962 to 1972." The statistics cover only 19 provinces. Therefore, the share is larger than that if we divide 0.65 millions by the numbers presented in Figure 1.

technicians, bare-foot doctors, community school teachers, et al. In Shaanxi, there had been 200 thousand SDYs ever worked as accountants, storekeepers, work-point recorders, community school teachers, agricultural technicians, bare-foot doctors, community school teachers, areographer, et al. Moreover, many SDYs grew up to become local leaders. Office of Intellectual Youth reported in 1981 that 2.93 millions SDYs worked as cadres at various levels in the year 1974, account for 4.3% of SDYs at that time.

The key takeaway here is, the SDYs were not simply inferior manual labors in the farmland. They bridged urban and rural areas by taking non-agricultural jobs, which were not prevalent in rural China back then. They exerted externalities onto the local incumbents by bringing new technique, knowledge, and ideology from urban China. Kinnan, Wang, and Wang (2017)'s and Xing and Zhou (2017)'s studies also confirm that the SDYs flow created persistence connections between the source and destination provinces of SDYs. Another obvious way of spillover is through marriage. About 7 percent of the SDYs who remained in rural areas in 1978 were married to rural local incumbents (Gu 2009).

3 Data

Understanding the spillover effects of SDYs flow on local rural population requires two sets of information. First, we construct a unique county-level data set compiled from over 3,000 local gazetteers. Second, we combine the county-level information on SDYs to the micro-level census of population.

3.1 Local Gazetteers

The main source of SDYs flow at the county level is local gazetteers (*xianzhi*). These are book-length volumes of local history documenting the major events ever happened in the county. Therefore, it is often regarded as the "encyclopedia" of a locality. Most local governments pay great attention to the compilation of local gazetteers and update them periodically because they are viewed as a type of local pride. Often, a committee composed of dozens will be in charge. The gazetteers we collected are mostly compiled in the 1990s and 2000s, in which period the SDY is no longer a sensitive topic. Many local governments are thankful for the SDYs and proud for their contribution made in the countryside, as discussed in the previous section. Therefore, we

believe the number of SDYs is truthfully reported in the local gazetteers, as opposed to more politically sensitive topics such as the local fatalities and victims during the Cultural Revolution, which is subject to serious underreport issues (Walder and Su 2003). We focus on two pieces of information. First, the total number of SDYs received by each county during 1968–1979. Second, the number of SDYs came from the urban areas within the same county and the number from outside the county. For example, local gazetteers of Taihu county in Anhui province published in 1995 documented that

> "*From 1968 to 1977, we received 3,697 educated-youth from Shanghai, Hebei, Anqing, and urban area within the county. Among them, 366 are from Shanghai, 1,596 are from Anqing, 1,498 are local, 237 are from Hefei and other places.*"

Note that once the second piece information is used, we lose about 30% of the sample because not all local gazetteers distinguish inflow-SDYs from local-SDYs.

We collect 3,153 gazetteers for all 2,877 county-level division in China.[17] We complement the local gazetteers with seven volumes of "Sent-Down Movement Historical Data Collection" (Jin and Jin 2015). We exclude 873 city-governed districts (*shixiaqu*) because those districts are more developed areas and rural areas are of key interest in this study. Finally, we manage to find information about SDYs for 1,957 counties out of the remaining 2,004 counties (98%). Our collection of county data covers a broader range than previous studies which also exploit information from local gazetteers.[18] Figure 3 illustrates the regional variation in the number of received SDYs in those counties.

The aggregate number of the SDYs in our county-level data is 11.0 million, accounting for 74% from the national statistics during the same period.[19] Table 3 compares our county-aggregate at the province level to the numbers from a national report which is documented in Gu (2009). The ratio varies from 60% – 80% for most provinces. Three reasons can account for the gap. First, the national statistics cover a longer span than the county-aggregate (1962–1979 versus 1968–1977). If taking into account the different length in span, the ratio becomes 72% – 96%. Moreover, provinces who first started receiving SDYs would be affected more. For example, Heilongjiang

[17] Two reasons explain why the number of gazetteers exceed that of counties. First, it is possible that there are multiple gazetteers for the same county on different topics. Second, some counties compiled one gazetteer during the 1990s and another during the 2000s.

[18] For example, the data set in Chen, Li, and Meng (2013) and Bai and Wu (2017) cover about 1,500 counties.

[19] Although there are some slight differences, most local gazetteers report the SDYs received during the period 1968–1977. 14.7 millions were sent during this period from the national statistics.

and Xinjiang are among the first to receive SDYs because there were thinly populated areas with large unreclaimed arable land (Zhang 1986). Second, the local gazetteers only cover SDYs received by the local government. 2.9 millions out of 17.7 million SDYs were sent to state farms during the movement. State farms did not distribute evenly across the county. The largest army farm organization was the Xinjiang Production and Construction Army Group (*Xinjiang Jianshe Bingtuan*). We verified that the local gazetteers in Xinjiang do not count SDYs sent there. Heilongjiang and Inner Mongolia also had many state farm because of the intense relationship between China and the Soviet Union during the 1960s. The SDYs sent there were separately recorded in the farm chronicles (*nongchangzhi*). This may explain why the ratios are especially low in Xinjiang (42%) and Heilongjiang (26.5%). We decide not to include those SDYs because (1) it is not clear which county they should be assigned to and (2) they did not directly interact with the rural incumbents. Finally, we exclude more developed city-governed districts. As a result, the ratio is smaller for Beijing (54.3%), Tianjin (39.4%), and Shanghai (22.7%).

We divide the county-level received SDYs by its population in 1964 to generate the density of SDYs. We choose the year 1964 because this is the only year during the 1960s in which county-level population is available.[20] Moreover, year 1964 is ahead of the Cultural Revolution as well as the massive rustication program. Therefore, the 1964 county-level population is unlikely to be reversely affected by the flow of SDYs.

3.2 Census of Population

We use the 1% sample from the 1990 China's Census of Population (census 1990 hereafter) to evaluate how rural people's individual exposure to the SDYs affect their educational outcomes. As previously mentioned, the majority of rural children back then finished primary education at best. Therefore, we define individuals' exposure according to whether their primary schooling years overlap with the massive SDY movement. We focus on cohorts born between 1944 and 1969. Among them, we define cohorts 1957–1969 as the treatment group. Cohort 1957 is the oldest cohort because they are supposed to be at their fifth year of primary school in the year 1968, the year in which the massive rustication movement began. Cohort 1969 is the last affected cohort because they start their primary education in the year 1977, the year starting from which the SDYs gradually returned to the urban areas. We will discuss the robustness to our definition

[20] China's second census of population took place is 1964.

of treated cohorts later in this paper. We choose the year 1990 because by that time the majority of the affected cohorts should have completed their education.[21]

To increase the variations in schooling outcomes, we not only code the highest level of education received, but also code the completion status. Before the enforcement of China's Compulsory Education Law in 1986, school dropouts were prevalent in rural China. For example, in our sample, 13.8% of those who attended primary school did not complete it. The rate is even higher for higher-level education. We assume that people receive six years of education if they graduate from a primary school. If they drop from primary schools, we will code the schooling years to be three. We code higher-level schooling years in a similar approach.[22]

We are aware that China Health and Retirement Longitudinal Study (CHARLS) contains detailed information about sent-down-youth at the village level.[23] We still opt for the approach combining 1990 census of population and county-level information related to sent-down-youth from local gazetteers for three reasons. First, our approach is able to cover a vast majority of counties (1,957 counties), while CHARLS only samples 150 counties and 450 communities (or villages). Second, in China, one primary school generally covers several villages. This means the education of rural children in a given village were not only affected by the SDYs within the village, but also by the SDYs accepted by villages nearby. In contrast, it is rare for students to receive education in other counties. Finally, migration can threaten our identification if people do not live in the same county as when they were students. The first wave of CHARLS is initiated in 2011. Migration is a much more serious issue in 2011 than that in 1990. The estimated number of migrants in China rose by more than 10 times from 21.3 million in 1990 (Duan and Sun 2006) to 252.8 million in 2011 (National Bureau of Statistics of China 2012).

[21]The third census of population took place in 1982. In that year, the youngest cohort in our analysis (born in 1969) only aged 13, which is too young for the analysis of educational outcome.

[22]Note that such way of coding is to proxy the genuine years of education, which are difficult to compute precisely because of the historical shifts in China's education system. For example, prior to the outbreak of the Cultural Revolution in 1966, primary-secondary education generally took the form of 6-3-3, which means 6 years of primary school, 3 years of junior high school and 3 years of senior high school. The system was compressed to 5-2-2 during the Cultural Revolution and gradually restored to 6-3-3 after its end (Hannum 1999). In summary, if we observe a positive effect of SDYs on our imputed "years of education," we can interpret it as either more advanced education level or higher probabilities of graduation.

[23]Information includes: how many rusticated youth did the village accept? Where did they come from? When did they come and when did they go back?

4 Empirical Strategy

Our identification strategy builds on two sources of variation. First, counties received different numbers of SDYs during the movement. Second, within the same county, children from different cohorts are exposed differently depending on how their schooling years overlap with the movement. More specifically, our main estimating equation is the following:

$$\text{Y\_Edu}_{i,g,c,p} = \beta_0 + \beta_1 \%\text{SDY}_{c,p} \times I\left(1957 \leq g \leq 1969\right) + \beta_2 X_{i,g,c,p} + \lambda_c + \mu_{g,p} + \varepsilon_{i,g,c,p}, \qquad (1)$$

where $\text{Y\_Edu}_{i,g,c,p}$ refers to the years of education of individual i of cohort g in county c of province p. According to our definition of "years of education," the variations in $\text{Y\_Edu}_{i,g,c,p}$ can originate from both the highest level of education and the corresponding completion status. $\%\text{SDY}_{c,p}$ is the density of received SDYs in county c during the movement, which is calculated as the ratio of received SDYs to the county population in 1964. We also try an alternative specification that using the level of SDYs (instead of ratio) and control for the county population in 1964. The results are very similar. $X_{i,g,c,p}$ is a vector of individual-level controls, including gender and ethnic. λ_c are county fixed effects, which absorb all county-level characteristics that are invariant across time, geographic for example. $\mu_{g,p}$ are the province-cohort fixed effects, which allow different provinces to have different cohort trend. Standard errors are clustered at the county level.

The primary parameter of interest in this study is coefficient β_1 in front of the interaction term $\%\text{SDY}_{c,p} \times I\left(1957 \leq g \leq 1969\right)$. Note that $\%\text{SDY}_{c,p}$ is included in the county fixed effects λ_c and $I\left(1957 \leq g \leq 1969\right)$ is included in the province-cohort fixed effects $\mu_{g,p}$. Therefore, equation (1) can be viewed as a more flexible form of a standard difference-in-difference specification. Moreover, by introducing province-cohort fixed effects, we not only make no assumption on the functional form of cohort trend, but also allow the trend to be different across provinces. Stephens and Yang (2014) show that allowing year-of-birth effects to vary across regions jeopardizes the causal estimates of compulsory education in the United States. Our specification is even more flexible than that used in Stephens and Yang (2014).

