In the Wrong Place at the Wrong Time? The Long-Run Effects of the Send-Down Movement in China*

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Abstract

The Chinese Send-Down Movement during the Cultural Revolution compulsorily sent youths of secondary-school age to live and work as peasants in the countryside. This paper investigates the long-run consequences of being displaced by this event, with a focus on health and family structure. I conduct a regression discontinuity design using across-cohort variation in the probability of being sent down, and extend the discussion on the causal effects of the Send-Down Movement with a two-sample method. The results suggest that the sent-down individuals, who encountered this sudden displacement in their adolescence and early adulthood, are more likely to have health issues, are less likely to have successful marriages, have children later in life, and grew up to have less trust in other people, including family members, irrespective of the socioeconomic status of the sent-down cohorts as adults. In addition, there is evidence of gender-asymmetric effects, with women being worse off in physical health and marital matching, and men being affected in mental health and fertility.

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1 Introduction

A rich literature has studied the long-run impacts of early life exposure to negative "shocks," including nutritional deprivation, disease exposure, and stress (Hoynes et al., 2016; Gluckman and Hanson, 2004; Aizer et al., 2015; Currie, 2011; Currie and Almond, 2011; Class et al., 2011). In contrast, the long-run impacts of negative shocks that occur during adolescence and early adulthood have received less attention. This paper studies the 1968-1979 Send-Down Movement, which forced urban youth to move into rural communities and assume a peasant lifestyle. It is a profound event and compulsorily sent over 17 million urban adolescents to the rural areas. Although the cohorts affected by the Send-Down Movement are often referred to as "the lost generation" in China – their economic and health outcomes are believed to have been compromised by geographical and psychological displacement – there have been few causal studies of the program's long-run effects. This paper investigates the long-run effects of being "sent-down," with particular attention to family stability and measures of individual trust.

The Send-Down Movement has been understudied due to data limitations and the complex historical setting in which it arose. Recent research, however, has begun to shed light on this important event by employing causal methodologies to national surveys. Emerging studies on the Send-Down Movement have found that sent-down individuals have a higher probability of developing chronic illnesses and mental problems (Gong et al., 2014), and higher incentives to invest in their children's education (Zhou, 2015; Roland and Yang, 2017). They are also more critical of communist ideology (Harmel and Yeh, 2016). Empirical findings on the movement's influence on income are inconclusive (Xie et al., 2008; Zhou, 2013; Zhou and Hou, 1999), and findings on beliefs in effort are mixed (Gong et al., 2015; Roland and Yang, 2017).

We have yet to understand the complex mechanisms through which the send-down experience generated these outcomes. The sent-down disturbance is a combination of the "wrong place" (the migration to a poorer environment) and the "wrong time" (the interruption to

human capital development). Few papers discuss how these factors work in combination to generate their findings. In addition, since the Send-Down movement, there have been many demographic and economic changes, which complicate researchers' ability to isolate the movement's impact. For instance, tremendous changes in economic prospects occurred during the 1980s-2000s. Sent-down individuals, who were more likely to accept suboptimal jobs in the private sector in the 1980s, were less likely to encounter the decrease in rewards and layoffs in state-owned enterprises in later periods. Third, it is well known that people who experience trauma adjust and adapt to their status over time: the adaptation theory of well-being, known as the "Hedonic Treadmill" (Brickman, 1971), implies that people usually return to a relatively stable level of happiness despite negative events. This factor may directly influence the findings on self-assessed well-being and attitudes documented in the existing literature. Finally, the Send-Down Movement has a complicated institutional background that poses further identification challenges. For instance, the Send-Down Movement happened during the Cultural Revolution. The unrest and missing schooling associated with the Cultural Revolution was experienced by both "sent-down" students and those who stayed in the city.

Conquering these difficulties has been further compromised by lack of available data. Most currently available data sets do not have the rich detail on individuals' geography and outcomes over time, that are necessary to isolate the relevant mechanisms. In addition, most surveys have been conducted more than 30 years after the Send-Down Movement occurred, leading to many missing pieces of information.

This paper focuses on well-being related to health capital and family structure. These outcomes are important to the sent-down experience, identifiable with enriched data, and path-dependent over time. I examine the Send-Down Movement's impact on general physical health, depressive disorders, and other specific health outcomes, with a focus on chronic and manual-labor related disorders. These measures of health are relevant to the fact that most of the sent-down youths worked intensively in the field, without adequate training and

mechanization in the rural areas. I am also the first to examine the movement's impact on family structure, including marital outcomes, fertility, and relationships between family members. This is a new, but important, contribution to research on the Send-Down Movement, as it unveils the relationship between the geographic and psychological displacement by the complete change in living environment, and the potential channels and intermediate factors through family members that result in the long-term outcomes.

To further support my investigation on family structure, I use interpersonal trust as a measure of psychological well-being and social adjustment. Several studies in psychology have found that measures of trust capture individuals' maladjustment and distress levels (Folkman et al., 1986; Grace and Schill, 1986). I examine trust in family members and relatives, as suggestive evidence on family functioning and well-being. I am also the first to examine potential gender asymmetries in these effects.

This paper exploits a regression discontinuity design based on an unexpected birth date cutoff (for being sent down) to identify the effects of the send-down experience. The validity of my approach is based on the assumption that youth on each side of the birth date cutoff are not systematically different except in their probability of being sent down. In later sections, I discuss more detail about the framework and validity of this method. This identification strategy follows the work of Gong et al. (2014), which uses the initial birth cohorts to conduct a RD estimation of the send-down effect. I use this method to look at different outcomes from previous work, including marital outcomes, fertility, and relationships between family members. In addition, I conduct the first application of a new two-sample method, the auxiliary-to-study tilting (AST) introduced in Graham et al. (2016), which improves the efficiency of estimation and practicability of data combination in a regression discontinuity design.

My main findings are the following: 1) Sent-down individuals are more likely to have chronic health issues 2) they are less likely to have successful marriages 3) they have children later in life, and 4) they grew up to have less trust in other people. Specifically, they have

less trust in family members and relatives, in individuals who were from the same town, and in the government. Importantly, I find gender-asymmetric effects on health, marriage, and fertility. Sent-down women are more likely to have physical and chronic illnesses, while sent-down men are substantially more likely to suffer from depressive disorders. Sent-down women are more likely to "marry down" to people with a lower education level, but a similar effect does not appear to exist for men. The male-to-female ratio of children is significantly lower for the sent-down men, with zero for the women. In spite of these findings, however, I find no effects of the Send Down Movement on later socio-economic outcomes.

With a focus on adversity and adolescence, this paper links to the economic research on exposure to stress and human capital development. Despite a rich economics literature on the long-run impact of in utero exposure to stress (Aizer et al., 2015; Currie, 2011; Currie and Almond, 2011; Camacho, 2008; Cawley et al., 2017; Class et al., 2011; Persson and Rossin-Slater, 2016; Bauer et al., 2016), economists have devoted less attention to stress experienced during adolescence. Yet, studies in neuroscience suggest that the adolescent brain might be especially sensitive to the effects of elevated level of glucocorticoids (i.e. stress) (Lupien et al., 2009). The human frontal cortex, which continues to develop during adolescence, might be particularly vulnerable to stress during this period, resulting in stress-related mental disorders. In addition, adolescence is an important phase during which noncognitive skills and personality traits are formed. Heckman and Kautz (2014) and Heckman and Mosso (2014) point out the non-monotonic relationship between human development and life stage. Early childhood interventions can be more effective in improving IQ and remedying disadvantaged children, while adolescent interventions are more effective in forming non-cognitive skills and socioemotional traits. Examining the potential impact of adolescent adversity on interpersonal relationships contributes to our understanding of how children develop under hardship. Furthermore, the Send-Down Movement is a profound event which compulsorily sent over 17 million urban adolescent students to rural areas in China. The generation most affected by this event was the majority of the labor force during the period of rapid economic growth

and transformation in China. A thorough analysis of its impact is meaningful not only to our understanding of the Send-Down Movement, but to our knowledge of the drivers of the Chinese economy.

The remainder of this paper is organized as follows. Section 2 outlines the institutional background of the Send-Down Movement. Section 3 illustrates the contextual background of the movement and related hypotheses of the long-run consequences. Section 4 describes the data sets and variables. Section 5 explains the empirical method. Section 6 provides main findings and interpretations. Section 7 concludes.

2 Institutional Background

The Send-Down Movement, also called the "Up to the Mountain and Down to the Countryside Movement", was to send urban youths at high school to live and work in rural areas. The direct motivation of this movement is the attempt to alleviate urban underemployment, partly due to the destructive influence on the economy by the Cultural Revolution. There were also desires to develop the rural areas in China, and to caltivate ideology in youth by the Chinese government at that time (Xie et al., 2008; Pye, 1986).

The influence of the Send-Down Movement is profound in terms of the massive population of the migration and the long duration. The total population of the sent-down youths is reported to be over 17 million (Pan, 1994). This movement started in a small scale in the early 1950s when urban youths volunteered to move to the countryside. The official command took place in December 1968 and called for the mandatory rustication of urban youth nationwide. Students who were sent down in 1968 were six cohorts of high school students ranging from 7th to 12th grade in 1966, as junior and senior high schools had been shut down in 1966-68 due to the Cultural Revolution. The timeline and the average years of being sent-down by birth cohort are summarized in Figure 1. Overall, those who have the sent-down experience have spent 5.6 years in the countryside on average in my sample. The rustication in the countryside was potentially for life. Even though some

students volunteered to participate, many were forced to cooperate and tried very hard to return after being sent to the destinations. In addition to those who were disabled or had severe illnesses, students could return to the city by joining the military force, going back to school, or being recruited by urban enterprises. The slots, however, were limited and highly competitive. Due to the increasing amount of complaints, the Send-Down policy became more lenient after early 1970s and youths were sent to areas that are closer to their families than the earlier sent-down cohorts. According to Gu and Hu (1996), upon to 1973, the proportion of youths returning to city is 42.9%. In 1978, the protest in Yunan province was later developed to be a nationwide petition against this movement. By 1979, Mao's successors brought this movement into termination and allowed youthes to return to city.

[Figure 1 here]

There are several types of displacement. The major type is called *"Cha Dui"*, literally meaning "insert into a team", required the youths to live and work with local farmers in a production team. In the early stage of the movement, around two thirds of the youths were sent to *Cai Dui* and the other one third were sent to the military corps in frontier areas. After 1974, about one fifth of the youths could live and work in local farms that were most likely near where their parents work. The proportion of being sent to military corps dropped down to less than 5% (Gu and Hu, 1997). One of the common features among these types of rustication is that these sent-down youths were uprooted from their families and lived and worked in the destination with peers who were from the same town. This is especially true in the early stages of the Send-Down Movement, as every year the local governments had a sent-down quota to fill assigned by the central government and the destinations were also planned in a top-down manner (Bernstein, 1977; Yihong, 2002).

3 Contextual Background

Even though quantitative analysis of the impacts of the Send-Down Movement is still under development, researchers have been collecting a variety of records, interviews, personal

narratives about that special period. On the one hand, some individuals who encountered this change in living environment and interruption to education are challenged in the labor market by having lost opportunity in schooling (Thurston, 1984; Zhou et al., 1998; Xie et al., 2008). On the other hand, some survivors of the Send-Down Movement appeared to be more independent and adaptive (Liang and Shapiro, 1986). The overall influence on youth is negative rather than positive in most papers (Liang and Shapiro, 1986; Ding, 1998; Liu, 2004, 1998; Deng, 2009). In this section, I summarize qualitative evidence about the Send-Down Movement, and hypotheses of influence on socioeconomic status, health, marital outcomes, and subjective values.

3.1 Discrimination and Socioeconomic Status

Labor market outcomes of the sent-down individuals were substantially affected by the movement, especially when they first entered the labor market. In 1979 when the majority of sent-down individuals returned to the city, over 20 million people were waiting to join the labor force (Bonnin, 2014). Most of the sent-down youths got an job by the end of 1982, but they had to take some less appealing positions.

