

**Children of the Chinese Cultural Revolution: Disrupted  
Education, Send-Down Experiences, and Subsequent  
Health**

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# Dedication

To my parents, Keliang Fan and Liya Li, whose experiences during the Cultural Revolution inspired my interest in this event and who have taught me all the precious things that matter.

## Abstract

The relationships between early-life adversity, educational attainment, and subsequent health have been the focus of much sociological research. Questions remain, however, regarding whether and under what conditions one can recover from initial disadvantages, why education is persistently associated with health, and to what extent selection and turning points account for the long-arm of early-life adversities. This dissertation sheds light on these questions by examining children of the Chinese Cultural Revolution (CR), who came of age during the turbulent decade of the Cultural Revolution (1966-76), when colleges were closed, school quality deteriorated, the state intervened to sever the intergenerational transmission of educational advantage, and approximately 17 million urban youth—mostly secondary school graduates—were sent to rural areas to do manual labor. First, I use the *2003 Chinese General Social Survey* to show that life courses are not set early in life; members of the CR cohort compensate for their initial educational loss by returning to school at later ages at a rate much higher than adjacent cohorts. Parental education matters more for members of the CR cohort in facilitating school reentry, reflecting the early-life discrimination of high-status families during the Cultural Revolution. Party members are more apt to return, suggesting party-sponsored patronage, and their advantages are most pronounced among members of the CR and post-CR cohorts. Next, using the Cultural Revolution as a natural experiment and the unique Chinese institutional arrangements as a single-party state society, I construct two tests to assess three theoretical perspectives dominant in the education-health literature: spurious correlation, human capital, and fundamental cause theory. Drawing on the *1994 State and Life Chances in Urban China Survey*, the *2002 Chinese Household Income Project*, and the *2010 China Family Panel Studies*, both tests provide strong support for but also complicate fundamental cause theory, showing that access to resources is the key underlying the educational gradient in health, while suggesting the specific form could differ across societies. Lastly, based on life history data collected from the *1994 State and Life Chances in Urban China Survey*, I investigate midlife consequences of the rustication (“sent down”) experience. Duration of time spent in rural areas and cohort membership combine to shape midlife health, with health disadvantage mostly

borne by members of the trailing-edge CR cohort who lived in rural areas for longer than 5 years. Results from propensity score analysis indicate a selection process; the rustication policy became less severely implemented later (1972-1976) in the Cultural Revolution, hence those who were sent to rural areas and stayed there for a long time from the trailing-edge CR cohort were disadvantaged in many other ways, accounting for their poorer subsequent health. Taken together, this dissertation highlights the roles of the state, institutional arrangements, and historical timing in the shaping of educational attainment, as well as the relationships between early-life adversity, education, and health.



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# Chapter 1

## Introduction and Overview

Decades of sociological research on health have uncovered the following two themes (see Figure 1.1):

[Figure 1.1 about here]

First, education brings strong health benefits (Arrow 2 of Figure 1.1). Better educated persons report higher levels of health, suffer fewer diseases, and die at older ages (Adler et al., 1994; Deaton and Paxson, 2001; Elo and Preston, 1996; Kitagawa and Hauser, 1973; Link and Phelan, 1995; Meara et al., 2008; Mirowsky and Ross, 2003). Indeed, the relationship between educational attainment and health is one of the strongest links in social sciences. There exists a large body of evidence supporting that education is consequential in structuring inequality in health over the life course across time and place (e.g., Adler et al., 1994; Deaton and Paxson, 2001; Elo and Preston, 1996; Kitagawa and Hauser, 1973; Link and Phelan, 1995; Meara et al., 2008; Mirowsky and Ross, 2003; Warren, 2009). While the major causes of mortality have changed from infectious disease to chronic conditions, for example, educational disparities in health have either persisted or increased (Lauderdale, 2001; Link and Phelan, 1995; Lynch, 2003; Pappas et al., 1993). The more educated are more likely to live longer, not just in the United States, but also in Britain (Marmot et al., 1991), Denmark (Arendt, 2005), Israel (Manor et al., 2000), Sweden (Torssander and Erikson, 2010) and other Western and Eastern European countries (Shkolnikov et al., 1998). The powerful role of education in determining health-related outcomes in the United States and other Western countries has motivated some scholars to refer to education as a “fundamental cause”

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(Link and Phelan, 1995) or “root cause” (Mirowsky and Ross, 2003, 31) of health.