We can further test the hypothesis that the SDYs from far away exert larger spillover effects

than local SDYs with a similar specification:

$$\begin{aligned} \text{Y\_Edu}_{i,g,c,p} &= \beta_0 + \beta_{1,1}\%\text{SDY\_inflow}_{c,p} \times I\left(1957 \leq g \leq 1969\right) \\ &\quad + \beta_{1,2}\%\text{SDY\_local}_{c,p} \times I\left(1957 \leq g \leq 1969\right) \\ &\quad + \beta_2 X_{i,g,c,p} + \lambda_c + \mu_{g,p} + \varepsilon_{i,g,c,p}. \end{aligned} \tag{2}$$

Before we proceed to present our main results, we would like to make a comment that our estimation should be interpreted as the lower bound of the spillover effects of the SDYs for two reasons. First, our main specification treats cohorts born between 1944–1956 as the control group. However, even if they had passed the age of primary education, they could still benefit from those better-educated SDYs (e.g., went back to school if previously dropped out) or benefit from their younger rural peers in the same village. Second, our specification implicitly assumes rural people who received their primary education from the 1960s to 1970s remain in the same county when 1990 population census took place. Overall this is not a strong assumption given China's rigid household registration system. According to the 1% sample from the 2000 China's Census of Population,[24] 86% of the rural people born between 1944 and 1969 lived in the same county as their birthplace. 83.3% of these people (71.2% of the cohorts) even did not move out of the township, an even smaller administrative unit than county. We believe those numbers to be even larger in 1990. However, it is true that the best-educated in rural areas are significantly more likely to migrate (Zhao 1997). Therefore, our specification is likely to miss those best-educated rural children who go beyond junior-high-school level.

5 Empirical Results

5.1 Main Results

Table 4 presents the main results of the paper. We separately report the total sample, the rural sample, and the urban sample. Most ideally, we should divide our sample according to their *hukou* status in 1966. However, such information is not available in the census 1990. We choose the rural sample in 1990 (Column (2)) as our preferred specification because we can safely assume those people also held rural *hukou* back in 1966. For completion purpose, we also report the results using

[24] Such information is not available in the 1990 census.

the 1990 urban sample as a comparison. But those results should be interpreted with caution. Although we expect those people are less affected by the flow of SDYs because SDYs were sent to rural areas not urban areas, the regression using the 1990 urban sample should not be viewed as "placebo" tests. On the one hand, those people might still be affected if they lived in rural areas during the rustication movement and moved to urban areas afterward. On the other hand, we treat cohorts born between 1944–1956 as the control group. However, urban cohorts could be the direct targets of the SDY movement. For example, the most severely-affected cohorts, "three old classes" were born between 1947–1952.

Table 4 Column (2) shows that the better-educated urban sent-down youths have strong spillover effects. The coefficient is 1.957 and is positively significant. The average density of SDYs is 1.94% (194 SDYs per 10,000 local people). This implies exposure to SDYs raises rural children's education by 0.038 years. The effect is not trivial and the magnitude is comparable to the effect of Compulsory Education Laws in the United States in the first half of the 20th century,[25] not to mention that the rustication movement never targeted at improving the education in rural China and our estimates only provide a lower-bound estimate. Column (3) suggests such spillover effects barely exist in the urban areas.

Table 5 compares the differential spillover effect of SDYs from urban areas within the same county (local-SDYs) and SDYs from outside the county (inflow-SDYs). The estimation using rural sample only (Column (2)), which is our preferred specification, suggests that the spillovers of SDYs from far away are about triple times that of the local SDYs. There are several possibilities. First, inflow-SDYs can be better educated. As introduced in the background section, urban youths in more developed cities were more likely to be sent far-away because those cities did not have sufficient rural areas to absorb the local SDYs. For example, SDYs from three municipalities — Beijing, Tianjin, and Shanghai — accounted for 87.3% of the SDYs who were sent outside their home provinces. Second, knowledge carried with the inflow-SDYs was more likely to be new to the local people. China is a large country. People in different regions share very different culture, language, and technology. Therefore, inflow-SDYs may make larger contributions to the local stock of knowledge. Finally, inflow-SDYs increase local people's access to the outside world (Kinnan, Wang, and Wang 2017; Xing and Zhou 2017), and therefore, increase the returns to

[25]The range of the estimates is between 0.025 and 0.05 (Angrist and Keueger 1991; Acemoglu and Angrist 2001; Lleras-Muney 2005). Note that in their sample, the average education level in the United States was about 10 years, almost twice as large as those of our reference group (5.42 years).

education (Zhao 1997).

The result using the urban sample (Table 5 Column (3)) also gives the expected sign. However, the effect is mainly driven by the baseline cohort (1944–1956) instead of "treatment" cohort (1957–1969). For the urban people, living in a county with high $\%\text{SDY\_local}_{c,p}$ implies that they have a higher probability of being sent-down, which negatively affect their educational attainment because they are less likely to complete the corresponding level of education (Meng and Gregory 2002). Cohorts born between 1957–1969 are less affected by $\%\text{SDY\_local}_{c,p}$ because they were too young to be sent-down. This explains why the coefficient in front of $\%\text{SDY\_local}_{c,p} \times I\,(1957 \leq g \leq 1969)$ is positively significant. Meanwhile, $\%\text{SDY\_inflow}_{c,p}$ has no such effect and its coefficient is statistically insignificant, lending support to our conjecture.

Table 6 estimates the spillover effect of the rusticated urban youths by gender. The spillover effect to rural girls quadruples that to boys (3.33 versus 0.71). Two reasons can potentially explain this gender differential. First, women in rural China are worse educated and their education can be improved in an easier way. The male sample in our reference group (1954–1956) on average receive 6.54 years of education and women's schooling years are only about 2/3 of that amount (4.26 years). Second, the rural-urban education gap is also larger for women, which may further leads a larger spillover effect. Urban men on average receive 9.38 years of education, which is 50% more than rural men. Urban women's schooling years fall behind those of urban men by only one year (8.33 years) and almost double those of rural women.

Appendix A shows our main results (Table 4 and Table 5) are robust to various robustness checks, including: (1) different bandwidth of treated cohorts, (2) allow junior high school education to be affected by SDYs, (3) exclude migrant samples, and (4) exclude three municipalities (Beijing, Tianjin, and Shanghai).

5.2 Tests of Common Trend Assumption

The most important assumption for a difference-in-difference style specification is the commend trend assumption. Although we rule out all possible heterogenous trends at the province level by controlling for province-cohort dummies, we still cannot rule out the possibility that there exists heterogenous trends of different counties within the same province. For example, the provincial capitals are generally more developed than remote counties and their trends in education can also be different. In our framework, the assumption would be that counties with different densities of

SDYs have similar cohort-trends of education before being affected by the rustication movement. To test this assumption, we run following regression (cohort 1944 serves as the baseline),

$$\text{Y\_Edu}_{i,g,c,p} = \beta_0 + \sum_{\gamma=1945}^{1969} \beta_{1,\gamma} \%\text{SDY}_{c,p} \times I\left(g = \gamma\right) + \beta_2 X_{i,g,c,p} + \lambda_c + \mu_{g,p} + \varepsilon_{i,g,c,p}. \quad (3)$$

Figure 4 plots the coefficient $\beta_{1,\gamma}$ for each cohort. The figure lends strong support to the common trend assumption. The coefficients fluctuate around zero before cohort 1956, suggesting that after controlling for province-cohort dummies, there were no heterogenous cohort trend in education with regard to the share of SDYs prior to the rustication movement. The coefficients gradually become larger starting from cohort 1957 and peak during the cohorts 1959–1964, whose primary schooling years almost entirely overlap with the SDY movement. The effect declines afterward as the movement was coming to an end and the SDYs were returning to the urban areas.

5.3 Outcomes other than Years of Schooling

Human capital is a much broader concept than years of schooling. In this subsection, we investigate SDYs' effect on local incumbent's other outcomes to further understand the spillover effect of those better-educated urban youths.

Attitude towards Education

The arrival of urban youths not only brought their knowledge but also their ideology and value. For example, people living in urban areas generally put a greater emphasis on education. The question is — will such value pass from SDYs onto rural children? On the one hand, greater valuation in education can result in more years of schooling. On the other hand, it can also affect their attitude toward education. To answer this question, we use the 2010 wave of China Family Panel Study (CFPS), which was launched by the Institute of Social Science Survey of Peking University in China. CFPS is a national representative survey covering 25 out of 34 provinces in China. In CFPS 2010, there are subjective questions asking people to what extent they believe and statement "more education, more chances of success." The answers range from "1 = strongly disagree" to "5 = strongly agree." As a comparison, we also examine the SDY's effect on their attitude toward family wealth.

Combining CFPS 2010 with our county-level data on SDYs,[26] we evaluate how exposure to

[26]There are 162 counties in the CFPS sample. After excluding city-governed districts, we are able to match 95

the more-educated sent-down-youths affects local incumbent's attitude toward education. Table 7 reveals two noteworthy findings. First, local incumbents who are more affected by the movement value education as a more important determinant of future success (Column 5 and 6), as opposed to more predetermined factors, including family wealth (Column 1–4). The standard deviations of three measures of values in CFPS are 1.02, 1.05 and 0.69, respectively. Therefore, the spillovers from the rusticated youths change rural children's attitude by 5.6%, 5.3%, and 3.1% of the corresponding standard deviation. Second, inflow-SDYs bring more shock to people's attitude than local-SDYs, which is expected because inflow-SDYs are more likely to originate from large cities and share a very different value. This also echoes the findings from Table 5 that inflow-SDYs have stronger spillover effect on local children's years of schooling. Additionally controlling for years of education and income (Panel B) only makes the coefficients marginally smaller, suggesting the effect is mostly independent of education.

Seeking Higher Level Education

Table 7 show that people subjectively think they value more education, but do they act so? To answer this question, we estimate whether people pursue further education after they complete junior high school. The idea is that local senior high education should not be directly affected by the arrival of SDYs. Most of SDYs were junior high or senior high graduates and, therefore, were not educated enough to serve as senior high school teachers. Therefore, the decision of pursuing education beyond junior high level can reflect local incumbents' valuation toward education. Table 8 confirms that local junior high graduates are more likely to seek more-advanced education and such effect mainly applies to rural students.

Occupational Choice

People's valuation of education not only affects how much education to receive but also influence what they do after graduation. If people value more on education, they are also more likely to choose education-related occupations. Census 1990 provides detailed occupation code and we can define the dummy of teacher occupation accordingly. Table 9 estimates whether the arrival of better-educated rusticated urban youths encourages local children to work as teachers when they grow-up. The results suggest a statistically significant effect upon rural children. Similar to our previous findings on schooling years and valuation toward education, the effect of inflow-SDYs is

CFPS counties with our county-level data set compiled from local gazetteers.

larger than local-SDYs. Panel B additionally controls for school years and the coefficients barely change, which suggests the positive effect of SDYs does not merely come from more qualified students as a result of more years of education.

Income

In addition to educational attainment, another variable of interest is income. To estimate SDYs' spillover effect on income, we combine our county-level data on the number of received SDYs with a 20% sample of the 2005 1% inter-decennial population census (usually referred as "mini-census"). Therefore, our data cover about 0.2% of the national population and sample size is about 2.6 million. We use mini-census 2005 because it is the only census that includes information related to income. Table 10 reports the results.