According to the Shanghai Volume in *China Population* (1987), most of the sent-down individuals were relatively older than the city youths on the labor market, and could not get the SOE jobs because of age restrictions. Some SOEs lowered the ceiling of worker age to be 24, while other enterprises recruit new workers aged between 16 to 35. In addition, many sent-down youths had to face discriminations in recruitment and payments. Many SOEs did not want to employ the sent-down persons with illness and disabilities, sent-down women, and the relatively aged sent-down cohorts. Some sent-down youths had to work as apprentice at first, as the years of working at local farms were not counted.

Another factor that can have profound impact on the sent-down cohorts is the possibility of going to college after returning to the city. The college entrance examination was resumed in 1977 when the age ceiling was raised to 30. Many sent-down youths were encouraged and attended the examinations. The admission rate, however, is as low as 4.79%. In fact,

only 0.27 million students were admitted from over 5.7 million participants (*Year Book of Education in China, 1949-1982* (1984)). In addition, age discrimination also emerged in the admission to college. The oldest sent-down cohorts were allocated to schools that ranked much lower than normal students with similar test scores. Starting from 1979, the age ceiling was lowered back to be 25. In order to make a living, many sent-down youths were preparing for the exams while working. The older they got, the harder for them to concentrate on the preparation. According to the work of Pepper (1983), only 20 - 30% of the exam takers were the fresh graduates (i.e. non-sent-down persons) in 1977, while the proportion increased to be 50% in 1978, 67% in 1979, and then over 80% in 1980.

To sum up, even though most of the sent-down individuals were able to return to their birth cities, the experience of being displaced still haunted them after the returning. One thing worth mentioning is that later in 198s0 and 1990s, the national economy reforms caused large scale of layoff and decrease in payments in SOEs, and the positions in private sectors became relatively more rewarding. This phenomenon clouded the impact of the send-down experience on labor market outcomes in the long run.

3.2 Difficulty and Health

The substantial gap in living conditions between the urban and rural life resulted in big concern on the health conditions of the sent-down individuals. As shown in many narratives from the sent-down people, the first impressions from the sent-down people of the rural life are disappointment and hopeless.

> *"We were happy to go at first, as we can be in a new environment and close to the nature. However, when we arrived, we only saw the muddy peasants, and the ruined village. Thinking that we may need to spend the rest of our life there, we became extremely anxious and panic. When there are no outsiders, we cried together. "* – A student from Beijing who were sent to a farm in Heilongjiang, recorded in Bonnin (2014).

One of the ideological purposes of the Send-Down Movement is to "re-educate the youth" by the working class. During the sent-down period, the urban students had to work in the fields to trade for supplements and food stamps, though most of them did not have any experience with heavy manual labor when living in the city. Physical exhaustion and malnutrition lead to digest disorders, tooth problems, and even fetal illnesses.

At the same time, there were a significant drop in the living standard and access to medical resources for them. For instance, many remote areas had no electricity or running water. Bonnin (2014) did an interview in 1979 with a female sent-down youths. This Shanghai girl had to carry water from two miles away everyday in order to wash her body, which the local farmers she lived with rarely did.

Moreover, some labor tasks require long-time contact with water, which can cause illnesses like rheumatism and arthritis. In some rural area, there were harmful insects like leech, bed bugs and mosquito. According to the narrative of a sent-down person who were sent to Hainan, the southernmost province of China, many sent-down youths were infected with malaria. Hormone disorders caused by local weather conditions made the female youths overweight while the male youths much thinner. Also, gynecological illnesses were very common among the female youths.

> *"Over 70% of the female sent-down youths had gynecological diseases. Some of them do not know much about health-related knowledge, and insist to do heavy manual labor in the water. In some places, female youths were given the same load of work as the male youths, and cannot get proper rests during menstruation and illnesses."* – Report on the protection of the female sent-down youths, Brief of the Send-Down Movement, National Bureau of Labor, 1972.

3.3 Age, Marriage, and Fertility

The Send-Down Movement affects a person's time-to-match both through during-movement and after-movement factors. Firstly, during the Send-Down Movement, policy of returning to the city gave priority to the sent-down individuals who were disabled, ill or single. The

sent-down individuals who were married to the local people had the lowest chance to return to the city. Because of this policy, the opportunity cost of getting married was relatively high for the sent-down youths during the movement.

Moreover, the Send-Down Movement has great impact on marital matches for the sent-down individuals after they returned to the city. After the sent-down cohorts returned to the city, job openings were limited due to economic destruction and the sent-down persons were less competitive than those who stayed in the city the whole time. The disadvantage in labor market value undermined the marriage market value of the sent-down cohorts, and therefore, resulted in a higher probability of mismatch.

In addition to the fact that age affects person's fertility, there was also policy factor on having children. When the Send-Down Movement was brought into termination in 1979, the One-Child Policy was initiated in the same year. Under this policy, the Han urban residents can only have one child. Having a second child would lead to monetary penalty in general, and the SOE workers would even lose their jobs if they violate the One-Child Policy. Given that a majority of the sent-down individuals were constrained by the One-Child Policy, 56.9% of individuals in the sample have only one child and arond 20% have two.

3.4 Violence, Hostility, and Personal Values

Being sent down increased the exposure to violence. In 1971, there were over 100 cases of violence towards the sent-down youths in just four prefectures in Shandong Province. Over 10,000 cases of persecution, mostly rapes, were reported in 1976, according to the official record.

> *"...Some abused their authority to beat, interrogate, and torture the sent-down youths. Some female sent-down persons were raped, or forced to married local people. They were severely harmed physically and mentally."* – Report on the Destructive Actions on the Send-Down in Shangdong, February 1971.

In addition, the sent-down individuals encountered hostility from local farmers during the sent-down period. The sent-down youths had difference life style and personal values from the local farmers. Most of the time, they were treated as outsiders, despite they had spent years in the countryside.

> *"In the village I stayed, all the local people had the same surname. We (the sent-down cohorts) were outsiders and were not welcomed. Even if I have stayed in this village for my whole life, the situation would never have changed. "* Michel and He (1978)

Another cause of hostility is that the sent-down youths were sharing the economic benefits with the local farmers. During the movement, the central government distributed settlement allowance for each sent-down youth to their destination places. According to the records of Gu (1996), corruption of the local governments on the settlement allowance is not a rare phenomenon. In such case, the living costs of the sent-down youths were partly offered by the local farmers. Meanwhile, the sent-down persons were not as productive but they take the same share of land and food stamp as the local farmers. Table 1 shows the rural population and arable land during 1965-1975. Over this ten years, the arable land per rural person decreased by 1100 acre. This situation might lead to a common hostility of local farmers to the sent-down youths.

[Table 1 here]

4 Data

There are two data sets I use for the RD estimation: the 2010 China Family Panel Studies (CFPS) and the 2010 China General Social Survey (CGSS). CFPS provides the information of whether a respondent has sent-down experience, and CGSS has detailed information of interpersonal relationship within a family. Both of the data sets are nationally representative of Chinese communities and families in 2010. CFPS is a longitudinal survey that has been conducted biennially since 2010. There are 33,600 adult respondents from 15,717 households

in 2010. CGSS is a cross-sectional survey that launched in 2003 and was implemented on a annual or biennial base. It interviewed 11,783 individuals in 2010. The questionnaire of the two surveys not only covers standard demographic and socioeconomic information, but also gathers information on a wide range of topics such as respondents' event histories (histories of being sent down, migration, military service etc.), opinions (about interpersonal relationships, government, public topics etc.) and self-assessments (confidence, social skills, well-being etc.). The major variables and the corresponding survey questions are summarized in Table 2.

[Table 2 here]

Send-down status. The CFPS reports whether the respondents experienced rustication during the Send-Down Movement, if so where they were sent to, and how long they stayed in the countryside. Since the probability of being sent down heavily depends on the place of registered residence (i.e. the hukou location), I check the hukou status at age 12 and only keep those who were identified as urban residents when 12.

Trust. The CGSS asks the respondents a sequence of questions about their interpersonal trust. Respondents were asked to rate how much they agree with the following statement on a scale from 1 (strongly disagree) to 5 (strongly agree): "Overall, most of people in today's society are trustworthy." I use this measure to quantify trust in general. In addition, there are questions about the respondents' trust levels towards certain group: family members, relatives, friends, classmates, colleagues, fellow-townsmen, the central government and so on. These measures also run on a scale of 1 to 5 with 5 being the most trustworthy.

Regression sample. Before any bandwidth selection, the CFPS regression sample I use consists of 5,478 urban individuals born between September 1917 and February 1995. The CGSS sample contains 7,222 urban individuals born between June 1914 and November 1994. Since the RD estimators essentially capture the LATE (i.e. the treatment effect locally across the cutoff), I use kernel weights and adjustment tilts to adjust the possible heterogeneity in the distribution of birth cohorts across two samples. In section 5.2 I discuss the method of

estimating the adjustment tilts. Table 3 reports the descriptive statistics for the sent-down experience, measures of trust, measures of subjective well-being, age, gender, marriage status and years of schooling. For the urban individuals, the sent-down proportion is 11.6%. To compare, the sent-down proportion for the rural individuals is 0.45% ($SD = 0.06$) which is very close to zero. Means of characteristics such as age, gender, marital status and education are similar across two samples.

[Table 3 here]

5 Empirical Methodology

5.1 Framework

The identification strategy is based on a combination of the compulsory schooling policy and the Send-Down Movement. First, the school year started in September and ran to the next August in this period in China. The compulsory schooling policy only allows children who are at least 7 years old in September to enter the first grade in that year. Because of this policy, one can expect that the ages for the majority of junior and senior high school graduates are 16 and 19, respectively. Second, the Send-Down Movement places a rigid age cutoff. In the initial year, only the youths who finished the ninth grade need to be sent down. In other words, individuals who were born before September 1946 was not subject to the mandatory migration, while those who were born after September 1946 were targeted for the movement. Figure 1 explicitly presents the timeline and the relevant youth cohorts. This first cohort, defined as individuals born between September 1946 to August 1947, graduated from high school in 1966, and was around 21 years old when encounter the shock to their living environment in December 1968.

I exploit this birth date cutoff to study the causal relationship between adolescent experience and outcome in adulthood using a regression discontinuity design. One of the pros of using this birth date cutoff is that the discontinuity based on local observations around the cutoff diminish the influence of factors that are relatively far from the cutoff. The im-

plementation was the most strict in the initial year of the Send-Down Movement, and hence led to the highest level of exogeneity. Starting from 1972, the policy became more lenient and the selection rules of urban students becomes more fuzzy.