Second, early-life adversities have unfavorable consequences for subsequent health (Arrow 4 of Figure 1.1). Researchers have increasingly adopted a life-course perspective realizing that adult health is the long-term outcome of a range of childhood conditions and experiences (Ben-Shlomo and Kuh, 2002; Blackwell et al., 2001; Elo and Preston, 1992; Hayward and Gorman, 2004; Preston et al., 1998). A number of early life conditions—exposure to adverse conditions *in utero*, nutritional deficits, poverty, and stressful family conditions—have been shown to have far-reaching associations with mortality and a range of chronic conditions such as glucose intolerance, dyslipidemia, hypertension, and cardiovascular disease in adulthood (Barker, 1998; Ben-Shlomo and Kuh, 2002; Blackwell et al., 2001; Elo and Preston, 1992; Hayward and Gorman, 2004; Roseboom et al., 2000; Stanner et al., 1997). In terms of how these adverse childhood circumstances extend their long arms, Preston et al. (1998) summarize four ways: (1) directly and negatively (e.g., a physiological “scarring” effect), (2) directly and positively (an acquired immunity effect), (3) indirectly and negatively (cumulative advantage and disadvantage), and (4) indirectly and positively (a selection process in which children in adverse circumstances “escape” because they are unusually robust and hence survive to older ages). Among the four, an “indirect and negative” explanation has been bolstered by much empirical research (e.g., Hayward and Gorman, 2004; Lundberg, 1993; O’Rand and Hamil-Luker, 2005; Preston et al., 1998).

## 1.1 Children of the Cultural Revolution

Guided by these two themes, this dissertation examines a Chinese cohort whose opportunity to receive an on-time higher education was lost, with many sent to rural areas—where living conditions were harsh—when they graduated from high school. This cohort was created by the Chinese Cultural Revolution (1966-76), a major state initiative to reverse the traditional social hierarchy by penalizing intellectuals (Bernstein, 1977; Davis, 1992; Deng and Treiman, 1997; Esherick et al., 2006; Pepper, 1991; Tsou, 1999; Unger, 1982; Zhou et al., 1996), for example, not letting their children go to college and even sending them and their children to work in the countryside. This exogenous and sudden system change fundamentally altered the life trajectories of a



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whole cohort who moved into adolescence and early adulthood (turned age 19) during that period, now constituting approximately 15% of the Chinese urban population (as of 2015 ages 58 to 68).

“Rarely are changes so localized in either age or time that their burden falls exclusively on the shoulders of one cohort,” said [Ryder \(1965, 847\)](#). The Cultural Revolution cohort, however, seems to fit exactly into that category. First, their opportunities for obtaining a college diploma were lost because the educational system in urban China came to a halt during the decade-long Cultural Revolution, with colleges ceasing normal recruitment for up to ten years ([Deng and Treiman, 1997](#); [Pepper, 1991](#); [Unger, 1980, 1982](#); [Zhou et al., 1998](#)). Second, children of this cohort from high SES families experienced a prolonged assault due to the top leaders’ inherent skepticism towards intellectuals, and as such, the society was stood on its head, with the better educated being the least advantaged social group in terms of their social status and life chances ([Davis, 1992](#); [Deng and Treiman, 1997](#); [Zhou et al., 1998](#)). Third, approximately 17 million urban youth from this cohort (about a third) were sent to rural areas to “learn from the peasants;” most of them returned home eventually, but many did so only after a period of up to ten years ([Bernstein, 1977](#); [Bonnin and Horko, 2013](#); [Zhou and Hou, 1999](#)).