There are two notable findings from Table 10. First, controlling for education barely affects the estimated coefficients of SDYs. That is to say, exposure to the urban youth increases rural incumbent's income mainly through channels other than improving education. Second, unlike our findings with regard to rural education, local SDYs' effect on income turns out to be larger than inflow SDYs. Moreover, urban people also share a benefit about the same magnitude. One possible explanation is that the SDYs build a bridge between rural and urban areas, which potentially benefits both areas. Kinnan, Wang, and Wang (2017) provide evidence that inter-province SDYs tighten the connection between source province and destination province. We believe such effect should be even stronger within the same county because inter-province migration is still difficult. This also explains why local SDYs have a stronger effect on income than inflow SDYs.

5.4 Persistent Effect across Generations

So far we have shown that the arrival of sent-down urban youths has important spillover effects onto the rural incumbents. They receive more years of schooling and hold a more positive attitude toward education. One important question here is, is such positive spillover temporary or persistent? The social value of human capital spillover would be much larger if the spillover not only applies to the directly-affected cohorts but also their offsprings. There are abundant studies about the intergenerational transmission of human capital (Currie and Moretti 2003; Black, Devereux, and Salvanes 2005; Black and Devereux 2011). Two China-related studies, Huang, Guo, and Song (2016) and Meng and Zhao (2016), find evidence that the negative consequences of the Cultural

Revolution passed onto the second generation.

To estimate SDYs' spillover effect on the second generation, we use 1‰ sample from the 2010 China's census of population and approach as follows. First of all, we construct parent-children pairs by taking out the household head (parent) and members who report their relationship to the head as son/daughter (child). Second, we restrict the sample to the children whose parents were born between 1944 and 1969. Parents born during the period 1956–1969 are treated. Finally, we estimate the following equation,

$$\text{Y\_Edu}_{i,g,c,p} = \beta_0 + \beta_1 \%\text{SDY}_{c,p} \times I\left(1957 \leq P_{i,g,c,p} \leq 1969\right) + \beta_2 X_{i,g,c,p} + \lambda_c + \mu_{g,p} + \varepsilon_{i,g,c,p}, \quad (4)$$

whereas $P_{i,g,c,p}$ represent parents' year of birth. The key difference from our main specification (equation (1)) is that now we are interested in understanding how parents' exposure to the arrival of SDYs affect children's education.

Table 11 reports the estimation results.[27] We find evidence that arrival of SDYs during the 1960s and 1970s still has a persistent spillover effect to the second generation 40 years later. Such persistence exists only among rural households. For urban households, we do not observe SDYs' spillover to both first and second generations. We also note that the coefficients in Table 11 using census 2010 are quite comparable to those in Table 4 using census 1990 despite a gap of twenty years. Previous studies estimated an intergenerational transition in schooling years of about 0.6 (Huang, Guo, and Song 2016; Meng and Zhao 2016), which means if parents' receive one more year of education, children's school years would be increased by 0.6. A first glance at our results seemingly suggests a coefficient exceeding one. But notice that parents' exposure to the arrival of rusticated youths affect their children's educational outcome not only through parents' schooling years, but although through their valuation towards as well as income.

[27] This is one concern. Some children might still have not completed their education. For example, if a parent was born in 1969 and had the child at the age of 25, the child would be of age 16 in the year 2010. But our estimation is still meaningful because we control for children's birth cohort fixed effects. At the age of 16, while some children are attending senior high school, others may decide not to seek further education after their graduation from junior high school. As a robustness check, we exclude the current students sample and obtain similar results.

6 Discussion

In this section, we first explore several possible mechanisms that how the SDYs improve the educational attainment of local rural children. In the second part of the section, we discuss the potential influence from other important historical events around the period of the rustication movement, especially the Great Famine (1959–1961) and the Cultural Revolution (1966–1976).

6.1 Mechanisms

How does the arrival of urban youth improve rural children's education? One possible mechanism is through direct learning — SDYs became teachers in the rural areas. There is abundant narrative evidence that some SDYs directly instructed rural children's study. Gu (2009) documented that SDYs worked as study counselors and community school teachers in Jilin and Shaanxi. Gu (2009) commented that

> "*Working as community school teachers (or substitute teachers) is an important experience of many educated youths. They dedicated themselves to the cause of education in rural China, especially in the remote areas.*"

In a speech for the 50th anniversary of the Sent-Down Movement, Mo Yan, the 2012 Nobel Laureates in Literature, said that

> "*When faced with difficulty, unfairness, and suffering, most of the 17 million educated-youth made a marvellous contribution to the country and nation. . . . Many current local cadres were students of zhiqing in those days. Those sent-down youth's achievement in bringing urban civilization and culture to the countryside shall be recorded in history.*"[28]

In addition to the narrative evidence, we also find some statistical evidence from 1% sample of 1982 population census. If the hypothesis that SDYs later turned into rural teachers (mainly in primary schools) is correct, we should observe an increase in the supply of primary school teachers in rural areas as a result of the SDY movement.

Figure 5 plots the cohort probabilities of working as primary school and secondary school teachers in rural areas. One important observation is that there is a huge mass for cohorts 1946–1961, who were the main target of the rustication program (Li, Rosenzweig, and Zhang 2010;

[28]Mo Yan, "Educated-youth going up to the mountains and down to the villages", in memorial of the 50th anniversary of China's Sent-Down Youth movement.

Gong, Lu, and Xie 2015; Fan 2017). The bunching is even more prominent for cohort 1954–1958. This pattern matches well with the cohort distribution of people with sent-down experience, as suggested in Figure 6 computed from the CFPS. In the 2010 wave, CFPS asked about people's life history, including sent-down experience. This pattern supports our hypothesis that some S-DYs became rural teachers and helped improving educational outcome of rural children. As a comparison, such mass is not observed in the urban areas. Note that the census took place in 1982, by which time the majority of SDYs had returned to urban areas. Therefore, the increase in the supply of rural teachers should be even larger during the rustication movement than what is suggested in Figure 5. In addition, increase in the supply of teachers was timely and important if taking into account the political background during the Cultural Revolution. China was suffering from a shortage of teachers during the Cultural Revolution because intellectuals were being attacked and labeled as "bad classes" (Bernstein 1977; Walder 1989).

In correspondence to more teachers, we also find suggestive evidence that counties accepted more rusticated youth experienced larger increase of primary school and secondary school students after the year 1968. From local gazetteers, we are able to find historical information on number of students for 801 counties out of 1,957 counties in our sample. We restrict our analysis to the period 1957–1979 and obtain 11,374 county-year observations[29] with either numbers of primary school students or numbers of secondary students available. To estimate how the arrival of SDYs affect the number of local students during the period of rustication movement, we estimation following equations which share a similar spirit as the main specification.

$$\begin{aligned}
\%\text{Students}_{t,c,p} &= \beta_0 + \beta_1 \%\text{SDY}_{c,p} \times I\left(t \geq 1968\right) + \lambda_c + \mu_{t,p} + \varepsilon_{t,c,p} \\
\%\text{Students}_{t,c,p} &= \beta_0 + \beta_{1,1} \%\text{SDY_inflow}_{c,p} \times I\left(t \geq 1968\right) + \\
&\quad + \beta_{1,2} \%\text{SDY_local}_{c,p} \times I\left(t \geq 1968\right) + \lambda_c + \mu_{t,p} + \varepsilon_{t,c,p}. \qquad (5)
\end{aligned}$$

Here $\%\text{Students}_{t,c,p}$ represents the number of primary/secondary students of county c in province p in year t as a share of the county population in 1964. Analogous to our main specification, we not only control for county fixed effects λ_c but also provincial heterogeneous time trend $\mu_{t,p}$. There is one data limitation that needs attention. Local gazetteers cannot differentiate rural students from

[29]Note that number of available years varies across counties. For example, gazetteer for Zhongyang county in Shanxi province only contains such information for the year 1971, while gazetteer for Luzhai county in Guangxi province covers the period from 1951 to 1990.

urban students. The rustication movement is expected to have opposite effect on numbers of rural and urban students, making the interpretation of the coefficients in front of $\%\text{SDY}_c \times I\,(t \geq 1968)$ difficult. On the one hand, more intensified rustication movement should increase the number of rural students because part of sent-down urban students became teachers in rural schools. On the other hand, it should also reduce the number of urban students because more students were sent-down. Notice the second channel only applies to local-SDYs. Therefore, our focus is coefficient $\beta_{1,1}$, which represents the effect of SDYs outside the county. Table 12 reports the results. As expected, more inflow-SDYs strongly increase the number of local students, while the effect of local-SDYs' effect is ambiguous (Column (2)). Moreover, we find these effects are stronger among less urbanized counties (Column (3)–(6)).

One related question is — can the effect of SDYs be simply interpreted as the effect of additional teachers? We believe the answer is no. In addition to teaching the standard courses, the urban youths also shared their knowledge, ideology, technology, and stories based on their urban experience. Such communications could happen outside the classroom. Our empirical results on outcomes other than education, as well as studies of Kinnan, Wang, and Wang (2017) and Xing and Zhou (2017), all suggest the role of SDYs are much more complicated. We find that SDYs' students hold a more positive attitude towards education (Table 7), have a greater tendency to pursue further education (Table 8), and are more likely to work as teachers after they grow up (Table 9). Moreover, a larger flow of SDYs also connects rural and urban areas inside the county (Table 10) as well as different provinces (Kinnan, Wang, and Wang 2017; Xing and Zhou 2017).

Another possible channel that SDYs influenced rural incumbents' education is through health. As mentioned in the background section, some rusticated youths became barefoot doctors in rural villages where they were sent. There is a large literature highlighting the importance of childhood health on future educational attainment (Bleakley 2007; Smith 2009; Case and Paxson 2010; Baird et al. 2016). By providing better health services, SDYs could improve the health status of rural children and indirectly increase their educational attainment. Unluckily, we are not able to test this hypothesis formally because of the data limitation, which requires health-related information during childhood back to 1960s and 1970s.[30]

[30]We cannot simply replace childhood health with current health status for two reasons. First, unlike education, which remains mostly unchanged once a person finishes his education, health varies a lot at different stages of life. Second, it is well-acknowledged that education is beneficial to health (see Galama, Lleras-Muney, and van Kippersluis (2018) for a recent review of empirical evidence). Therefore, even if we observe a positive effect of SDYs on adulthood health, it may captures the effect of more education instead of better childhood health.

6.2 Alternative Explanations

The remainder of this subsection discusses other competing stories which can also generate a positive association between SDYs and rural incumbent's education.

Cultural Revolution and Violence

The most important contemporaneous historical event with the rustication movement is the Cultural Revolution. Two out of three main purposes of the SDY movement — to discharge Red Guards and to relieve urban unemployment — are the direct results of the Cultural Revolution. Moreover, it is possible that there exists a correlation between the local severity of the violence during the Cultural Revolution and the number of received SDYs. For example, counties which experienced less violence during the revolution maintained a better government function and were able to receive more SDYs. In that scenario, our findings could be interpreted in an alternative way — rural incumbents did not benefit from more SDYs, but from less violence.

However, we would like to argue that our main results are robust to the Cultural Revolution because it cannot explain the variation in SDYs' effect onto different cohorts (Figure 4). Despite that the Cultural Revolution spans from 1966 to 1976, a majority of the violence events took place within the first few years. Walder and Su (2003) collected information on violence events during the Cultural Revolution for 1,530 counties. While there were 836 armed battles recorded in 1967 and 215 battles in 1968, there were only 26 battles in 1969 and zero afterward. Cultural Revolution's impact on education system also displayed a similar pattern. At the beginning of the Cultural Revolution, all schools in urban China were closed for about 2–3 years. Schools were reopened during 1968–1969 and the standard school curriculum was gradually resumed starting from 1972 (Deng and Treiman 1997). In contrast, Figure 4 suggests that SDYs affected as many as 13 cohorts (born between 1957–1969), a range which is too wide to be explained fully by the Cultural Revolution.