The discontinuity provided by the Send-Down Movement is a fuzzy regression discontinuity (FRD) design because the compliance with the cutoff is not perfect. Individuals who were born before the cutoff could also volunteer to join in the rusticates. After the policy being updated in 1970s, families with more than one children can choose only one to be sent down. Being born after the cutoff date does not necessarily mean this person had been sent down. In other words, the fraction of compliers (i.e. sent-down persons who were born after th cutoff date) is not 100%. As Angrist and Pischke (2008) and Imbens and Lemieux (2008) point out, a FRD model can be treated as a two-stage least square model. As defined in equation 1, the FRD estimator can be identified as the ratio of the reduced-form estimator to the first-stage estimator if the model is just-identified. In this paper, for example, the FRD estimated effects on health is the reduced-form estimate on health, divided by the fraction of compliers estimated from the first stage.

$$\gamma_{FRD} = \frac{\lim_{\longrightarrow c_0^+} E[Y_i|c_i = c_0] - \lim_{\longrightarrow c_0^-} E[Y_i|c_i = c_0]}{\lim_{\longrightarrow c_0^+} E[X_i|c_i = c_0] - \lim_{\longrightarrow c_0^-} E[X_i|c_i = c_0]} = \frac{\beta_1}{\alpha_1} \tag{1}$$

where Y_i is the outcome variable, X_i is the treatment variable, c_i is the running variable and c_0 is the cutoff in the RD design. This paper adopts a local linear regression approach as the main estimation method. Hence, the first-stage α_1 in equation 1 is estimated from

$$\min_{\alpha_0,\alpha_1,\alpha_2,\alpha_3} \sum_{i=1}^{N} K(\frac{c_i - c_0}{h})[X_i - \alpha_0 - \alpha_1 T_i - \alpha_2 f(c_i - c_0) - \alpha_3 f(c_i - c_0)T_i]^2 \tag{2}$$

where T_i is an indicator equal to one if $c_i \geq c_0$ and 0 otherwise. h is the bandwidth selected by using the method of Calonico et al. (2014). Similarly, the reduced-form estimator β_1 is

estimated from

$$\min_{\beta_0,\beta_1,\beta_2,\beta_3} \sum_{i=1}^{N} K(\frac{c_i - c_0}{h})[Y_i - \beta_0 - \beta_1 T_i - \beta_2 f(c_i - c_0) - \beta_3 f(c_i - c_0)T_i]^2 \tag{3}$$

5.2 Two-Sample Estimation

The FRD estimator in equation 1 is determined by four sample moments and can be independent of microdata, which is the essential idea of the two-sample instrumental variable (TSIV) method[1]. An extant literature has documented the theory and empirical applicability of the TSIV method (Angrist and Krueger, 1991, 1992, 1995; Bjorklund and Jantti, 1997; Inoue and Solon, 2010; Angrist and Pischke, 2008; Patel, 2012). An illustrative example is that for IV estimation, a random sample with the measures of outcome, treatment, and instrument variable (Y, X, Z) is unavailable. Instead, two separate samples are available: the first sample with measurements of (Y, Z) and the second sample with (X, Z). The TSIV method makes it possible to get a consistent estimate even when the outcome variable is observed in one sample and the treatment variable is in a second sample, as long as there is a common instrument variable in both samples. In this paper, I examine the influence of the sent-down experience on interpersonal trust in family members, to support my research focus on family well-being. The information is only available in CGSS, which shares the common birth date variable with CFPS. The two-sample method makes the discussion on trust possible.

There are two main obstacles to the application of TSIV method. First, sample moments of the common variable are the same across the two datasets: $F_1(Z) = F_2(Z)$. This is also called the full compatibility condition. In practice, however, it is often found that the sample moments of the common variable Z are significantly different across two datasets. Second, the traditional two-sample estimators are heavily dependent on the correct specification of the first-stage relationship between X and Z. For instance, the conditional expectation

[1]In a two-sample FRD framework, the estimator is actually a two-sample two-stage least square (TS2SLS) estimator. Inoue and Solon (2010) illustrate in details the difference between TSIV and TS2SLS estimations.

projection (CEP) estimator of Chen et al. (2008) is consistent and efficient in large samples, but the performance in small samples substantially depends on the quality of the conditional expectation functions (CEF) in the two samples. Similarly, a high level of precision and efficiency for the propensity-score-reweighting (PSR) estimator of Hirano and Imbens (2001) and Abadie (2005) rely on good approximations for the propensity score.

In a recent study, Graham et al. (2016) introduce the auxiliary-to-study tilting (AST) estimator that is generally more efficient than the original TSIV method proposed by Angrist and Krueger (1992), and is consistent under a wider set of assumptions. As proved by Graham et al. (2016), two-sample estimates from AST-tilted samples has the following advantages:

(1) Estimates have the property of double robustness, which means estimates remain consistent if the propensity score is misspecified.

(2) Assumption of full compatibility proposed in Angrist and Krueger (1991) and several applications of two-sample method is not required. Estimates are still consistent even when the moments of common variables fail to match across two samples and/or when the propensity score is misspecified.

(3) This method is flexible in parametric choices, especially for high dimensional common variables across two samples.

(4) Comparing to propensity score reweighting (Hirano and Imbens, 2001) estimator which also have the doubt robustness property, the AST estimators consider the data combination problems and are more efficient.

These advantages of the AST procedure increase the robustness of a two-sample estimator in this paper, where the treatment variable X (the sent-down experience) and outcomes Y (interpersonal trust) are measured in two separate samples. Estimators can still be consistent and efficient even if the full compatibility condition fails in these two samples ($F_1(Z) \neq$

$F_2(Z)$) and the propensity score model is not well specified, as long as the CEFs of Y and X are linear in a independent function of Z[2]. Following the notation of Graham et al. (2016), let $t(Z)$ be the known linear function of the vector of common variables Z. Different from the traditional propensity-score reweighting estimator, the AST method compute a reweighting using both samples. Let $\hat{\pi}_i^e$ be the weights in the most efficient estimate of the merged population distribution function of Z:

$$\hat{F_s}^e(z) = \sum_{i=1}^{N} \hat{\pi}_i^e 1(Z_i \leq z) \tag{4}$$

Let $\hat{\pi}_i^1$ and $\hat{\pi}_i^2$ be the tilts for the first and second sample, respectively. These weights are carefully chosen such that

$$\sum_{i=1}^{N_1} \hat{\pi}_i^1 t(Z_i) = \sum_{i=N_1+1}^{N} \hat{\pi}_i^2 t(Z_i) = \sum_{i=1}^{N} \hat{\pi}_i^e t(Z_i) \tag{5}$$

One way to interpret equation 5 is that after reweighting by the AST tilts, the sample moments of the common variable Z in both samples are numerically identical to the efficient estimate of study population moments.

This paper uses the AST two-sample adjustment in a RD framework. Figure 2 shows the distribution of the running variable (birth cohort) in both samples. And Table 4 presents the sample moments of common variables in two samples before and after the AST adjustment. Sample moments in one sample coincide the moments in the other sample much better after the adjustment. More details are presented in Section 5.3.

5.3 Details of Empirical Strategy in This Paper

Running variable. The running variable (c_i) in this RD framework is a birth cohort. Each cohort includes one birth month. Schools in China start the academic year in September.

Cutoffs. As described in section 5.1, the earliest cohort affected by the Send-Down Movement were those who were born in September 1946. This is the cohort who were

[2]See Graham et al. (2016) Assumption 2.

supposed to graduate from senior high school in 1966 when the Cultural Revolution started and shut down all schools. The last affected cohort contains those who were born during June and August in 1960, as it is the last cohort who had just graduated from junior high school in 1976. The estimation of causality in this paper concentrates on the first cutoff as there were fewer confounding factors.

Tilting weights. The FRD estimator is a LATE where observations near the cutoff play an more important role than those far away from the cutoff. In the following context, the notation with a superscript FS refers to the (X, Z) sample and notation with a superscript RF refers to the (Y, Z) sample.

Figure 2 shows the kernel density estimates of the distributions of birth cohorts in two samples. The raw distributions are not quite the same across two samples. Following Graham et al. (2016), an auxiliary-to-tilt (AST) adjustment is estimated based on a function of the common variables Z. Let $t(Z)$ be the vector of all these functions of Z. My choice of $t(Z)$ includes the running variable (birth cohort), a quadratic of the running variable, years of schooling, income[3], and 7 dummy variables for the birth cohort lying below -150, -100,...,100,150, respectively. This choice ensures that after the adjustment, the reduce-form and first-stage sample share the following features: (i) the means and variances of the running variables coincide; (ii) the marginal distribution of income and years of schooling coincide; (iii) the probability masses assigned to the intervals defined by the -150, -100,...,100,150 grid of the running variable coincide. As is evident from the figure, this choice is fairly rich to match the distribution of the running variable in the reduced-form sample with the first-stage sample. Further evidence is shown in Table 4 where sample moments before and after the AST adjustment are presented. Gaps in the raw sample moments across two samples are excluded once the samples are adjusted by the AST weights.

[Figure 2 here]

[Table 4 here]

[3]Income is transformed to have mean one.

Kernel weights. In addition to the tilts, a common triangle kernel weight $K(\frac{c_i - c_0}{h_c})$ where $h_c = min[h_s, h_a]$ as suggested by Imbens and Lemieux (2008) is applied across two samples.

Bandwidth. In each data set, the optimal bandwidth is calculated based on the method of Calonico et al. (2014) (CCT). To avoid errors in the calculation of the CCT bandwidth, I drop individuals who were born after August 1960, as they have a much lower possibility of being affected by the Send-Down Movement. In section 6.7, I present estimates using alternative bandwidths and the results are fairly robust across choices of bandwidths. Let the linear function in the square parentheses in equation 2 and 3 be $\psi(X, T, \alpha)$ and $\psi(Y, T, \beta)$, respectively. X is the treatment variable, T is an indicator equal to one if the running variable is above the cutoff value, and α and β are the coefficients of interest. Then the TS-RD estimator α_1 and β_1 are estimated from

$$\min_{\alpha} \sum_{i=1}^{N} \hat{\pi}_i^a K(\frac{c_i - c_0}{h_c}) \psi(X, T, \alpha)^2 \tag{6}$$

$$\min_{\beta} \sum_{i=1}^{N} \hat{\pi}_i^s K(\frac{c_i - c_0}{h_c}) \psi(Y, T, \beta)^2 \tag{7}$$

5.4 Validity

To further support my identification strategy, I conduct tests following the suggestion of Lee and Lemieux (2010). First, I check whether there was manipulation of birth timing around the cutoff date. If people were manipulating the timing of birth for children to avoid the Send-Down Movement, the distribution of birth cohorts would not be smooth across the cutoff. I follow McCrary (2008) and conduct an RD examination of density (Figure 3). The McCrary t-statistic of the density of the running variable at the cutoff is 0.980, indicating that we fail to reject the null hypothesis that there are no manipulation of the birth cohort at the cutoff. It is not surprising, because for the cohorts of interest, it is very unlikely to have manipulation on birth date since parents could not have known that the Send-Down

Movement was coming more than 10 years later.

[Figure 3 here]

Second, the identification would be problematic if individual characteristics on two sides of the cutoff differ. If these characteristics are not smooth, the discontinuity at the cutoff will capture effects other than the sent-down experience and the identification design will be jeopardized. I examine whether individuals' characteristics are smooth across the cutoff. Table 5 presents the examination on smoothness of individual characteristics at the cutoff. Each cell represents the RD estimate from a local linear regression of the corresponding characteristic on the indicator $I(c_i \geq c_0)$. If there were likely manipulation of the running variable, or heterogeneity on two sides of the cutoff, I will find discontinuities in these characteristics at the cutoff. As shown in the table, there is no statistically significant discontinuity in these variables at the cutoff, suggesting that there was no systematic difference in individual characteristics on either side of the cutoff.

[Table 5 here]

6 Results

As illustrated in Section 3, I discuss the effects of being sent down on health, marital outcomes, fertility, and interpersonal relationships. I also revisit socioeconomic status and present the estimates in the appendix. First, I show the relation between birth cohort and the send-down status. Then, I present results in each category of outcomes, using either a one-sample or a two-sample RD method.

6.1 Send-Down Probability

Figure 4 shows the relationship between the running variable (birth cohort by birth months) and the treatment of interest (sent-down experience). Each dot represents the proportion of being sent down within each bin of birth months. The solid blue lines indicate the local polynomial smoothing line weighted by a triangle kernel and the optimal bandwidth calculated by the method of Calonico et al. (2014). The dashed blue lines shows the estimated

95% confidence intervals and the vertical line indicate the birth cohort cutoff for the initial sent-down cohort.

[Figure 4 here]

As is evident in the figure, there is a clear discontinuity in the sent-down probability across the cutoff. The sent-down probability jumps up across the cutoff when the Send-Down Movement launched on a national scale in 1968. This discontinuity support the research design of this paper. I focus on the discontinuity at the first affected cohort, as the sent-down policy is most strict and uniform in the starting year, and then became more lenient as years went by.

Table 6 reports the results. SEND is an indicator equal to one if the respondent had any sent-down experience and zero otherwise. Results in this table are from local linear regression at the cutoff. Triangular kernel function is used in the local linear estimation. In addition to the overall effect using the full sample, there are subsample estimates by gender presented. Standard errors are in the parentheses. The estimate indicates that the sent-down probability of cohorts born just after the cutoff date is 27.4% higher than the cohorts who were born right before the cutoff.