The gloomy life chances of the Cultural Revolution cohort have been the focus of several scholarly investigations ([Chen, 1999](#); [Davis, 1992](#); [Davis-Friedmann, 1985](#); [Deng and Treiman, 1997](#); [Hung and Chiu, 2003](#); [Lin, 2013](#); [Pepper, 1991](#); [Qian and Hodson, 2011](#); [Unger, 1980, 1982](#); [Xie et al., 2008](#); [Zang, 2000](#); [Zhou and Hou, 1999](#)), but this body of research has focused exclusively on socioeconomic outcomes such as education, employment, and earnings. No study has attempted to systematically examine the long-run impacts on an important well-being component—health—for adults who as children grew up during the Cultural Revolution. Given the well-established relationships between education, early-life adversities, and health in the existing literature, there are strong theoretical reasons to expect worse adult health for this cohort, because of their interrupted education and youth time spent in rural areas doing manual labor. But is that actually the pattern in the empirical data?

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## 1.2 The Puzzle

I find members of the Cultural Revolution cohort do not fare worse in health as older adults compared with adjacent cohorts (coming both before and after them). As can be seen in Figure 1.2, net of the aging effect that reflects a biological process, mortality and self-reported health exhibit little fluctuation from the pre-Cultural Revolution cohort to the Cultural Revolution cohort and on to the post-Cultural Revolution cohort. Age-adjusted models show similar results; differences in the cohort coefficients never reach statistical significance in those models.

[Figure 1.2 about here]

How to account for this inconsistency between theoretical expectations and empirical findings? Drawing on data collected from the *1994 State and Life Chances in Urban China Survey*, the *2002 Chinese Household Income Project*, the *2003 Chinese General Social Survey*, and the *2010 China Family Panel Studies*, my three analytic chapters offer detailed accounts with the overarching goal to understand why the Cultural Revolution did not translate into poorer health for individuals who came of age during that tumultuous decade.

## 1.3 Chapter Overviews

*Chapter 2: Education Delayed but Not Denied: The Chinese Cultural Revolution Cohort Returning to School*

This chapter targets Arrow 1 in Figure 1.1 by asking: are individuals' life courses "set" early in life and continue relatively unaffected by external conditions and contexts? Or are individuals able to somehow reverse early adversities when they have opportunities to do so? What characteristics—in terms of social origins, structural locations, and life histories—differentiate those who return to school and those who do not? The unique life experiences of the Cultural Revolution cohort offer an ideal setting to address life course assumptions about the role of early disadvantage and individual agency. Previous studies have shown considerable educational loss of those who were high-school or college age during the Cultural Revolution (e.g., Deng and Treiman, 1997; Pepper, 1991; Unger, 1980, 1982). This chapter examines the undoing of educational loss when coming of age during China's Cultural Revolution by returning to college at later ages.

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Drawing on life-history data with detailed measures of educational experience, I consider the differential rates of returning to school at a later point in time across cohorts, as well as how cohort membership conditions predictors of a return to school.

My analysis shows that, in the aftermath of the extraordinary and pervasive school disruption during the Cultural Revolution, individuals compensate for their initial disadvantages by returning to college when there are institutional opportunities (the surge of adult education since the 1980s and party-sponsored patronage) permitting them to do so. The odds of returning are higher among members of the Cultural Revolution cohort than those of adjacent cohorts; the actual human capital loss due to the Cultural Revolution, therefore, is less severe when returning to school is taken into account. Further, those from intellectual families and those who are party members are particularly apt to return if they are members of the Cultural Revolution cohort, indicating that past experience and age-sensitive state policies, as denoted by cohort membership, shape the interplay between structural constraints and human agency.

*Chapter 3: Long-term Effects of A Large Shock? The Chinese Cultural Revolution, College Attainment, and Health*

This chapter targets Arrow 2 in Figure 1.1 by confronting a widely-held claim in health studies that higher education universally promotes better health (Adler et al., 1994; Deaton and Paxson, 2001; Elo and Preston, 1996; Kitagawa and Hauser, 1973; Link and Phelan, 1995; Meara et al., 2008; Mirowsky and Ross, 2003). This chapter asks: what is the relationship between educational attainment and health in China, and how does the answer shed light on the three dominant theoretical perspectives (i.e., spurious correlation, human capital theory, fundamental cause theory) regarding this question? The education-health literature draws on evidence primarily from developed countries in relatively stable times. By contrast, I consider the relationship between education and health within specific historical and institutional circumstances in a non-Western setting.