Great Famine

In addition to the Cultural Revolution, another possible confounding historical event is China's Great Famine, which took place from 1959 to 1961 and caused estimated fatalities of 16.5 to 45 million (Meng, Qian, and Yared 2015).[31] Our study covers cohorts born between 1944 and 1969.

[31]The estimated number of excess fatalities varies a lot in different studies. See footnote 1 in Meng, Qian, and Yared (2015) for details.

Therefore, some of them were exposed to this catastrophic event. There is a large literature discussing the long-run negative impact of the Great Famine on various socioeconomic outcomes, including health, education, earning, labor supply, et al. (Chen and Zhou 2007; Meng and Qian 2009; Xinzheng 2011). Moreover, it is possible the local severity of the Great Famine is correlated with the number of accepted SDYs.[32]

To control for the influence of the Great Famine, we construct county-level severity of the famine following the idea of Meng, Qian, and Yared (2015). They find that there is much more variation in cross-county birth cohort sizes for famine birth cohorts relative to non-famine birth cohorts. Therefore, they use the birth cohort sizes of survivors observed in 1990 to proxy for famine severity at the county level. We define the severity of the famine as the ratio of cohort size of 1959–1961 over that of 1955–1957. Table 13 reports the estimation results which additionally control for the interaction between local famine severity and a dummy variable indicating born during the period 1957–1969.[33] Consistent with the previous literature, we also find a strong negative impact of the Great Famine on education and the effect is only observed in rural areas.[34] However, the estimated impact of SDY's arrival remains almost unchanged, suggesting our results are robust to the inclusion of the Great Famine.

Substitute Child Labor

Another possibility that the SDYs affect local rural children's education is through substituting child labor. In a developing economy, child labor is common in the farmland. About 71 percent of child labor in developing countries is rural (International Labour Organization 2017). Previous studies have revealed a strongly negative effect of child labor on educational outcome (Ravallion and Wodon 2000; Beegle, Dehejia, and Gatti 2009). Therefore, if the extra labor with the arrival of urban youth relieved rural children's burden of farming, it is possible that children's education became better. However, such hypothesis cannot generate one important empirical findings in our study — the effect of SDYs from far away is about triple times that of local SDYs. Because the inflow SDYs are more likely to come from more developed areas and large cities, their capabilities in providing manual labor should not differ a lot from local SDYs.

[32]Less developed counties generally received more rusticated youths during the sent-down movement. However, the determinants of the local severity of the Great Famine is less clear. Therefore, the association can be either positive or negative.

[33]Famine severity is time-invariant within a county and, therefore, absorbed by the county fixed effects.

[34]Under the central planning system, the food need in urban areas was prioritized (Lin and Yang 2000). Therefore, the famine mainly shocked the rural area.

7 Conclusions

Understanding the human capital spillovers is challenging because of the difficulty in identification issues. In this paper, we exploit China's sent-down-youth movement as a natural experiment. From 1962 to 1979, the government mandated the temporary resettlement of 17.7 million urban youths to rural areas. The majority of those urban youths were reluctant but forced to go because of the special political regime during that period. The movement provides an opportunity of looking into the human capital spillovers by estimating how the arrival of those better-educated urban youth affected the rural incumbents. For this purpose, we compile a unique county-level data set from over 3,000 book-length local gazetteers on the inflow of SDYs in each county. Our estimation suggests that rural children who were more exposed to urban SDYs during their schooling years ended up with more years of education and hold a more positive value towards education. Moreover, SDYs coming from outside the county have stronger spillover effect than local SDYs.

Despite our study looks at a historical event took place half a century ago, it still contains implications for the current policies. Although the involuntary urban-to-rural migration has flipped its page, the voluntary rural-to-urban migration is becoming increasingly prevalent in China. The current local policies for migrant workers are biased towards the better-educated group. For example, in June 2013, Shanghai issued "Regulations on Shanghai Residence Permit" (*Shanghai juzhuzheng guanli banfa*), which ties the social benefits of migrants to a point system. If a migrant earns 120 points, his social benefit would be essentially the same as a Shanghai *hukou* holder. The regulation guarantees an immediate 110 points to a migrant with a Ph.D. degree. Such bias also exists in the international immigration policy. For example, U.S. Citizenship and Immigration Services (USCIS) sets different caps of H-1B visas, which allows U.S. employers to employ foreign workers, for workers who have a masters degree or higher from a U.S. institution and those without such a degree. Our study provides partial support to such education-biased design. Of course, much more studies are necessary to evaluate the efficiency of those policies.

It is noteworthy that our study has not yet sufficiently explored the mechanisms how the urban SDYs affect the rural incumbent. Our data on SDYs are aggregated at the county level. As a result, we do not know enough about what they did during their sent-down years and how they interacted with the rural villagers. A better understanding of the mechanisms helps to extrapolate

the findings from a historical event to contemporary policies.

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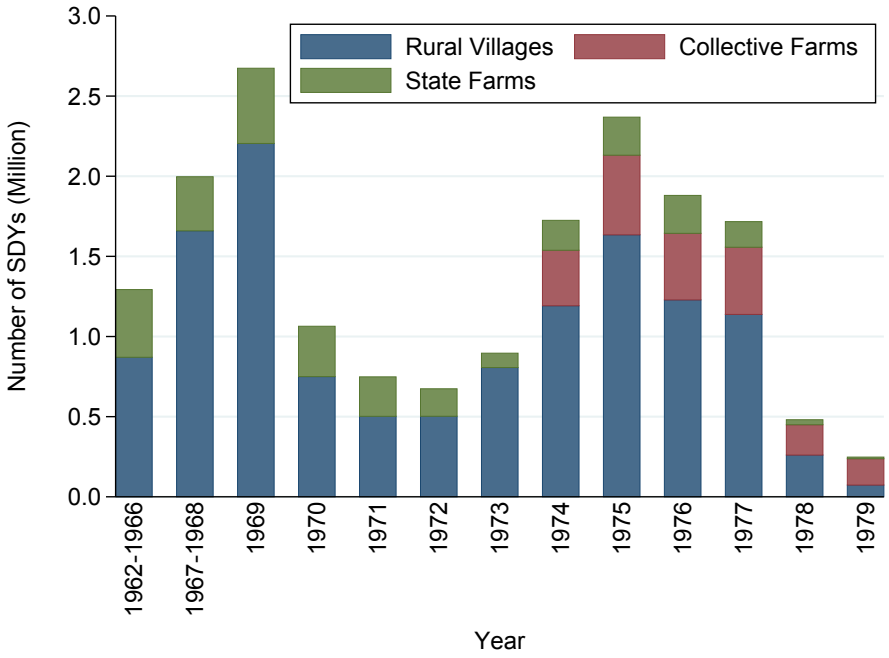
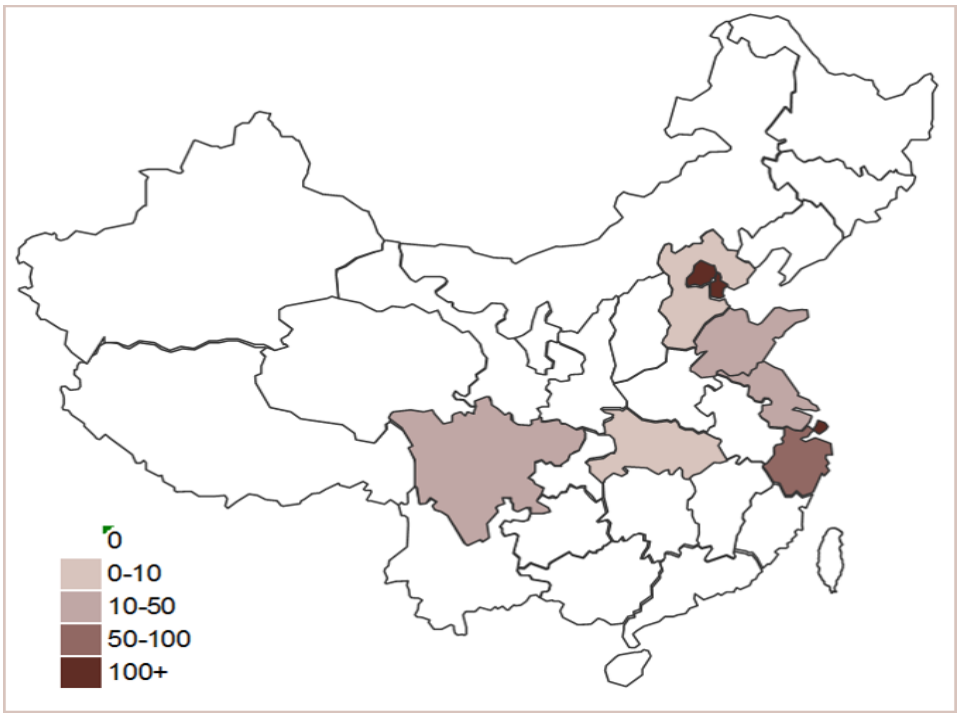
Figures

Figure 1: Number of Sent-Down-Youth by Resettlement, 1962–1979

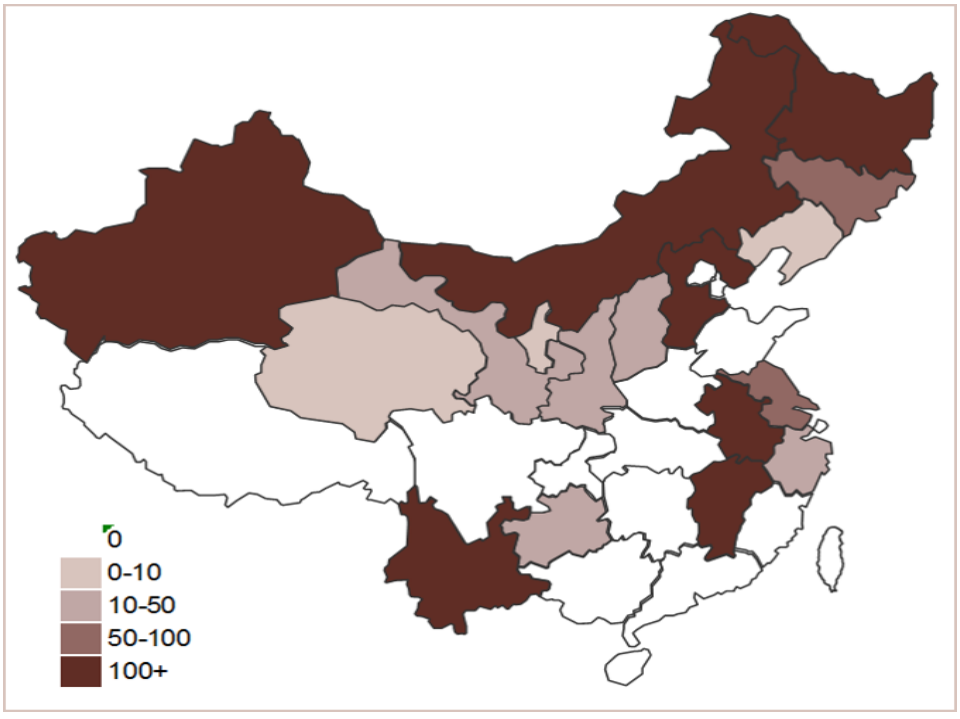


Note: Data source is Gu (2009) "Chinese Educated City Youth: The Whole Story."