[Table 6 here]

Falsification tests with alternative cutoff and the rural sample are also presented. Cutoff *"CR"* indicates the first birth cohort affected by the Cultural Revolution two years before the Send-Down Movement. Rural sample consists of individuals who were living in the rural area and were not targeted in the Send-Down Movement. The estimates from using the alternative cutoff and the rural sample are all statistically insignificant, suggesting a valid first-stage identification strategy.

6.2 Health

The impact on health can be gender-asymmetric. In this section, I present results for impacts on both the overall health, and more detailed health symptoms. I examine whether the respondents have chronic illnesses by the following categories: orthopedic, joint and muscular

disorders, digest system problems, cardiovascular diseases, and mental depression. Estimates are presented in Table 7. Overall, the sent-down individuals have a higher probability of developing chronic illnesses, and it is specially true for women. The orthopedic, joint and muscular category of chronic illnesses includes arthritis, spinal disc herniation lumbar and cervical spondylosis, and other disorders that relate to physical activities. This is a category of disorders that has strong relationship with wear-and-tear damage and worsen with aging. The overall estimated effect of the send-down experience is positive on the probability of having such disorders, but it is not statistically significant. Meanwhile, the effect on women is positive and statistically significant, whereas the effect on men is close to zero. This result indicates that the sent-down women had a higher probability of developing disorders that have a close relationship with heavy labor work and physical activities. On the contrary, the sent-down men are not much affected in terms of chronic illnesses. In addition, one effect that is statistically significant for men is the effect on the mental depression. The sent-down men, with a lower probability of having physical chronic conditions in the past six months, report a higher probability of depressive disorders.

[Table 7 here]

The results on health outcomes imply some gender-related heterogeneity under the influence of sent-down experience. Female sent-down individuals appear to have a higher probability of developing chronic illnesses, especially the orthopedic, joint and muscular disorders. According to the report based on the last six months, male sent-down individuals are not as likely to have such issues, and they expend less moeny on medical services. One possible explanation is that the gender differences in physical development and strength differentiate how the sent-down youths react to the physical stress. Due to the physical advantage at adolescence, the male students were more physically capable and confident with intensive labor tasks than the female students, and hence were less likely to be negatively affected in terms of physical health. Mental health, however, does not have such a pattern.

6.3 Marriage

To capture both the during- and after-movement factors, I investigate some marital outcomes, as well as the differences in education level between couples as a measure of marital matching. Spending years in the countryside, the sent-down experience can impose scarring effect on individual's value in the marriage market, leading to higher likelihood of marital mismatching.

Firstly, I examine the current marital status and the number of marriages. The marital status equals to one if currently married and zero otherwise. In Table 8, zero effect are found on whether individuals got married. The estimate on how many marriages they went through is significantly positive, indicating that the sent-down individuals are less likely to obtain a stable marriage at the beginning.

[Table 8 here]

Secondly, I investigate the age of getting married. The point estimates of the effects on married age is not statistically significant, suggesting no effect on the age of getting married.

Furthermore, I examine the gaps in years of schooling between the couple. The gap is calculated by spouse's measure minus one's own measure. The overall effect on the gap of years of schooling is slightly smaller than zero but insignificant. Interestingly, the effect in the female subsample is significantly negative. Based on the result in Table 8, women who were born after the age cutoff have around 2.6 more years of schooling than their spouses. This result indicates that the female sent-down individuals are more likely to "mismatch" with their spouses.

6.4 Fertility

Because both of the biological condition and the time to have children were possibly affected by the sent-down experience, I examine the following variables in Table 9: the possibility of having no child, teen birth, non-marital birth, total number of children, number of boy babies and girl babies, and age of having the first child.

[Table 9 here]

I found zero effect on the probability of having no children, indicating no link between the sent-down experience and infertility. The estimate on teen birth is positive, but not statistically significant at the 5% confidence level. The estimated effects on the number of children and non-marital birth are negative but insignificant. In addition, The effect on the age of having the first child is statistically positive, which means the sent-down individuals are prone to have kids later than the never sent-down ones. These findings, together with the zero effect on age at first marriage found in Section 6.3, suggests that the sent-down individuals had children later in life, due to biological condition or conservative preference, comparing to the never-sent-down counterparts.

Moreover, I examine the secondary sex ratio (the ratio of male-to-female live births). By natural, this gender ratio should be close to 50%, with slightly skewing towards boys. Approximately, there are 107 boy babies born for every 100 girl babies worldwide. Factors that affect whether a sperm with a Y chromosome or an X chromosome will be the first to fertilize an egg include parental age, the stage of the mother's ovulation cycle and fertility history, exposure to environmental contaminants, and stress. Under certain circumstances, this ratio may be deviate further away from 50%. Research show that the odds of male birth declines following extreme events, such as natural disaster, pollution events and economic decline. Examples for such events include 9-11 (Bruckner et al., 2010), 1995 Kobe earthquake (Fukuda et al., 1998), and the Germany's economy collapse in 1991 (Catalano, 2003). The mutual factor that has been discussed among the studies is the widespread feeling of distress. Regarding parental investment strategies, Trivers-Willard hypothesis predicts that parents in good conditions bias their investment towards sons and that parents in poor conditions bias towards daughters. The results in Table 9 show that the sent-down individuals have a lower male-to-female ratio of children especially for the sent-down males, while the effect on female is zero. The overall effect matches the previous findings, as the sent-down parents were exposed to stress, and were disadvantaged in terms of economic conditions in their early

adulthood. For the gender-asymmetric effects, one of the explanations is that the sent-down individuals favor sons over daughters and kept on giving birth to children until they had a boy. By examining the effect on the number of children, the negative and insignificant estimate lower the possibility of giving more birth to girl babies. I also find zero effect on the probability of having more children after having the first child as a girl. Another explanation is that late marriage leads to difference in biological conditions of the parents. A negative association between the paternal age and the secondary sex ratio found in several studies in different societies (Jacobsen et al., 1999; Ruder, 1985; Bernstein, 1958) may help to explain my finding that the sent-down men have a lower male-to-female ratio of children than the sent-down women.

6.5 Subjective Outcomes

In this section, I examine the measures of subjective variables, including interpersonal trust, relationship with children, social relations, subjective well-being, and sense of fairness. I also extend the discussion in trust towards trust in specific group of people, by using a two-sample two-stage method. Reduced-form results are presented in Table 10. The sent-down cohorts have less trust in people. In addition, I also find significantly negative effect on the social relations for women, and negative effect on their relation with children for men with a never-sent-down spouse. While the estimates are negative for the subjective well-being, they are not statistically significant. Effects on agreement with fairness are found to be positive but insignificant.

[Table 10 here]

Since the send-down cohorts are found to have less trust in people, I want to investigate how it relates to the sent-down experience. In Table 12, I exploit more detailed information of interpersonal trust from another data set CGSS 2010, and examine the effects on trust in general and in several groups, including fellow-townsmen, family members, relatives, and the government, using the two-sample two-stage least squares method described in Section 5.2. All the estimates in the table are negative except the trust in relatives for men. In

addition, women have significantly less trust in fellow-townsmen, relatives and government, while the effects on men is insignificant. The fact that the effects on trust in fellow-townsmen and government stand out is connected with the situation during the send down period. In addition to the fact that the sent-down individuals were forced by the government to move to the countryside, most of them were sent to live and work together with fellow-townsmen. The results suggest that the sent down persons have less trust in others in general, and especially in the group who they used to have most contacts with during the sent-down period. These effects are gender-asymmetric and are more significant for women.

6.6 Two-Stage Least Squares Estimates

Table 11 presents the results of RD estimation on health, marriage, and fertility. All the regressions are from local linear models with a CCT bandwidth (Calonico et al., 2014) and a triangle kernel. There are four categories of outcomes: health, marriage, fertility, and subjective variables. Measures of socioeconomic status are not presented in this table because no significant estimates are captured in the reduced-form regressions in Table A.1 and A.2. In each category, only those variables with statistical significance from reduced-form regressions are presented.

[Table 11 here]

Comparing to the never-sent-down cohorts, sent-down individuals have 20.4% higher probability in having chronic disorders. Sent-down women have a 40.9% higher probability in having orthopedic, joints, and muscular diseases. Sent-down men are 1.05 standard deviation (of the control group) more depressed than the never-sent-down cohort. Sent-down individuals had 0.27 more marriages, and women have a higher probability of having married down, with 9.64 more years of schooling than their spouses. For fertility, sent-down men have the first child 9.37 years later than the never-sent-down men, and the number of sons are 1.3 lower than the never-sent-down men.

Table 12 presents the results of RD estimation on interpersonal relationships. Samples are weighted by the AST weight adjustment (Graham et al., 2016). As shown in Figure 2

and Table 4, the sample moments of the vector of common variables in two samples match each other. All the estimates are from local linear models with a CCT bandwidth (Calonico et al., 2014) and a triangle kernel.

[Table 12 here]

Negative effects of the sent-down experience are found on all measures of relationships. Women are 1.15 SD lower in self-assessment of social relationships. Overall, the sent-down people are 1.85 SD less trust in strangers, 1.77 SD less trust in *laoxiang* (fellow-townsmen), 1.29 SD less trust in Family, 0.82 less trust in relatives, 1.82 SD less trust in government.

Table 13 shows the results of two-sample estimations without the AST adjustment. Fewer estimates remain statistically significant at the 5% confidence level, indicating that the AST adjustment improves the efficiency of estimation.

[Table 13 here]

One important question is the interpretation of the magnitude of the estimated effects on trust. By adopting a life satisfaction approach (Tideman et al., 2008; Frey and Stutzer, 2002; Clark and Oswald, 1996), I measure the monetary compensation of losing trust without lowering the level of subjective well-being. By running regressions of subjective well-being on income and trust, it is possible to calculate utility constant trade-off ratios between income and (losing) trust. Table 14 presents the results from both OLS and ordered Probit models. The trade-off ratio ranges from 0.58 to 0.69, indicating that losing trust in others requires a RMB 5,800 - 6,900 compensation in order to keep the same level of utility.

6.7 Robustness Checks

Multiple Hypotheses Testing. In the previous section, I estimate the effects based on female-male subsamples, and gender×spouse's sent-down status subsamples. To avoid over-rejection issues in multiple hypotheses testing, I use Bonferroni adjusted P-value for size control. Estimates in the female and male subsamples are robust and significant after the adjustment.

Bandwidth. Figure 7 - 12 present the reduced form estimates using alternative bandwidths. In each figure, the point estimate is obtained from a local linear regression of the

variable of interest on the indicator of running variable on the right of the cutoff ($I(c_i \geq c_0)$) with the corresponding bandwidth. Alternative bandwidths run from zero to 400 on the horizontal axis. Specifically, the vertical gray lines indicates bandwidths calculated by CCT method (Calonico et al., 2014) and IK method (Imbens and Kalyanaraman, 2011), respectively. The vertical axis presents the RD estimates and the horizontal gray line indicates the value of zero. The intersection between the vertical line of CCT bandwidth and the solid black line is the RD estimate presented in Table 8 to 10. The relation between the bandwidths and RD estimates displayed in these figures is fairly stable.

[Figures 7 - 12 here]

7 Conclusion

While there have been lively discussions about the consequences of under prolonged exposure to stress in economics, the stress in adolescence and gender differentials under such stress have not been widely investigated. In this paper, I investigate the long-run effect of the Send-Down Movement on individual's socioeconomic status, health conditions, marital and fertility outcomes, and interpersonal trust. Evidence show that the sent-down individuals have similar socioeconomic outcomes as the never-sent-down individuals, yet they are more likely to have certain illnesses, have children later at life, and have lower trust in other people. I interpret these findings as their costs of surviving the sent-down hardship.

The two-sample RD method in this paper makes it possible to discuss outcome variables that are not all available in one data set. My findings on marital outcomes, fertility, and trust in others adds knowledge to the influence of the Send-Down Movement and the influence of exposure to adversity in general. I also add to the literature gender-asymmetric effects, with women being more vulnerable in physical challenges and in marriage market, while men being more vulnerable in mental health and fertility outcomes. Understanding the long-run effects of the Send-Down Movement helps to unveil how the experience during adolescence and early adulthood shaped the whole generation of people who play an important role in

the current society in China. In future work, I plan to extend the discussion to labor market outcomes and children's outcomes using newly available data sources.