Using the Cultural Revolution as a natural experiment and China as a strategic research site with distinct institutional arrangements sheds light on *why* education matters for health. Recall the three dominant theoretical perspectives offered to account for the robust relationship between education and health are: spurious correlation (a third variable predicts both education and health), human capital (knowledge and skills

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learned in school are key), and fundamental cause theory (access to a wide range of flexible resources is vital). As pointed out in the existing literature, it is difficult to empirically distinguish among these three explanations.

I construct two tests to assess these three theoretical perspectives. The first test exploits the natural experiment of the Chinese Cultural Revolution when colleges were closed, school quality deteriorated, and the state intervened to sever the intergenerational transmission of educational advantage, creating a cohort with distinct educational experiences as compared to adjacent cohorts. The second test draws on the unique Chinese institutional arrangement as a single-party state that provides different levels of resources to its elite members, to compare health differences between two elite groups: elites because of their higher education, and elites with both a higher education and communist party membership. Using three cross-sectional waves of survey data eight years apart over a span of almost 20 years (1994-2010), both tests support but also complicate fundamental cause theory, revealing that institutional arrangements that shape access to resources are important parameters for understanding the powerful link between education and health.

*Chapter 4: Turning Point or Selection? Rustication (Sent-Down) and Midlife Health of Chinese Cultural Revolution Cohort*

Chapter 4 targets Arrows 3 and 4 in Figure 1.1, examining whether and how early-life adversities translate into health assessed later in life (at 37-47). It does so by unraveling the rustication policy, otherwise known as the “up to the mountains and down to the villages” or the send-down movement that sent children (“the rusticates”) in their late teens and early twenties to the countryside. How did this large-scale social dislocation translate into health later in life? There are multiple possibilities. First, it was not a random but deeply stratified and changing process governing who was pulled to rural areas (Bonnin and Horko, 2013; Qian and Hodson, 2011; Xie et al., 2008; Zhou and Hou, 1999). Given the dominant ideology during the initial stage of the Cultural Revolution (1966-71), children born into advantaged families (parents being intellectuals or cadres) and children with better education (middle or high school as opposed to primary school) were more likely to be sent to rural areas. But the later stage of the Cultural Revolution (1972-76) was characterized as one of resumption of cadre power and return to pre-CR social order. The composition of those who were uprooted, therefore, could differ

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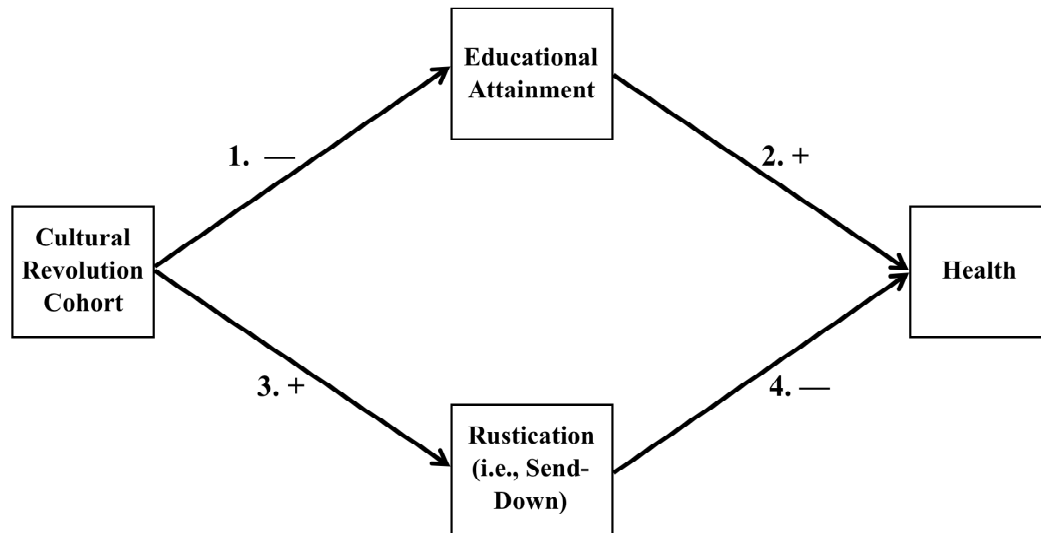
depending on when individuals were sent. Second, the actual “journeys” taken by the rusticates might matter (Elder, 2003). Living conditions in rural China were harder than in urban areas: housing was inferior by urban standards, and employment was largely limited to labor intensive agriculture. On the other hand, given the accentuated role of personality and agency in difficult environments, the rusticates might have been forced to become more adaptive in order to acquire the skills necessary to their survival, which might promote subsequent health later in their life course. Third, the rustication experience possibly permeates into midlife health through its influences on life chances outcomes when the youth returned to their home cities. The days spent in rural areas likely delayed and hurt their entire social lives later on: marriage, family, and jobs (Chen, 1999; Hung and Chiu, 2003; Qian and Hodson, 2011; Zhou and Hou, 1999), which may have had health consequences.