Figure 2: Source and Destination of Inter-Province SDYs



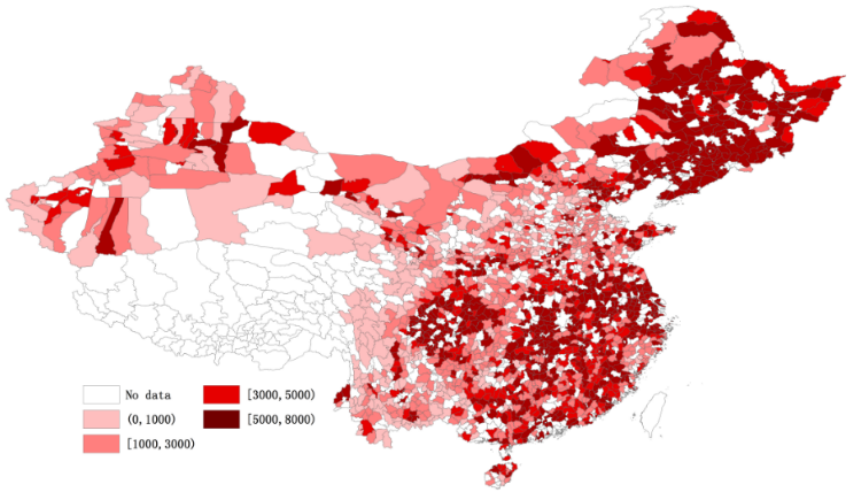
(a) Source Province



(b) Destination Province

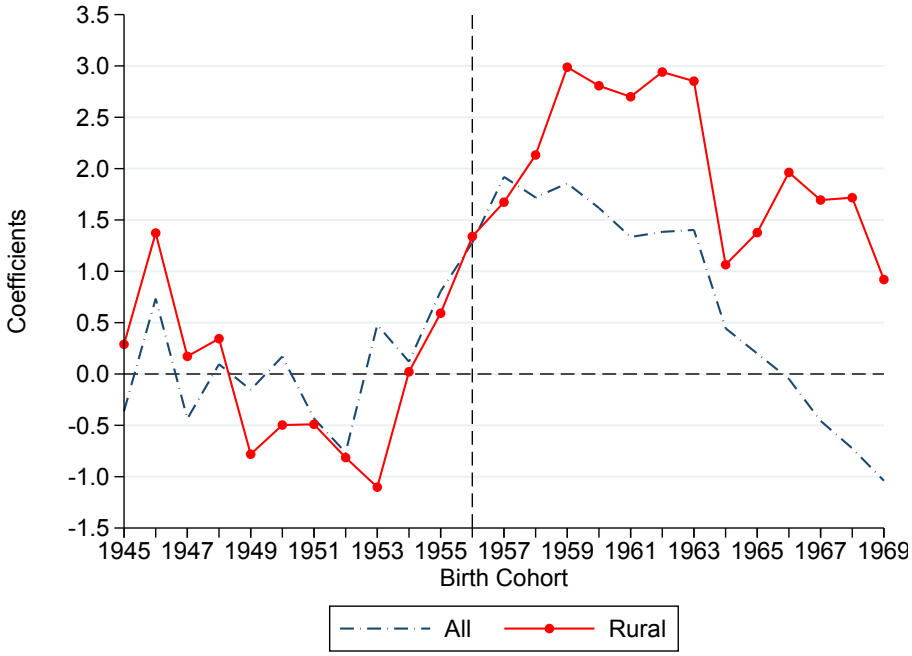
Note: Data source is Gu (2009) "Chinese Educated City Youth: The Whole Story." Unit: thousand.

Figure 3: Number of Received Sent-Down-Youth in Each County



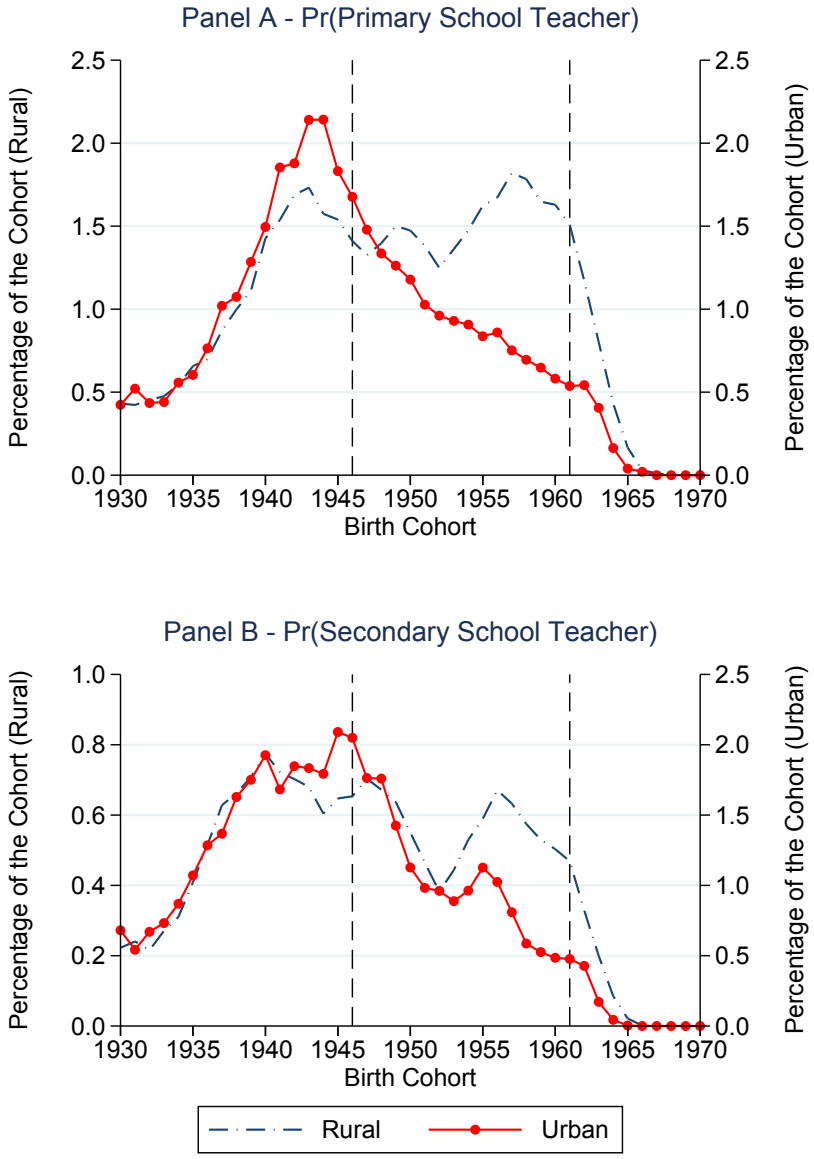
Note: Unshaded counties are lacking in data.

Figure 4: The Coefficients of the Interaction Terms between County SDYs densities with Cohort Dummies



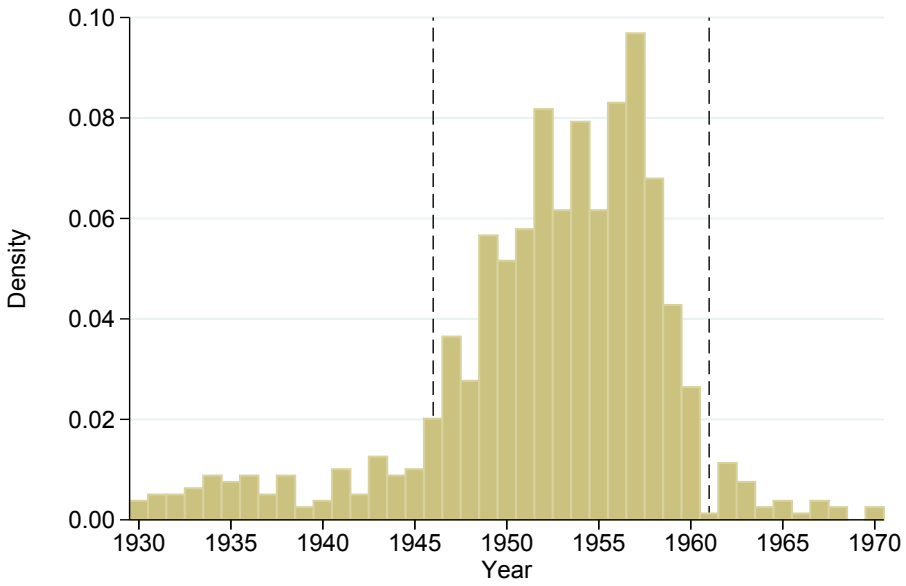
Note: y axis represents the coefficients from equation (3), which captures the effect of SDYs densities on different cohorts.

Figure 5: Probabilities of being Primary and Secondary School Teachers



Note: Authors' calculation from 1% sample of China 1982 Census of Population.

Figure 6: Cohort Distribution of Sent-Down-Youths



Note: Authors' calculation from China Family Panel Study (CFPS) 2010.

Tables

Table 1: Summary Statistics of the 1% sample from the 1990 China's Census of Population

Cohort	Reference Group (1944–1956)			Control Group (1957–1969)		
Hukou	All	Rural	Urban	All	Rural	Urban
	(1)	(2)	(3)	(4)	(5)	(6)
Years of Education	5.926	5.416	8.950	7.717	7.264	10.555
	(3.598)	(3.405)	(3.207)	(3.192)	(3.057)	(2.475)
Male = 1	0.519	0.508	0.589	0.513	0.505	0.565
	(0.500)	(0.500)	(0.492)	(0.500)	(0.500)	(0.496)
Han Ethnic = 1	0.927	0.926	0.936	0.919	0.917	0.930
	(0.259)	(0.262)	(0.245)	(0.273)	(0.276)	(0.256)
Age	39.299	39.268	39.579	26.211	26.159	26.538
	(3.643)	(3.633)	(3.694)	(3.656)	(3.652)	(3.662)
Observations	1,419,193	1,214,495	204,698	2,021,880	1,743,430	278,450

Table 2: Total Number of Sent and Received Educated-Youth in Each Province, 1962–1979

Province	SDY Sent (Thousand)			SDY Received (Thousand)		
	Total	Inside	Outside	Total	Inside	Outside
Beijing	636.3	384.2	252.1	384.2	384.2	
Tianjin	465.1	193.6	271.5	193.6	193.6	
Hebei	384.4	377.8	6.6	510.5	377.8	132.7
Shanxi	264.3	264.3		312.9	264.3	48.6
Inner Mongolia	193.8	193.8		299.3	193.8	105.5
Liaoning	2013.4	2013.4		2018.0	2013.4	4.6
Jilin	991.4	991.4		1052.6	991.4	61.2
Heilongjiang	1519.2	1519.2		1922.2	1519.2	403.0
Shanghai	1259.2	532.3	719.9	532.3	532.3	
Jiangsu	828.4	810.2	18.2	861.2	810.2	51.0
Zhejiang	646.2	563.9	82.3	595.9	563.9	32.0
Anhui	576.5	576.5		725.5	576.5	149.0
Fujian	372.3	372.3		372.3	372.3	
Jiangxi	504.5	504.5		622.5	504.5	118.0
Shandong	512.9	492.7	20.2	492.7	492.7	
Henan	673.0	673.0		673.0	673.0	
Hubei	886.6	878.6	8.0	878.6	878.6	
Hunan	635.8	635.8		635.8	635.8	
Guangdong	973.2	973.2		973.2	973.2	
Guangxi	434.8	434.8		434.8	434.8	
Sichuan	1472.4	1427.4	45.0	1427.4	1427.4	
Guizhou	213.5	213.5		224.1	213.5	10.6
Yunnan	232.5	232.5		339.1	232.5	106.6
Tibet	3.4	3.4		3.4	3.4	
Shaanxi	463.1	463.1		490.3	463.1	27.2
Gansu	245.2	245.2		264.3	245.2	19.1
Qinghai	43.6	43.6		51.0	43.6	7.4
Ningxia	49.2	49.2		57.5	49.2	8.3
Xinjiang	277.6	277.6		416.6	277.6	139.0
Total	17771.8	16341.0	1423.8	17764.8	16341.0	1423.8

Note: Data source is Gu (2009) "Chinese Educated City Youth: The Whole Story."