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Figures

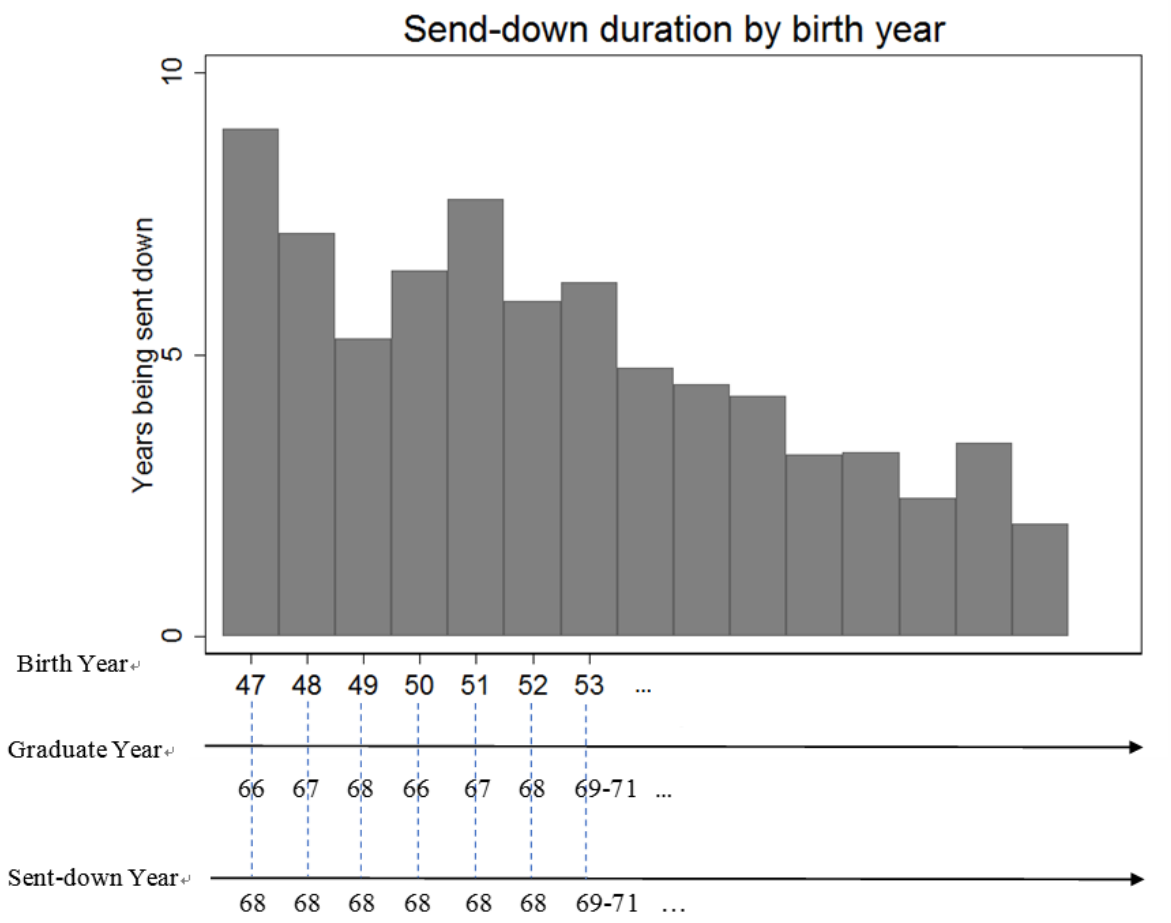

Figure 1: Timeline of the events and send-down years by birth cohort

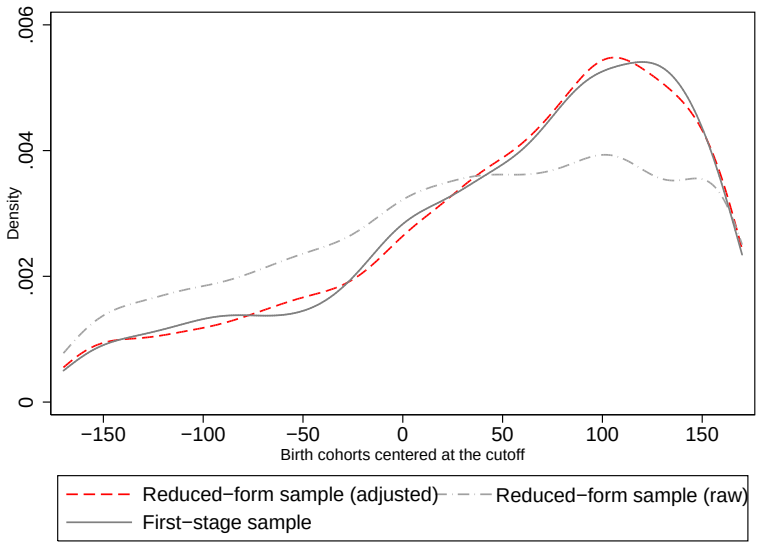

Figure 2: Raw and adjusted birth cohort distribution

This figure shows the kernel density estimates of the distributions of birth cohorts in two samples. The dashed line in gray represents the distribution of reduced-form sample, and the dashed line in red represents the distribution of the reduced-form sample after the adjustment. The adjustement on the reduced-form sample distribution is following the method of Graham et al. (2016). The choice of variables to be matched across samples includes the running variable (birth cohort), a quadratic of the running variable, years of schooling, income, and 7 dummy variables for the birth cohort lying below -150, -100..., 100, 150 respectively.

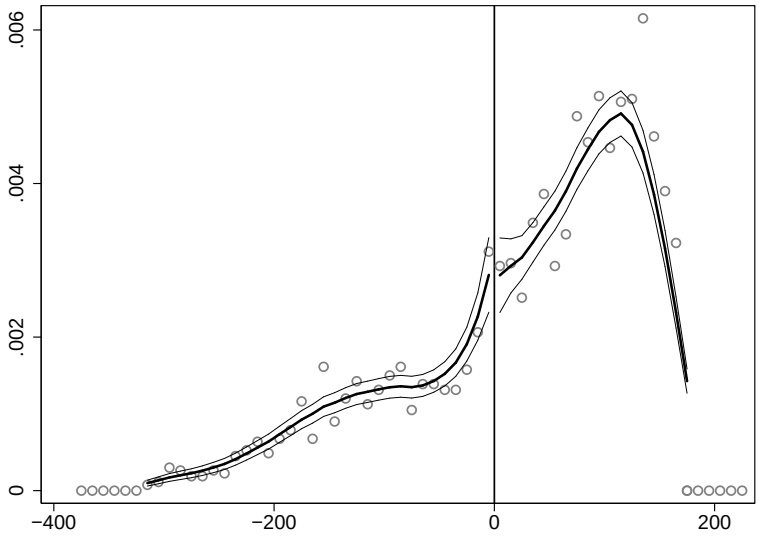

Figure 3: McCrary Test on the running variable

Notes: The t-statistic value at $Z = 0$ is $-.147/.150 = 0.98$, indicating that we fail to reject the null hypothesis that there is no manipulation of the running variable at the cutoff.

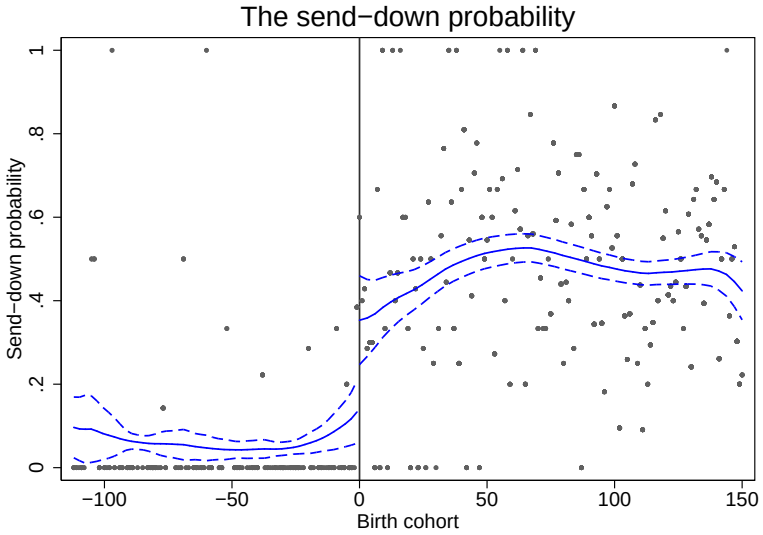

Figure 4: The send-down probability

Data source: CFPS 2010. The variable on the vertical axis is the proportion of being sent down within each bin. Bandwidth is selected by the method of Calonico et al. (2014). The solid blue lines indicate the local polynomial smoothing line weighted by a triangle kernel. The dashed blue lines shows the estimated 95% confidence intervals. The vertical lines indicate the two cutoffs, one for the initial send-down cohort and the other for the last affected cohort.

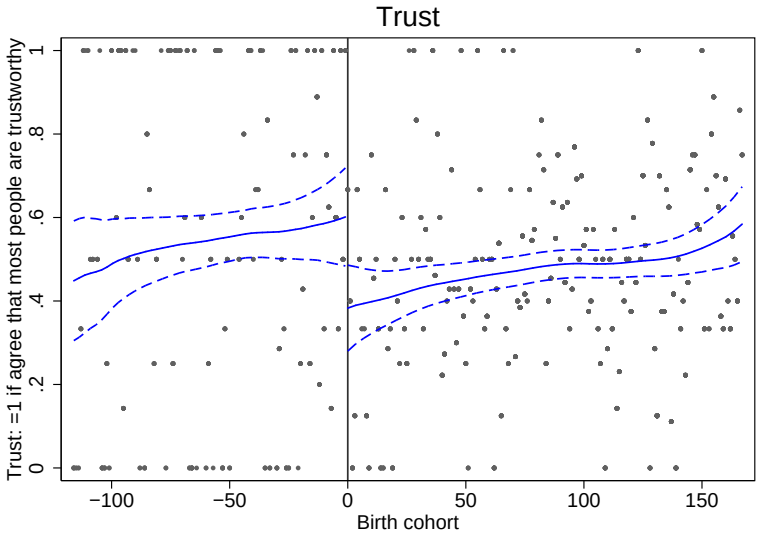

Figure 5: Trust: general population

Data source: CGSS 2010. The variable on the vertical axis is the measure of general trust on a scale of 1 to 5. Bandwidth is selected by the method of Calonico et al. (2014). The solid blue lines indicate the local polynomial smoothing line weighted by a triangle kernel. The dashed blue lines shows the estimated 95% confidence intervals. The vertical lines indicate the two cutoffs, one for the initial send-down cohort and the other for the last affected cohort.