Table 3: Comparing the Number of Received SDYs from County-aggregate and from National Report in Each Province

Province	SDY Received (Thousand)		
	County Aggregate 1968–1977	National Report 1962–1979	Ratio (%)
Beijing	208.5	384.2	54.3
Tianjin	76.4	193.6	39.4
Hebei	280.1	510.5	54.9
Shanxi	135.8	312.9	43.4
Inner Mongolia	306.5	299.3	102.4
Liaoning	1256.2	2018.0	62.3
Jilin	657.4	1052.6	62.5
Heilongjiang	509.6	1922.2	26.5
Shanghai	120.8	532.3	22.7
Jiangsu	575.3	861.2	66.8
Zhejiang	436.8	595.9	73.3
Anhui	498.3	725.5	68.7
Fujian	319.7	372.3	85.9
Jiangxi	399.7	622.5	64.2
Shandong	389.6	492.7	79.1
Henan	448.9	673.0	66.7
Hubei	635.1	878.6	72.3
Hunan	563.1	635.8	88.6
Guangdong	554.0	973.2	56.9
Guangxi	277.0	434.8	63.7
Sichuan	1284.6	1427.4	90.0
Guizhou	156.5	224.1	69.8
Yunnan	177.8	339.1	52.4
Tibet	N/A	3.4	N/A
Shaanxi	373.1	490.3	76.1
Gansu	164.8	264.3	62.3
Qinghai	33.1	51.0	64.9
Ningxia	21.3	57.5	37.1
Xinjiang	174.8	416.6	42.0
Total	11034.7	17764.8	62.1

Note: county aggregate number are computed based on authors' collection of data from local gazetteers. National report numbers are the same as those in Table 2.

Table 4: The Effect of SDY Densities on the Educational Attainment of Local Rural Children (census 1990)

Dependent Variables	Years of Education		
	ALL	Rural	Urban
	(1)	(2)	(3)
Share of Total received SDYs	0.441***	1.957***	0.0136
*Affected Cohort (Born 1957–1969)	(0.145)	(0.191)	(0.197)
Male	1.817***	1.890***	0.690***
	(0.0033)	(0.0034)	(0.0082)
Han Ethnic	0.426***	0.190***	0.0203
	(0.0095)	(0.0104)	(0.0198)
County FE	Yes	Yes	Yes
Province-cohort FE	Yes	Yes	Yes
Observations	3,225,302	2,794,505	430,750
R-squared	0.291	0.296	0.214

Note: * significant at 10%; ** significant at 5%; *** significant at 1%. Standard errors are clustered at the county level. Share of total SDYs is computed from dividing the number of SDYs by the county population in 1964.

Table 5: Examining the Effect of Inflow-SDYs versus Local-SDYs (census 1990)

Dependent Variables	Years of Education		
	ALL	Rural	Urban
	(1)	(2)	(3)
Share of Inflow SDYs	1.005***	1.921***	0.692
*Affected Cohort (Born 1957–1969)	(0.266)	(0.306)	(0.441)
Share of Local SDYs	1.080***	0.664*	1.843***
*Affected Cohort (Born 1957–1969)	(0.364)	(0.401)	(0.689)
Male	1.825***	1.897***	0.704***
	(0.0039)	(0.0040)	(0.0099)
Han Ethnic	0.404***	0.142***	-0.0131
	(0.0121)	(0.0133)	(0.0254)
County FE	Yes	Yes	Yes
Province-cohort FE	Yes	Yes	Yes
Observations	2,232,352	1,939,372	292,949
R-squared	0.287	0.292	0.225

Note: * significant at 10%; ** significant at 5%; *** significant at 1%. Standard errors are clustered at the county level. Share of inflow/local SDYs is computed from dividing the number of inflow/local SDYs by the county population in 1964.

Table 6: Heterogeneous Effect of SDY Densities by Gender (census 1990)

Dependent Variables	Years of Education					
	ALL		Rural		Urban	
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Male Subsample						
Share of Total received SDYs	-0.276		0.707***		0.115	
*Affected Cohort (Born 1957–1969)	(0.195)		(0.255)		(0.281)	
Share of Inflow SDYs		1.198***		1.436***		1.180*
*Affected Cohort (Born 1957–1969)		(0.351)		(0.404)		(0.616)
Share of Local SDYs		-1.027**		-0.223		0.234
*Affected Cohort (Born 1957–1969)		(0.488)		(0.530)		(1.022)
Han Ethnic	0.358***	0.333***	0.154***	0.0949***	-0.0402	-0.109***
	(0.0126)	(0.0160)	(0.0138)	(0.0177)	(0.0276)	(0.0353)
Observations	1,610,218	1,113,407	1,389,340	964,011	220,779	149,325
R-squared	0.198	0.192	0.200	0.194	0.183	0.193
Panel B: Female Subsample						
Share of Total received SDYs	1.170***		3.338***		-0.155	
*Affected Cohort (Born 1957–1969)	(0.223)		(0.292)		(0.294)	
Share of Inflow SDYs		1.716***		2.311***		0.586
*Affected Cohort (Born 1957–1969)		(0.409)		(0.462)		(0.682)
Share of Local SDYs		1.006*		2.125***		0.872
*Affected Cohort (Born 1957–1969)		(0.569)		(0.614)		(1.115)
Han Ethnic	0.475***	0.460***	0.163***	0.113***	0.0918***	0.102***
	(0.0147)	(0.0188)	(0.0158)	(0.0204)	(0.0310)	(0.0396)
County FE	Yes	Yes	Yes	Yes	Yes	Yes
Province-cohort FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,517,954	1,052,470	1,347,924	937,044	169,886	115,320
R-squared	0.319	0.315	0.321	0.317	0.245	0.251

Note: * significant at 10%; ** significant at 5%; *** significant at 1%. Standard errors are clustered at the county level. Share of total/inflow/local SDYs is computed from dividing the number of total/inflow/local SDYs by the county population in 1964.

Table 7: The Effect of SDY Densities on Local Incumbents' Attitude Toward Education (CFPS 2010)

Dependent Variables	Do you agree with following statements? 1 = strongly disagree, 5 = strongly agree					
	Children from higher SES families achieve higher.		Children from poorer families achieve lower.		More education, more chances of success.	
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Education and Income Not Controlled						
Share of Total received SDYs	-2.968***		-2.904*		1.093	
*Affected Cohort (Born 1957–1969)	(1.110)		(1.644)		(1.283)	
Share of Inflow SDYs		-5.226**		-2.618		2.391
*Affected Cohort (Born 1957–1969)		(2.464)		(2.909)		(2.800)
Share of Local SDYs		-1.558		-2.953		-1.894
*Affected Cohort (Born 1957–1969)		(3.714)		(4.645)		(3.508)
Male	-0.025	-0.011	-0.080***	-0.077***	0.052***	0.066***
	(0.021)	(0.026)	(0.022)	(0.027)	(0.015)	(0.017)
Han Ethnic	0.099	0.083	0.044	0.020	0.032	0.056
	(0.068)	(0.070)	(0.072)	(0.068)	(0.065)	(0.057)
Observations	8,778	6,431	9,204	6,736	9,217	6,757
R-squared	0.121	0.136	0.128	0.135	0.108	0.116
Panel B: Education and Income Controlled						
Share of Total received SDYs	-2.816***		-2.687*		1.107	
*Affected Cohort (Born 1957–1969)	(1.065)		(1.562)		(1.274)	
Share of Inflow SDYs		-5.666**		-3.222		2.323
*Affected Cohort (Born 1957–1969)		(2.444)		(2.628)		(2.758)
Share of Local SDYs		0.378		-0.064		-1.629
*Affected Cohort (Born 1957–1969)		(3.721)		(4.022)		(3.515)
Years of Education	-0.031***	-0.032***	-0.050***	-0.051***	-0.003	-0.004
	(0.003)	(0.004)	(0.004)	(0.005)	(0.002)	(0.003)
log(income)	-0.002	0.001	-0.003	-0.002	-0.001	-0.002
	(0.003)	(0.004)	(0.004)	(0.004)	(0.002)	(0.003)
Male	0.038*	0.049*	0.023	0.027	0.060***	0.078***
	(0.021)	(0.027)	(0.021)	(0.026)	(0.016)	(0.019)
Han Ethnic	0.095	0.086	0.041	0.032	0.032	0.058
	(0.070)	(0.075)	(0.071)	(0.071)	(0.065)	(0.057)
County FE	Yes	Yes	Yes	Yes	Yes	Yes
Province-cohort FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	8,778	6,431	9,204	6,736	9,217	6,757
R-squared	0.131	0.147	0.152	0.160	0.109	0.117

Note: * significant at 10%; ** significant at 5%; *** significant at 1%. Standard errors are clustered at the county level. Share of total/inflow/local SDYs is computed from dividing the number of total/inflow/local SDYs by the county population in 1964.

Table 8: Exposure to SDYs and Decision of Pursuing Senior High School Education or Above conditional on Completing Junior High School Education (census 1990)

Dependent Variables	Continue Senior High Education (conditional on Junior High Graduate)					
	ALL		Rural		Urban	
	(1)	(2)	(3)	(4)	(5)	(6)
Share of Total received SDYs	0.00993***		0.00692***		0.000825	
*Affected Cohort (Born 1957–1969)	(0.0009)		(0.0010)		(0.0019)	
Share of Inflow SDYs		0.00160**		0.00415***		-7.65e-05
*Affected Cohort (Born 1957–1969)		(0.0007)		(0.0008)		(0.0015)
Share of Local SDYs		0.00882***		0.00356***		0.00266
*Affected Cohort (Born 1957–1969)		(0.0010)		(0.0011)		(0.0021)
Male	-0.0404***	-0.0371***	-0.0447***	-0.0416***	-0.0445***	-0.0444***
	(0.0007)	(0.0008)	(0.0007)	(0.0009)	(0.0015)	(0.0019)
Han Ethnic	0.000154	0.000357*	0.000742***	0.00113***	0.00316***	0.00392***
	(0.0001)	(0.0002)	(0.0002)	(0.0002)	(0.0003)	(0.0005)
County FE	Yes	Yes	Yes	Yes	Yes	Yes
Province-cohort FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,608,849	1,092,471	1,207,422	823,926	401,346	268,491
R-squared	0.114	0.118	0.073	0.073	0.129	0.137

Note: * significant at 10%; ** significant at 5%; *** significant at 1%. Standard errors are clustered at the county level. Share of total/inflow/local SDYs is computed from dividing the number of total/inflow/local SDYs by the county population in 1964.

Table 9: The Effect of SDY Densities on the Occupational Choice (census 1990)

Dependent Variables	Teacher as an Occupation = 1					
	ALL		Rural		Urban	
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Education Not Controlled						
Share of Total received SDYs	-0.0057		0.0306***		-0.0691***	
*Affected Cohort (Born 1957–1969)	(0.007)		(0.006)		(0.019)	
Share of Inflow SDYs		0.0327***		0.0355***		0.0652
*Affected Cohort (Born 1957–1969)		(0.012)		(0.010)		(0.044)
Share of Local SDYs		-0.0447***		0.0221*		-0.3742***
*Affected Cohort (Born 1957–1969)		(0.016)		(0.013)		(0.068)
Male	-0.0039***	-0.0038***	-0.0021***	-0.0020***	0.0122***	0.0112***
	(0.0001)	(0.0002)	(0.0001)	(0.0001)	(0.0008)	(0.0010)
Han Ethnic	-0.0014***	-0.0009	-0.0005	-0.0006	-0.0255***	-0.0221***
	(0.0004)	(0.0005)	(0.0003)	(0.0004)	(0.0019)	(0.0025)
Observations	3,225,302	2,232,352	2,794,505	1,939,372	430,750	292,949
R-squared	0.010	0.009	0.005	0.004	0.109	0.105
Panel B: Education Controlled						
Share of Total received SDYs	-0.0098		0.0220***		-0.0695***	
*Affected Cohort (Born 1957–1969)	(0.006)		(0.006)		(0.019)	
Share of Inflow SDYs		0.0234**		0.0271***		0.0448
*Affected Cohort (Born 1957–1969)		(0.012)		(0.010)		(0.042)
Share of Local SDYs		-0.0547***		0.0192		-0.4286***
*Affected Cohort (Born 1957–1969)		(0.016)		(0.013)		(0.065)
Years of Education	0.0093***	0.0093***	0.0044***	0.0044***	0.0292***	0.0295***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0001)	(0.0002)
Male	0.0130***	0.0131***	0.0063***	0.0063***	0.0324***	0.0320***
	(0.0001)	(0.0002)	(0.0001)	(0.0001)	(0.0008)	(0.0009)
Han Ethnic	-0.0053***	-0.0046***	-0.0014***	-0.0013***	-0.0261***	-0.0217***
	(0.0004)	(0.0005)	(0.0003)	(0.0004)	(0.0019)	(0.0024)
County FE	Yes	Yes	Yes	Yes	Yes	Yes
Province-cohort FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3,225,302	2,232,352	2,794,505	1,939,372	430,750	292,949
R-squared	0.053	0.053	0.024	0.023	0.187	0.185

Note: * significant at 10%; ** significant at 5%; *** significant at 1%. Standard errors are clustered at the county level. Share of total/inflow/local SDYs is computed from dividing the number of total/inflow/local SDYs by the county population in 1964.

Table 10: The Effect of SDY Densities on the Monthly Income of Local Incumbents in 2005 (inter-decennial census 2005)

Dependent Variables	Logarithm of Income					
	ALL		Rural		Urban	
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Education Not Controlled						
Share of Total received SDYs	5.038***		2.137***		1.954***	
*Affected Cohort (Born 1957–1969)	(0.251)		(0.275)		(0.556)	
Share of Inflow SDYs		2.778***		1.369***		2.718***
*Affected Cohort (Born 1957–1969)		(0.410)		(0.417)		(1.030)
Share of Local SDYs		10.00***		3.988***		7.019***
*Affected Cohort (Born 1957–1969)		(0.659)		(0.680)		(1.614)
Male	1.307***	1.344***	1.152***	1.186***	2.060***	2.099***
	(0.0053)	(0.0065)	(0.0051)	(0.0062)	(0.0161)	(0.0194)
Han Ethnic	-0.0123	-0.0265	0.0600***	0.0423**	-0.0439	-0.0694
	(0.0132)	(0.0177)	(0.0128)	(0.0173)	(0.0397)	(0.0528)
Observations	609,587	413,810	488,777	330,224	120,599	83,435
R-squared	0.206	0.213	0.206	0.213	0.309	0.314
Panel B: Education Controlled						
Share of Total received SDYs	5.037***		2.068***		2.252***	
*Affected Cohort (Born 1957–1969)	(0.251)		(0.274)		(0.542)	
Share of Inflow SDYs		2.759***		1.305***		3.026***
*Affected Cohort (Born 1957–1969)		(0.410)		(0.416)		(1.005)
Share of Local SDYs		9.906***		3.870***		6.055***
*Affected Cohort (Born 1957–1969)		(0.658)		(0.678)		(1.575)
Years of Education	0.0340***	0.0321***	0.0501***	0.0488***	0.205***	0.204***
	(0.0009)	(0.0011)	(0.0009)	(0.0012)	(0.0026)	(0.0032)
Male	1.249***	1.289***	1.067***	1.102***	1.800***	1.842***
	(0.0055)	(0.0067)	(0.0053)	(0.0065)	(0.0161)	(0.0193)
Han Ethnic	-0.0358***	-0.0463***	0.0353***	0.0216	0.00941	-0.0125
	(0.0132)	(0.0177)	(0.0128)	(0.0173)	(0.0387)	(0.0515)
County FE	Yes	Yes	Yes	Yes	Yes	Yes
Province-cohort FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	609,587	413,810	488,777	330,224	120,599	83,435
R-squared	0.208	0.214	0.211	0.217	0.343	0.348

Note: * significant at 10%; ** significant at 5%; *** significant at 1%. Standard errors are clustered at the county level. Share of total/inflow/local SDYs is computed from dividing the number of total/inflow/local SDYs by the county population in 1964.

Table 11: Human Capital Spillover onto the Second Generation (census 2010)

Dependent Variables	Years of Education					
	ALL		Rural		Urban	
	(1)	(2)	(3)	(4)	(5)	(6)
Share of Total received SDYs	0.579		2.966***		-0.813	
*Parents Born 1957–1969)	(0.376)		(0.469)		(0.612)	
Share of Inflow SDYs		2.626***		2.344**		-0.522
*Parents Born 1957–1969)		(0.819)		(0.928)		(1.651)
Share of Local SDYs		2.138*		6.322***		-2.772
*Parents Born 1957–1969)		(1.207)		(1.384)		(2.314)
Male	-0.051***	-0.504***	0.009	0.008	-0.157***	-0.164***
	(0.010)	(0.012)	(0.010)	(0.013)	(0.025)	(0.030)
Han Ethnic	0.379***	0.343***	0.349***	0.332***	0.058	0.098
	(0.025)	(0.034)	(0.027)	(0.036)	(0.065)	(0.091)
County FE	Yes	Yes	Yes	Yes	Yes	Yes
Province-cohort FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	137,382	91,416	113,568	75,279	22,680	15,337
R-squared	0.667	0.668	0.669	0.670	0.746	0.744

Note: * significant at 10%; ** significant at 5%; *** significant at 1%. Standard errors are clustered at the county level. Share of total/inflow/local SDYs is computed from dividing the number of total/inflow/local SDYs by the county population in 1964. See Section 5.4 for the detailed construction of data which combine two generations.

Table 12: SDY and Number of Students, 1957 – 1979

Dependent Variables	Share of Students					
	All		Less Urbanized Counties		More Urbanized Counties	
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Share of Primary School Students as the Dependent Variable						
Share of Total received SDYs*Post 1968	0.289***		0.869**		0.249***	
	(0.077)		(0.370)		(0.089)	
Share of Inflow SDYs*Post 1968		0.434***		2.850***		0.107
		(0.162)		(0.886)		(0.178)
Share of Local SDYs*Post 1968		-0.010		-7.974***		0.713***
		(0.270)		(1.567)		(0.206)
Observations	8,280	6,220	3,891	2,823	4,375	3,372
R-squared	0.638	0.642	0.631	0.649	0.654	0.647
Panel B: Share of Secondary School Students as the Dependent Variable						
Share of Total received SDYs*Post 1968	0.209***		1.495***		0.083*	
	(0.034)		(0.368)		(0.046)	
Share of Inflow SDYs*Post 1968		0.288***		3.003***		0.023
		(0.086)		(0.820)		(0.076)
Share of Local SDYs*Post 1968		-0.022		-4.764***		0.268**
		(0.198)		(1.267)		(0.128)
County FE	7,740	5,876	3,593	2,683	4,133	3,161
Year FE	0.965	0.965	0.970	0.970	0.959	0.960
Observations	7,740	5,883	3,603	2,695	4,137	3,188
R-squared	0.961	0.961	0.967	0.967	0.953	0.953

Note: * significant at 10%; ** significant at 5%; *** significant at 1%. Standard errors are clustered at the county level. We compile both county-level information on number of students and county-level information on number of SDYs from local gazetteers. Share of total/inflow/local SDYs is computed from dividing the number of total/inflow/local SDYs by the county population in 1964. Share of primary/secondary students is computed from dividing the number of primary/secondary students by the county population in 1964.

Table 13: The 1959–1961 Great Famine as a Possible Confounding Event (census 1990)

Dependent Variables	Years of Education					
	ALL		Rural		Urban	
	(1)	(2)	(3)	(4)	(5)	(6)
Share of Total received SDYs	0.413***		1.709***		0.169	
*Affected Cohort (Born 1957–1969)	(0.151)		(0.198)		(0.204)	
Share of Inflow SDYs		1.308***		1.689***		0.838*
*Affected Cohort (Born 1957–1969)		(0.274)		(0.313)		(0.461)
Share of Local SDYs		-0.224		0.353		1.334*
*Affected Cohort (Born 1957–1969)		(0.381)		(0.414)		(0.759)
Local severity of Great Famine	-0.408***	-0.355***	-0.471***	-0.446***	0.123**	-0.0115
*Affected Cohort (Born 1957–1969)	(0.0225)	(0.0270)	(0.0230)	(0.0276)	(0.0615)	(0.0730)
Male	1.823***	1.832***	1.898***	1.905***	0.662***	0.677***
	(0.0033)	(0.0040)	(0.0034)	(0.0041)	(0.0085)	(0.0103)
Han Ethnic	0.415***	0.395***	0.160***	0.109***	0.00946	-0.0261
	(0.0098)	(0.0125)	(0.0107)	(0.0137)	(0.0207)	(0.0265)
County FE	Yes	Yes	Yes	Yes	Yes	Yes
Province-cohort FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3,128,129	2,165,877	2,737,222	1,901,056	390,850	264,785
R-squared	0.289	0.285	0.299	0.295	0.199	0.205

Note: * significant at 10%; ** significant at 5%; *** significant at 1%. Standard errors are clustered at the county level. Share of total/inflow/local SDYs is computed from dividing the number of total/inflow/local SDYs by the county population in 1964. Local severity of great famine is proxied by the ratio of 1959–1961 cohort size over 1954–1958 cohort size, following Meng, Qian, and Yared (2015).

Appendix A: Robustness Check

This appendix is devoted to discussing the robustness of our main findings, which is shown in Table 4 and Table 5.

Different Bandwidth of Cohorts.