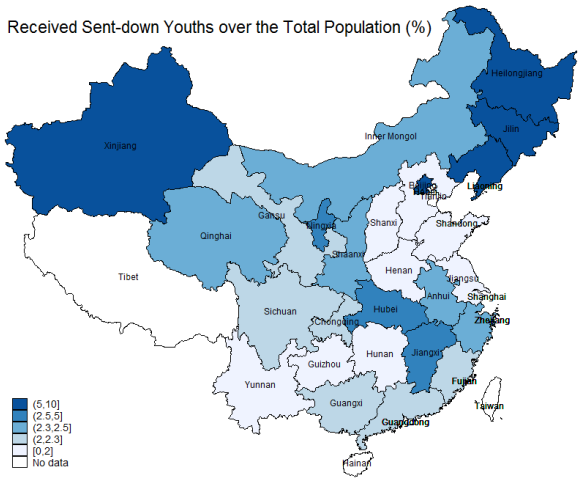

Figure 6: Received Sent-down Youths over the Total Population (%)

Data source: Gu et al. (1997) and China Historical County Population Census Data

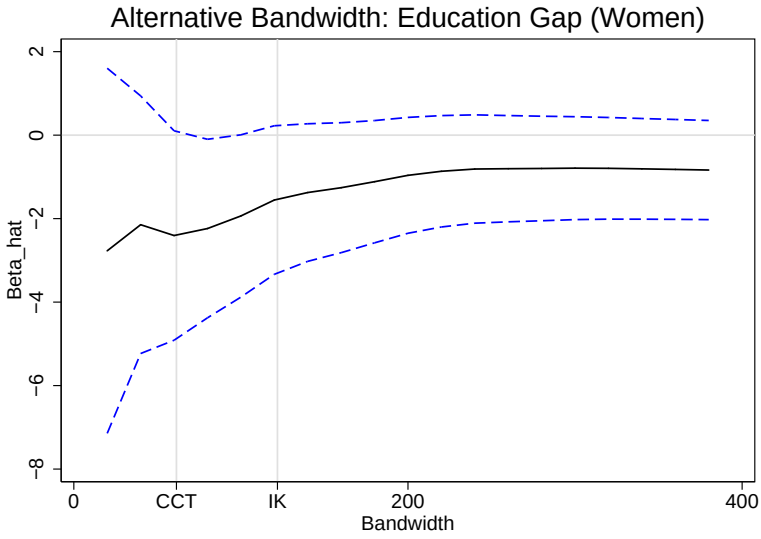

Figure 7: Alternative Bandwidth: Education Gap (Women)

Data source: CFPS 2010. The point estimate is obtained from a local linear regression of the variable of interest on the indicator of running variable on the right of the cutoff ($I(c_i \geq c_0)$) with the corresponding bandwidth. Alternative bandwidths run from zero to 400 on the horizontal axis. The vertical gray lines indicates bandwidths calculated by CCT method (Calonico et al., 2014) and IK method (Imbens and Kalyanaraman, 2011), respectively.

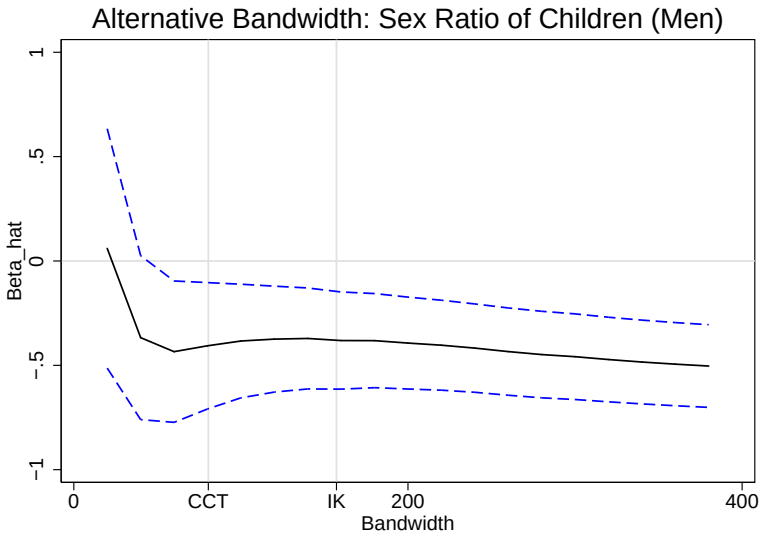

Figure 8: Alternative Bandwidth: Sex Ratio of Children (Men)

Data source: CFPS 2010. The point estimate is obtained from a local linear regression of the variable of interest on the indicator of running variable on the right of the cutoff ($I(c_i \geq c_0)$) with the corresponding bandwidth. Alternative bandwidths run from zero to 400 on the horizontal axis. The vertical gray lines indicates bandwidths calculated by CCT method (Calonico et al., 2014) and IK method (Imbens and Kalyanaraman, 2011), respectively.

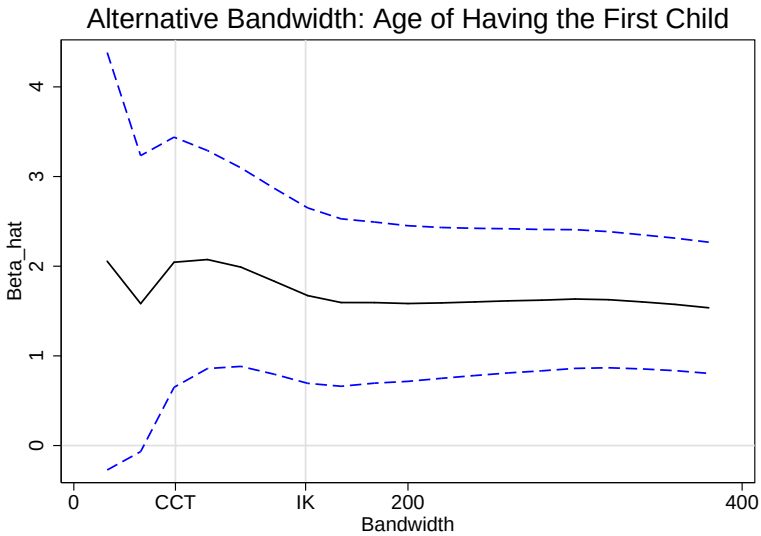

Figure 9: Alternative Bandwidth: Age of Having the First Child

Data source: CFPS 2010. The point estimate is obtained from a local linear regression of the variable of interest on the indicator of running variable on the right of the cutoff ($I(c_i \geq c_0)$) with the corresponding bandwidth. Alternative bandwidths run from zero to 400 on the horizontal axis. The vertical gray lines indicates bandwidths calculated by CCT method (Calonico et al., 2014) and IK method (Imbens and Kalyanaraman, 2011), respectively.

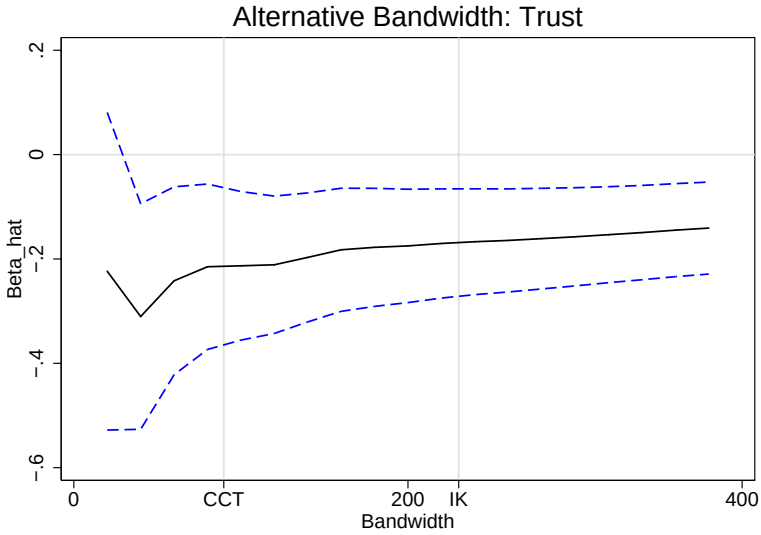

Figure 10: Alternative Bandwidth: Trust in general

Data source: CFPS 2010. The point estimate is obtained from a local linear regression of the variable of interest on the indicator of running variable on the right of the cutoff ($I(c_i \geq c_0)$) with the corresponding bandwidth. Alternative bandwidths run from zero to 400 on the horizontal axis. The vertical gray lines indicates bandwidths calculated by CCT method (Calonico et al., 2014) and IK method (Imbens and Kalyanaraman, 2011), respectively.

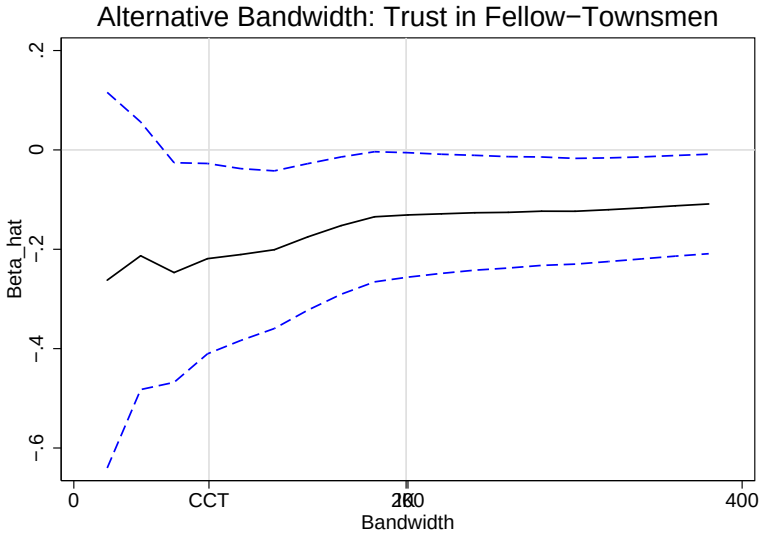

Figure 11: Alternative Bandwidth: Trust to people from the same town

Data source: CGSS 2010. The point estimate is obtained from a local linear regression of the variable of interest on the indicator of running variable on the right of the cutoff ($I(c_i \geq c_0)$) with the corresponding bandwidth. Alternative bandwidths run from zero to 400 on the horizontal axis. The vertical gray lines indicates bandwidths calculated by CCT method (Calonico et al., 2014) and IK method (Imbens and Kalyanaraman, 2011), respectively.

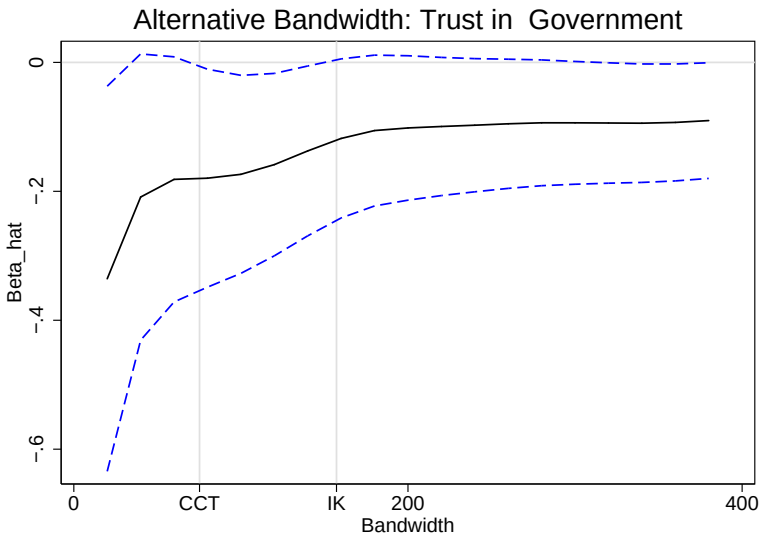

Figure 12: Alternative Bandwidth: Trust to the central government

Data source: CGSS 2010. The point estimate is obtained from a local linear regression of the variable of interest on the indicator of running variable on the right of the cutoff ($I(c_i \geq c_0)$) with the corresponding bandwidth. Alternative bandwidths run from zero to 400 on the horizontal axis. The vertical gray lines indicates bandwidths calculated by CCT method (Calonico et al., 2014) and IK method (Imbens and Kalyanaraman, 2011), respectively.