Our main specification focuses on cohort born between 1944 and 1969 and cohorts 1957–1969 are defined as the treatment group. That is to say, our bandwidth is 12 years. The rationale of such choice is that cohort 1957 was receiving their last year of primary education at the beginning of the massive rustication movement, while cohort 1969 just started their primary school when the movement came to an end. Table A1 (Table A2) replicates the results from Table 4 (Table 5) using different bandwidths (10 years, 6 years, and 4 years, respectively). In terms of statistical significance, Table A1 and A2 yield exactly the same results regardless of the choice of bandwidth. In terms of the magnitude of the coefficients, the results also match the findings from Figure 4. Exclusion of the last few SDY-affected cohorts (bandwidth = 10, 6 years) makes the coefficients even larger because those cohorts were exposed to SDYs only for several years at the start of primary education. Following the same logic, only focusing on the first few affected cohorts (bandwidth = 4 years) also makes the coefficients smaller.

Allow SDYs to Affect Junior High Education.

Currently, we define exposure to the SDYs according to whether rural children's years in primary school overlap with the massive SDY movement. The justification is based on the fact that the majority of rural children in China during that period received at most primary-level education. Still, about one-fourth went to junior high school. Moreover, Figure 4 also suggests the SDYs flow has some positive effects for cohorts born in 1955 and 1956. If we allow the flow of SDYs not only affects primary school but junior high school as well, the treatment cohorts would be extended by three years (1954–1969). Table A3 reports the results using the alternative definition of exposure. The coefficients become larger, which is not surprising because now we allow SDYs flow to influence a broader range of education.

Exclude Migrant Sample.

Our empirical analysis combines the census 1990 to the historical data on the SDYs flow during the period 1968–1977. One implicit assumption is that people live in the same county at those two points in time. Although 1% sample from the 2000 China's Census of Population suggest that 86% of the sample in this study lived in the same county as their birthplace, we cannot rule out the possibility that the remaining 14% has an important influence on our results. In Table A4, we exclude the migrants whose residence county differ from their registration county. Note that this is an approximation to our ideal experiment, which is to exclude those whose current residence county differ from their birth county. Unluckily, such information is not available in census 1990. Rural sample (Table A4 Column (3) and (4)) gives almost identical results as those in Table 4 and Table 5. The urban sample give slightly different results. With the no-migrants assumption, we drop 2.0% of the rural sample and 9.3% of the urban sample. In 1990, the rural-urban migration is still in limited scope. The migrant size grew rapidly during the 1990s because of the huge demand for unskilled labor as a result of the influx of the foreign direct investment. The government also loosened its control over rural-urban during the 1990s (Meng 2014). To summarize, we conclude that migration has limited impact on our study, especially on the rural sample.

Exclude Municipalities Sample.

Three municipalities (Beijing, Tianjin, and Shanghai) play a special role during the rustication movement. These municipalities feature a higher level of development and play important roles in China's economic and political activities. The three municipalities also account for the majority of inter-province flow of SDYs. Table A5 shows results excluding those three municipalities. The coefficient increases by about 10%, from 1.957 to 2.206. The finding suggests that the SDYs' spillover effect is stronger in less developed areas.

Table A1: Robustness Check with Different Cohort Bandwidth (census 1990)

Dependent Variables	Years of Education								
	ALL			Rural			Urban		
Bandwidth	N=10	N=6	N=4	N=10	N=6	N=4	N=10	N=6	N=4
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Share of Total received SDYs	0.910***	1.326***	1.145***	2.330***	2.531***	1.695***	0.265	0.392	0.366
*Affected Cohort (1957–1957+N)	(0.172)	(0.242)	(0.311)	(0.225)	(0.318)	(0.405)	(0.227)	(0.309)	(0.395)
Male	1.928***	2.199***	2.269***	2.019***	2.330***	2.412***	0.703***	0.723***	0.730***
	(0.0039)	(0.0056)	(0.0072)	(0.0040)	(0.0058)	(0.0075)	(0.0094)	(0.0127)	(0.0159)
Han Ethnic	0.421***	0.390***	0.382***	0.173***	0.117***	0.0879***	0.0315	0.0579*	0.104***
	(0.0113)	(0.0162)	(0.0208)	(0.0125)	(0.0181)	(0.0231)	(0.0227)	(0.0305)	(0.0382)
County FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Province-cohort FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,374,461	1,269,876	792,744	2,051,947	1,093,765	681,202	322,426	175,987	111,397
R-squared	0.29	0.285	0.27	0.294	0.288	0.272	0.211	0.196	0.171

Note: * significant at 10%; ** significant at 5%; *** significant at 1%. Standard errors are clustered at the county level. Reference cohorts are those born between the year 1956-N and 1956. Share of total/inflow/local SDYs is computed from dividing the number of total/inflow/local SDYs by the county population in 1964.

Table A2: Robustness Check with Different Cohort Bandwidth when Separating Inflow- and Local-SDYs (census 1990))

Dependent Variables	Years of Education								
	ALL			Rural			Urban		
Bandwidth	N=10	N=6	N=4	N=10	N=6	N=4	N=10	N=6	N=4
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Share of Inflow SDYs	1.157***	1.368***	1.145**	1.907***	2.132***	1.347**	0.898*	0.823	0.744
*Affected Cohort (1957–1957+N)	(0.310)	(0.430)	(0.546)	(0.359)	(0.501)	(0.637)	(0.499)	(0.665)	(0.831)
Share of Local SDYs	1.604***	1.677***	0.999	1.454***	1.171*	-0.0379	1.843**	1.851*	1.516
*Affected Cohort (1957–1957+N)	(0.427)	(0.594)	(0.758)	(0.474)	(0.665)	(0.849)	(0.780)	(1.018)	(1.277)
Male	1.935***	2.202***	2.266***	2.024***	2.328***	2.404***	0.725***	0.746***	0.757***
	(0.0047)	(0.0067)	(0.0086)	(0.0048)	(0.0069)	(0.0090)	(0.0113)	(0.0153)	(0.0193)
Han Ethnic	0.398***	0.350***	0.316***	0.123***	0.0447*	-0.00332	-0.0134	0.0177	0.0476
	(0.0144)	(0.0206)	(0.0263)	(0.0159)	(0.0230)	(0.0294)	(0.0291)	(0.0393)	(0.0496)
County FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Province-cohort FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,643,233	879,177	547,469	1,423,549	758,662	471,138	219,629	120,437	76,233
R-squared	0.286	0.28	0.264	0.29	0.284	0.267	0.219	0.201	0.173

Note: * significant at 10%; ** significant at 5%; *** significant at 1%. Standard errors are clustered at the county level. Reference cohorts are those born between the year 1956-N and 1956. Share of total/inflow/local SDYs is computed from dividing the number of total/inflow/local SDYs by the county population in 1964.

Table A3: The Effect on the Local Rural Children's Education when Junior High School is Taken into Account (census 1990)

Dependent Variables	Years of Education					
	ALL		Rural		Urban	
	(1)	(2)	(3)	(4)	(5)	(6)
Share of Total received SDYs	0.426***		2.197***		-0.221	
*Affected Cohort (Born 1954–1969)	(0.143)		(0.189)		(0.200)	
Share of Inflow SDYs		1.576***		2.745***		0.325
*Affected Cohort (Born 1954–1969)		(0.265)		(0.302)		(0.457)
Share of Local SDYs		0.753**		0.910**		0.987
*Affected Cohort (Born 1954–1969)		(0.361)		(0.396)		(0.703)
Male	1.916***	1.921***	1.969***	1.975***	0.874***	0.876***
	(0.0032)	(0.0038)	(0.0032)	(0.0039)	(0.0081)	(0.0098)
Han Ethnic	0.417***	0.397***	0.174***	0.127***	0.0141	-0.00269
	(0.0092)	(0.0117)	(0.0100)	(0.0127)	(0.0197)	(0.0251)
County FE	Yes	Yes	Yes	Yes	Yes	Yes
Province-cohort FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3,614,523	2,500,351	3,119,234	2,164,587	495,251	335,737
R-squared	0.314	0.311	0.327	0.324	0.233	0.243

Note: * significant at 10%; ** significant at 5%; *** significant at 1%. Standard errors are clustered at the county level. Share of total/inflow/local SDYs is computed from dividing the number of total/inflow/local SDYs by the county population in 1964. Note the range of cohorts in this table is extended to 1938–1969.

Table A4: Robustness Check when Migrants are Excluded (census 1990)

Dependent Variables	Years of Education					
	ALL		Rural		Urban	
	(1)	(2)	(3)	(4)	(5)	(6)
Share of Total received SDYs	0.468***		1.916***		0.177	
*Affected Cohort (Born 1957–1969)	(0.151)		(0.198)		(0.204)	
Share of Inflow SDYs		1.460***		1.922***		0.843*
*Affected Cohort (Born 1957–1969)		(0.273)		(0.313)		(0.460)
Share of Local SDYs		-0.0456		0.686*		1.328*
*Affected Cohort (Born 1957–1969)		(0.381)		(0.413)		(0.757)
Male	1.823***	1.832***	1.898***	1.904***	0.662***	0.677***
	(0.0033)	(0.0040)	(0.0034)	(0.0041)	(0.0085)	(0.0103)
Han Ethnic	0.415***	0.395***	0.161***	0.109***	0.00957	-0.0261
	(0.0098)	(0.0125)	(0.0107)	(0.0137)	(0.0207)	(0.0265)
County FE	Yes	Yes	Yes	Yes	Yes	Yes
Province-cohort FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3,128,172	2,165,877	2,737,265	1,901,056	390,850	264,785
R-squared	0.289	0.285	0.299	0.295	0.199	0.206

Note: * significant at 10%; ** significant at 5%; *** significant at 1%. Standard errors are clustered at the county level. Share of total/inflow/local SDYs is computed from dividing the number of total/inflow/local SDYs by the county population in 1964. Migrants are defined as those who do not hold a local *hukou* in the county.

Table A5: Robustness Check when Municipalities are Excluded (census 1990)

Dependent Variables	Years of Education					
	ALL		Rural		Urban	
	(1)	(2)	(3)	(4)	(5)	(6)
Share of Total received SDYs	0.510***		2.206***		0.0368	
*Affected Cohort (Born 1957–1969)	(0.147)		(0.193)		(0.198)	
Share of Inflow SDYs		1.256***		2.024***		0.702
*Affected Cohort (Born 1957–1969)		(0.274)		(0.317)		(0.451)
Share of Local SDYs		1.186***		1.453***		1.959***
*Affected Cohort (Born 1957–1969)		(0.376)		(0.411)		(0.725)
Male	1.839***	1.853***	1.910***	1.921***	0.704***	0.727***
	(0.0033)	(0.0040)	(0.0034)	(0.0041)	(0.0084)	(0.0102)
Han Ethnic	0.432***	0.412***	0.193***	0.146***	0.00689	-0.0367
	(0.0096)	(0.0123)	(0.0105)	(0.0134)	(0.0201)	(0.0260)
County FE	Yes	Yes	Yes	Yes	Yes	Yes
Province-cohort FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3,162,667	2,180,409	2,748,667	1,902,819	413,953	277,559
R-squared	0.289	0.284	0.296	0.292	0.212	0.221

Note: * significant at 10%; ** significant at 5%; *** significant at 1%. Standard errors are clustered at the county level. Share of total/inflow/local SDYs is computed from dividing the number of total/inflow/local SDYs by the county population in 1964. Municipalities include: Beijing, Tianjin, and Shanghai.