Tables

Table 1: Rural Population and Arable Land 1965-1975

(Unit)	Total Rural Population (10000)	Total Rural Labor (10000)	Arable Land (10000 Acre)	Arable Land/Population (10000 Acre)
1965	59,493	23,534	25,592	0.43
1975	76,390	29,946	24,632	0.32
Change	16,897	6,412	-960.04	-0.11

Data source: Gu and Hu (1996)

Table 2: Variables based on survey questions

Variable	Survey Question
Send-down status	(0 or 1) Have you being sent-down during the Send-Down Movement?
Orthopedic	(0 or 1) Do you have orthopedic, muscular, or joint issues in the past six months?
Depress	(1 - 5) How often do you feel depressed?
Social Score	(1 - 5) How much do you rate yourself on social relationships?
Trust	(0 or 1) Do you agree that most of people are trustworthy?
Trust to strangers	
Trust to *laoxiang*	
Trust to family members	(1 - 5) To which extent do you trust the following groups? (1 never trust; 5 always trust)
Trust to relatives	
Trust to government	

Data source: CFPS and CGSS 2010

Table 3: Summary statistics

CFPS				CGSS			
	(1)	(2)	(3)		(1)	(2)	(3)
VARIABLE	MEAN	SD	N	VARIABLE	MEAN	SD	N
Send-down	0.116	0.320	5478	Trust to Strangers	3.400	1.140	7222
Orthopedic	0.016	0.128	5478	Trust to Family	4.792	0.564	7222
Depress	1.671	0.890	5478	Trust to Relatives	4.165	0.795	7222
# Marriage	0.752	0.497	5478	Trust to *laoxiang*	3.317	1.020	7222
Age 1st Child	26.864	3.987	5478	Trust to Governments	4.234	.970	7222
# Sons	0.771	0.733	1349				
# Daughter	0.665	0.754	1349				
Social Score	4.049	0.834	5478				
Trust	0.419	0.493	5478				
Age	44.163	16.288	5478	Age	47.257	43.157	7222
Male	0.492	0.499	5478	Male	0.475	0.499	7222
Married	0.730	0.443	5478	Married	0.773	0.418	7222
Years of Schooling	10.459	4.004	5471	Years of schooling	10.185	4.868	7174

Data source: CFPS and CGSS 2010.

Table 4: Moments of Two Samples Before and After the AST Adjustment

	Raw		Adjusted	
Common Variables	First-Stage	Reduced-Form	First-Stage	Reduced-Form
$Z/100$	0.527	0.316	0.527	0.527
$(Z/100)^2$	0.999	0.954	0.999	0.999
Male	0.492	0.484	0.492	0.492
Married	0.873	0.845	0.873	0.873
Yr Schooling	8.772	8.841	8.746	8.746
Income	17379.314	26214.358	18743.714	18743.714

Note: All the numbers in the table are sample means for the corresponding variable.
Z is the birth month centered at September 1946, as the running variable of the regression discontinuity design.

Table 5: Smoothness of individual characteristics at the cutoff

	(1) Male	(2) Father's Edu	(3) Mother's Edu	(4) Ethnic Minority
CFPS 2010				
RD	-0.077	0.272	0.156	-0.025
	(0.069)	(0.670)	(0.957)	(0.034)
Mean	0.492	8.974	7.014	0.0205
Effective N	964	812	750	759
CGSS 2010				
RD	0.009	-0.107	-0.127	-0.082
	(0.058)	(0.303)	(0.423)	(0.102)
Mean	0.475	8.432	7.522	0.511
Effective N	1,425	1,073	933	973

Notes: Results in this table are from local linear regression at the cutoff. Triangular kernel function is used in the local linear estimation. The bandwidth is selected using the method of Imbens and Kalyanaraman (2011). Numbers in the parentheses are the standard errors. ** p<0.01, ** p<0.05, * p<0.1.

Table 6: First-stage Estimates

	Send-Down Movement		Cultural Revolution (Placebo)	
	Urban	Rural	Urban	Rural
$I(C_i \geq C_0)$	(1)	(2)	(3)	(4)
Full Sample	0.274***	0.033	-0.005	-0.042
	(0.084)	(0.048)	(0.054)	(0.030)
Female	0.273**	0.043	-0.057	-0.003
	(0.122)	(0.083)	(0.065)	(0.008)
Male	0.219*	0.026	-0.081	-0.058
	(0.121)	(0.053)	(0.051)	(0.038)
Sample Mean	0.376	0.038	0.357	0.039
Bandwidth (month)	49.714	43.023	43.780	33.883
Effective N	395	257	470	339

Data source: CFPS 2010.

Notes: $I(C_i \geq C_0)$ is an indicator with a value of one if the running variable (birth month) is greater or equal to the cutoff C_0 and zero otherwise. SEND is an indicator equal to one if the respondent had any sent-down experience and zero otherwise. Results in this table are from local linear regression at the cutoff. Triangular kernel function is used in the local linear estimation. Falsification tests with alternative cutoff and the rural sample are presented. Cutoff *"CR"* indicates the first birth cohort affected by the Cultural Revolution two years before the Send-Down Movement. Standard errors are in the parentheses. In addition to the overall effect using the full sample, there are subsample estimates by gender presented. *** p<0.01, ** p<0.05, * p<0.1.

Table 7: Illness: Reduced-form Estimate

$I(C_i \geq C_0)$	Chronic (1)	Orthopedic (2)	Digest (3)	Cardiovascular (4)	Depression (5)	Hospitalized Days (6)
Full Sample	0.188**	0.036	-0.030	0.020	0.211	0.898
	(0.084)	(0.052)	(0.043)	(0.089)	(0.129)	(0.936)
Subsample: Female	0.318***	0.108**	-0.088	0.025	0.094	1.599
	(0.120)	(0.048)	(0.080)	(0.149)	(0.214)	(1.353)
Subsample: Male	0.0204	-0.056	0.0332	-0.00176	0.377***	-0.022
	(0.113)	(0.085)	(0.033)	(0.108)	(0.120)	(1.348)
Sample Mean	0.237	0.053	0.042	0.184	4.437	2.120
BW	43.880	47.262	57.205	42.841	37.011	57.355
N	584	370	424	327	503	747

Data source: CFPS 2010 and 2014.

Notes: $I(C_i \geq C_0)$ is an indicator with a value of one if the running variable (birth month) is greater or equal to the cutoff C_0 and zero otherwise. Chronic is an indicator equal to one if the respondent had any chronic illnesses in the past six months and zero otherwise. Orthopedic, Digest, and Cardiovascular represent the 0/1 indicator of having a diseases in the corresponding system for the past six months. Depression with a value from 1 to 5 is a self-reported frequency of feeling depressed, with 5 the most frequent. Smoker is an 0/1 indicator with a value one for a current smoker. Hospitalized Day records the total days the respondent was hospitalized in the past year. Results in this table are from local linear regression at the cutoff. Triangular kernel function is used in the local linear estimation. The bandwidth is selected using the method of Calonico et al. (2014). Standard errors are in the parentheses. In addition to the overall effect using the full sample, there are subsample estimates by gender presented. *** p<0.01, ** p<0.05, * p<0.1.

Table 8: Marriage: Reduced-form Estimates

$I(C_i \geq C_0)$	Married (1)	N Marriage (2)	Age 1st Marriage (3)	Education Gap (4)
Full Sample	0.056	0.074**	-0.723	-1.328*
	(0.059)	(0.042)	(1.010)	(0.787)
Subsample: Female	0.088	0.130*	-2.637*	-2.643**
	(0.093)	(0.070)	(1.364)	(1.241)
Subsample: Male	0.004	0.035	0.833	0.226
	(0.074)	(0.030)	(1.227)	(0.703)
Sample Mean	0.768	1.029	25.369	0.024
BW	55.633	40.739	80.132	54.059
N	606	449	802	387

Data source: CFPS 2010 and 2014.

Notes: $I(C_i \geq C_0)$ is an indicator with a value of one if the running variable (birth month) is greater or equal to the cutoff C_0 and zero otherwise. Married is an indicator equal to one if the respondent is currently married and zero otherwise. N Marriage measures the total number of marriages the respondent had when being interviewed. Age 1st Marriage is the respondent's age at the first marriage. Education Gap is the spouse's years of schooling (income) minus the respondent's years of schooling. Results in this table are from local linear regression at the cutoff. Triangular kernel function is used in the local linear estimation. The bandwidth is selected using the method of Calonico et al. (2014). Standard errors are in the parentheses. In addition to the overall effect using the full sample, there are subsample estimates by gender presented. *** p<0.01, ** p<0.05, * p<0.1.

Table 9: Fertility: Reduced-form Estimates

	No Children	Teen Birth	Non-marital Birth	N Children	Age 1st Child	N Boy Born	N Girl Born
$I(C_i \geq C_0)$	(1)	(2)	(3)	(4)	(5)		
Full Sample	0.023	0.008*	-0.009	-0.298	2.306***	-0.115	-0.119
	(0.0224)	(0.005)	(0.019)	(0.182)	(0.713)	(0.114)	(0.144)
Subsample: Female	0.044	0.020*	-0.037	-0.246	2.085*	0.102	-0.291
	(0.027)	(0.011)	(0.0319)	(0.291)	(1.080)	(0.162)	(0.218)
Subsample: Male	0.002	-0.007	0.0213	-0.312	2.445**	-0.363**	0.075
	(0.035)	(0.004)	(0.0212)	(0.229)	(0.997)	(0.159)	(0.196)
Sample Mean	0.043	0.018	0.003	1.66	27.383	0.911	0.790
BW	63.124	70.342	63.784	45.298	69.699	61.087	45.164
N	655	911	831	482	652	802	611

Data source: CFPS 2010 and 2014.

Notes: $I(C_i \geq C_0)$ is an indicator with a value of one if the running variable (birth month) is greater or equal to the cutoff C_0 and zero otherwise. No Children is the indicator with a value of one if the respondent does not have any child and zero otherwise. Teen Birth is an indicator of whether the respondent had a children between age 14-20. Non-marital Birth is an indicator of whether the respondent ever had a child without getting married. N Children (Boy Born / Girl Born) is the total number of children the respondent has. Age 1st Child is the respondent's age having the first child. Results in this table are from local linear regression at the cutoff. Triangular kernel function is used in the local linear estimation. The bandwidth is selected using the method of Calonico et al. (2014). Standard errors are in the parentheses. In addition to the overall effect using the full sample, there are subsample estimates by gender presented. *** p<0.01, ** p<0.05, * p<0.1.

Table 10: Subjective Variables: Reduced-form Estimates

	Trust	Relation Child	Social Relation	Well-being	Fairness
$I(C_i \geq C_0)$	(1)	(2)	(3)	(4)	(5)
Full Sample	-0.294***	-0.067	-0.105	-0.085	0.720
	(0.105)	(0.297)	(0.154)	(0.151)	(0.502)
Subsample: Female	-0.320**	0.421	-0.478**	-0.176	0.441
	(0.154)	(0.417)	(0.194)	(0.226)	(0.696)
Subsample: Male	-0.270*	-0.629	0.276	0.0197	1.376*
	(0.150)	(0.385)	(0.233)	(0.200)	(0.719)
Sample Mean	0.501	4.2	4.068	3.925	5.999
BW	53.216	21.366	49.103	69.927	59.731
N	390	213	524	717	395

Data source: CFPS 2010 and 2014.

Notes: $I(C_i \geq C_0)$ is an indicator with a value of one if the running variable (birth month) is greater or equal to the cutoff C_0 and zero otherwise. Trust is an indicator equal to one if the respondent trust others in general and zero otherwise.Relation Child and Social Relation are self-assess scores for interpersonal relationships with their children and with people in general, respectively, and value 1 to 5 with 5 being the highest. Well-being is self-reported happiness level from 1 to 5 with 5 the happiest. Satisfy Marriage is self-reported satisfaction with the current marriage. Marriage for Female is a 1-5 score of respondent's agreement on the statement "Marriage is very important to women." Fairness is a 1-5 score of respondent's agreement on the statement "Life is generally fair in the current society." Results in this table are from local linear regression at the cutoff. Triangular kernel function is used in the local linear estimation. The bandwidth is selected using the method of Calonico et al. (2014). Standard errors are in the parentheses.In addition to the overall effect using the full sample, there are subsample estimates by gender presented. *** p<0.01, ** p<0.05, * p<0.1.

Table 11: Two-Stage Least Squares Estimates: Health and Family Structure

	Health			Marriage		Fertility	
	Chronic (0/1)	Orthopedic (0/1)	Depress (1-5)	# Marriage	Edu Gap	Age 1st Child	# Sons
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Full Sample	0.204	0.127	0.782	0.270**	-5.165	8.239**	-0.419
	(0.257)	(0.151)	(0.609)	(0.125)	(4.783)	(2.432)	(0.414)
Subsample: Female	0.805**	0.409**	0.336	0.463*	-9.645**	7.063*	0.372
	(0.365)	(0.161)	(0.798)	(0.279)	(4.073)	(3.735)	(0.593)
Subsample: Male	-0.461	-0.227	1.384***	0.131	6.080	9.374***	-1.324**
	(0.348)	(0.260)	(0.430)	(0.105)	(5.161)	(3.601)	(0.591)
Sample Mean	0.237	0.053	1.553	1.027	-0.028	27.383	0.557
BW	43.769	47.262	37.056	36.876	63.43	69.999	66.381
N	479	370	413	385	575	652	432

Data source: CFPS 2010 and 2014.

Notes: Chronic is an indicator equal to one if the respondent had any chronic illnesses in the past six months and zero otherwise. Orthopedic is an indicator of having an orthopedic, muscular or joint disorder for the past six months. Depress with a value from 1 to 5 is a self-reported frequency of feeling depressed, with 5 the least frequent. N Marriage measures the total number of marriages the respondent had when being interviewed. Education Gap is the spouse's years of schooling (income) minus the respondent's years of schooling (income). Age 1st Child is the respondent's age having the first child. Results in this table are the Wald ratios of the reduced-form estimates over the first-stage estimates based on local linear regressions at the cutoff. Triangular kernel function is used in the local linear estimation. The bandwidths are selected using the method of Calonico et al. (2014). Standard errors in the parentheses are obtained from bootstrapping 500 times. In addition to the overall effect using the full sample, there are subsample estimates by gender presented. *** p<0.01, ** p<0.05, * p<0.1.

Table 12: Two-Stage Least Squares Estimates: Interpersonal Relationship

			Trust in certain people				
	Social	Trust	Strangers	*laoxiang*	Family	Relatives	Government
	(1-5)	(0/1)	(1-5)	(1-5)	(1-5)	(1-5)	(1-5)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Full Sample	-0.291	-0.753**	-2.037**	-1.953**	-1.419**	-0.902	-2.007**
	(0.352)	(0.301)	(1.021)	(0.928)	(0.696)	(0.756)	(0.789)
Subsample: Female	-1.059***	-0.911**	-2.123	-3.146**	-0.972	-2.496**	-2.533**
	(0.407)	(0.459)	(1.614)	(1.461)	(0.858)	(1.153)	(1.096)
Subsample: Male	0.569	-0.987**	-0.964	-0.851	-0.955	0.641	-1.460
	(0.542)	(0.404)	(1.895)	(1.202)	(0.645)	(0.978)	(1.165)
Sample Mean	4.068	0.501	3.54	3.42	4.801	4.194	4.407
BW	49.103	53.216	77.261	54.023	45.078	78.629	54.432
N	524	390	1,149	779	604	1,167	794

Data source: CFPS 2010 and CGSS 2010.

Notes: Social is the self-assess score for social relationships and values 1 to 5 with 5 being the highest. Trust is an indicator equal to one if the respondent trust others in general and zero otherwise. Trust in certain people is a 1-5 score of how the respondent trust in the group of people, with 5 the highest trust level. Results in this table are the Wald ratios of the reduced-form estimates over the first-stage estimates based on local linear regressions at the cutoff. Triangular kernel function is used in the local linear estimation. The bandwidths are selected using the method of Calonico et al. (2014). Standard errors in the parentheses are obtained from bootstrapping 500 times. In addition to the overall effect using the full sample, there are subsample estimates by gender presented. *** p<0.01, ** p<0.05, * p<0.1.

Table 13: Two-Sample Two-Stage Least Squares Estimates (No Adjustment)

			Trust in certain people				
	Social	Trust	Strangers	*laoxiang*	Family	Relatives	Government
	(1-5)	(0/1)	(1-5)	(1-5)	(1-5)	(1-5)	(1-5)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Full Sample	-0.291	-0.753**	-1.873*	-1.924**	-0.935*	-0.765	-1.765**
	(0.352)	(0.301)	(1.055)	(0.928)	(0.549)	(0.711)	(0.740)
Subsample: Female	-1.059***	-0.911**	-2.123	-3.107**	-0.818	-2.360*	-2.387**
	(0.407)	(0.459)	(1.614)	(1.414)	(0.821)	(1.210)	(0.999)
Subsample: Male	0.569	-0.987**	-0.964	-0.774	-0.929	0.814	-1.122
	(0.542)	(0.404)	(1.895)	(1.051)	(0.737)	(0.975)	(1.178)
Sample Mean	4.068	0.501	3.54	3.42	4.801	4.194	4.407
BW	49.103	53.216	77.261	54.023	45.078	78.629	54.432
N	524	390	1,149	779	604	1,167	794

Data source: CFPS 2010 and CGSS 2010.

Notes: Social is the self-assess score for social relationships and values 1 to 5 with 5 being the highest. Trust is an indicator equal to one if the respondent trust others in general and zero otherwise. Trust in certain people is a 1-5 score of how the respondent trust in the group of people, with 5 the highest trust level. Results in this table are the Wald ratios of the reduced-form estimates over the first-stage estimates based on local linear regressions at the cutoff. Triangular kernel function is used in the local linear estimation. The bandwidths are selected using the method of Calonico et al. (2014). Standard errors in the parentheses are obtained from bootstrapping 500 times. In addition to the overall effect using the full sample, there are subsample estimates by gender presented. *** p<0.01, ** p<0.05, * p<0.1.

Table 14: Utility Trade-Off Ratio Between Trust and Income

	OLS		Ordered Probit	
	(1)	(2)	(3)	(4)
VARIABLES	SWB	SWB	SWB	SWB
Trust	0.109***	0.102***	0.110***	0.105***
	(0.013)	(0.013)	(0.013)	(0.013)
Income	0.073***	0.059***	0.076***	0.063***
	(0.006)	(0.006)	(0.006)	(0.006)
Covariates	No	No	Yes	Yes
Trade-Off Ratio	0.674	0.579	0.694	0.608
Observations	24,101	24,036	24,101	24,036

Data source: CFPS 2010 and 2014.

Notes:Trust is an indicator equal to one if the respondent trust others in general and zero otherwise. The unit of income is RMB 10,000. The trade-off ratio is the coefficient of Income over the coefficient of Trust. Standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

A Appendix

A.1 Socioeconomic Status

Sent-down individual's socioeconomic status may be affected in the long term due to the age discrimination in job searching and college entrance exam when they first returned to the city. One of the difficulty of examining the effect on the socioeconomic status of the sent-down individuals is that by the time of 2010 when the survey respondents were firstly interviewed, the earliest affected sent-down individuals are in their 60s. Most of them are retired, leaving a value of zero in the reported income. CPFS has adjusted the personal income and imputed for missing values in 2012 to be the weighted summation of after-tax wage, benefits in kind, earnings from all sources, pension payments, and fellowships (Yan and Xiaoyan, 2012). After the adjustment, personal income with a value of zero takes 21.63% of the survey sample. Alternatively, I examine the pension payments. I also check whether there are asymmetric likelihood of retirement or having a zero income across the age cutoff of my RD design.

The reduced-form results are shown in Table A.1. The four columns present the point estimates from local linear regressions of effects on the natural log of income[4], the proportion of being retired, the log of pension payments, and the proportion of having no income, respectively. Estimates in different rows are obtained using the full sample, or four subsamples by gender and by the sent-down status of their spouses.

[Table A.1 here]

The overall effect is inconclusive across all SES variables. Estimated effects on annual income is close to zero for the whole sample, and negative but insignificant for women. Positive and insignificant effects on the probability of having a zero income is also found on women. Negative estimates on the pension payments appears in the male-spouse-non-SDY subsample, while all other estimates are insignificant. These findings indicate that the female

[4]To deal with the value of zero, the log of income is transformed as ln(income+1).

sent-down individuals are more likely to have no sources of rewards by the time of the 2010 survey, given the same probability of being retired with the never-sent-down cohorts. The inference, however, is inconclusive due to statistical insignificance.

In a survey data, one of the common issue with the income variable as the measure of socioeconomic status is that people may misreport, or refuse to report their true incomes. This involves endogenous factors that can undermine the credibility of the results. To pursue complementary evidence, I investigate the education outcomes for both the respondents and their spouses, as another measure of their socioeconomic statuses. As shown in Table A.2, among the years of schooling, probability of having a college degree and plus, probability of finishing high school and less, and the corresponding measure of education for the spouse, none of the estimated effects is statistically significant.

[Table A.2 here]

To sum up, most of the estimated effects on the measures of socioeconomic status are not statistically significant. Having a higher probability of being sent down does not necessarily lead to a lower socioeconomic status. One of the explanation is the change of return to education during 1980-90s. Due to massive reform in state-owned enterprises (SOE) in 1990s, SOE job positions, the most competitive jobs in 1980s, became much less rewarding, while non-SOE jobs were more stable. Moreover, the RD design with the advantage to capture the reduced-form causal effect has limitation in disentangling the effect of being sent-down and the effect of being interrupted by the Cultural Revolution on the quality of education.

Table A.1: Income: Reduced-form Estimates

$I(C_i \geq C_0)$	Income (1)	Pension (2)	Zero Income (3)	Retired (4)
Full Sample	-0.928	-0.001	0.090	0.104
	(0.733)	(0.100)	(0.074)	(0.082)
Subsample: Female	-1.738*	0.100	0.174*	0.085
	(1.006)	(0.158)	(0.101)	(0.133)
Subsample: Male	-0.352	-0.064	0.030	0.069
	(1.041)	(0.134)	(0.104)	(0.100)
Sample Mean	6.141	7.492	0.328	0.752
BW	68.762	38.82	73.186	39.771
N	724	269	801	319

Data source: CFPS 2010 and 2014.

Notes: $I(C_i \geq C_0)$ is an indicator with a value of one if the running variable (birth month) is greater or equal to the cutoff C_0 and zero otherwise. Income is the log form of income. Pension is the log form of monthly pension payment. Zero Income is an indicator equal to one if the respondent reports no income and zero otherwise. Retired is an indicator being one if retired and zero otherwise. Results in this table are from local linear regression at the cutoff. Triangular kernel function is used in the local linear estimation. The bandwidth is selected using the method of Calonico et al. (2014). Standard errors are in the parentheses. In addition to the overall effect using the full sample, there are six subsample estimates presented: female, male, female with a never-sent-down spouse, female with a sent-down spouse, male with a never-sent-down spouse, and male with a sent-down spouse. I use "–" to indicate that there are too fewer observations to generate estimates. *** p<0.01, ** p<0.05, * p<0.1.

Table A.2: Education: Reduced-form Estimates

$I(C_i \geq C_0)$	Yr Schooling (1)	College+ (2)	HS- (3)	Spouse Yr Schooling (4)	Spouse College+ (5)	Spouse HS- (6)
Full Sample	1.112	-0.004	-0.051	0.187	0.023	0.075
	(0.794)	(0.030)	(0.0815)	(0.791)	(0.036)	(0.078)
Subsample: Female	1.102	0	0.034	0.313	0.043	-0.002
	(1.188)	(0.040)	(0.110)	(1.249)	(0.067)	(0.112)
Subsample: Male	0.693	-0.019	-0.093	0.176	-0.007	0.136
	(1.050)	(0.038)	(0.119)	(1.011)	(0.023)	(0.109)
Sample Mean	8.387	0.039	0.635	8.873	0.032	0.534
BW	60.248	47.425	55.686	63.435	68.4	64.81
N	648	527	606	606	741	703

Data source: CFPS 2010.

Notes:$I(C_i \geq C_0)$ is an indicator with a value of one if the running variable (birth month) is greater or equal to the cutoff C_0 and zero otherwise. Yr schooling is the self-reported years of schooling completed by the respondent. College+ (HS-) is an indicator equal to one if the respondent finished college or more (if the respondent only finished high school or less) and zero otherwise. the latter three columns represent the corresponding measures of education for the current spouse. Results in this table are from local linear regression at the cutoff. Triangular kernel function is used in the local linear estimation. The bandwidth is selected using the method of Calonico et al. (2014). Standard errors are in the parentheses. In addition to the overall effect using the full sample, there are six subsample estimates presented: female, male, female with a never-sent-down spouse, female with a sent-down spouse, male with a never-sent-down spouse, and male with a sent-down spouse. I use "–" to indicate that there are too fewer observations to generate estimates. *** p<0.01, ** p<0.05, * p<0.1.