Through mapping midlife health with individual characteristics prior to rustication, their experiences in rural areas, and their life chances subsequent to home return, my findings reveal two important patterns. First, it is not whether one was sent to rural areas—but how long one stayed there—that predicts midlife health, and this association is dependent on cohort membership. Members of the trailing-edge Cultural Revolution cohort who stayed in rural arrears for longer than 5 years are the biggest losers in terms of health outcomes. Second, using propensity score matching, it turns out that this group’s health disadvantage reflects a selection process at least. That is, it is unobserved disadvantages that sent this group to rural areas and prevented them from returning to cities early on that led to their poorer health. By contrast, what happened during and following the rustication journey explained little variation in health.

## 1.4 Significance

My dissertation makes important contributions to the field of medical sociology and life course studies. It adds to the lively debate regarding why education matters for health by examining a country with distinct institutional arrangements and which underwent one of the largest social experiments (Cultural Revolution) in human history. By doing so, it sheds new light on the importance of institutional arrangements and the historical period within which educational attainment is embedded in shaping health outcomes.

Through three separate sets of analysis, this dissertation also provides a rich empirical account of the interplay between structural constraints, selection, and human agency, illustrating how individuals bring their biographical pasts as resources and constraints but also opportunities for the shaping of their life courses. Taken as a whole, this dissertation provides a much-needed contribution to health research and ongoing sociological debates regarding the ties linking family background, education, health, and the life course.



*Notes:* 1. Arrow 1: For members of the Cultural Revolution cohort, their opportunities for obtaining a college diploma were lost because the educational system in urban China came to a halt during the decade-long Cultural Revolution, with colleges ceasing normal recruitment for up to ten years (Davis-Friedmann 1985; Davis 1992; Deng and Treiman 1997; Pepper 1991; Unger 1980; 1982; Zhou, Moen, and Tuma 1998).

2. Arrow 2: A large body of evidence supports that education is consequential in structuring inequality in health over the life course across time and places (e.g., Adler et al. 1994; Deaton and Paxson 2001; Elo and Preston 1996; Kitagawa and Hauser 1973; Link and Phelan 1995; Meara, Richards, and Cutler 2008, Mirowsky and Ross 2003).

3. Arrow 3: Approximately 17 million urban youth from the Cultural Revolution cohort (about a third) were sent to rural areas to “learn from the peasants;” most of them returned home eventually, but many did so only after a period of up to ten years (Bernstein 1977; Bonnin 2013; Zhou and Hou 1999).

4. Arrow 4: Although no study has examined long-term health consequences of the rustication experience, previous literature has provided ample guidance. In particular, early-life adversities--a range of childhood conditions and experiences--have been shown to have unfavorable consequences for subsequent health (Ben-Shlomo and Kuh 2002; Blackwell, Hayward, and Crimmins 2001; Elo and Preston 1992; Hayward and Gorman 2004; Preston, Hill, and Drenstedt 1998).

Figure 1.1: Analytic Framework

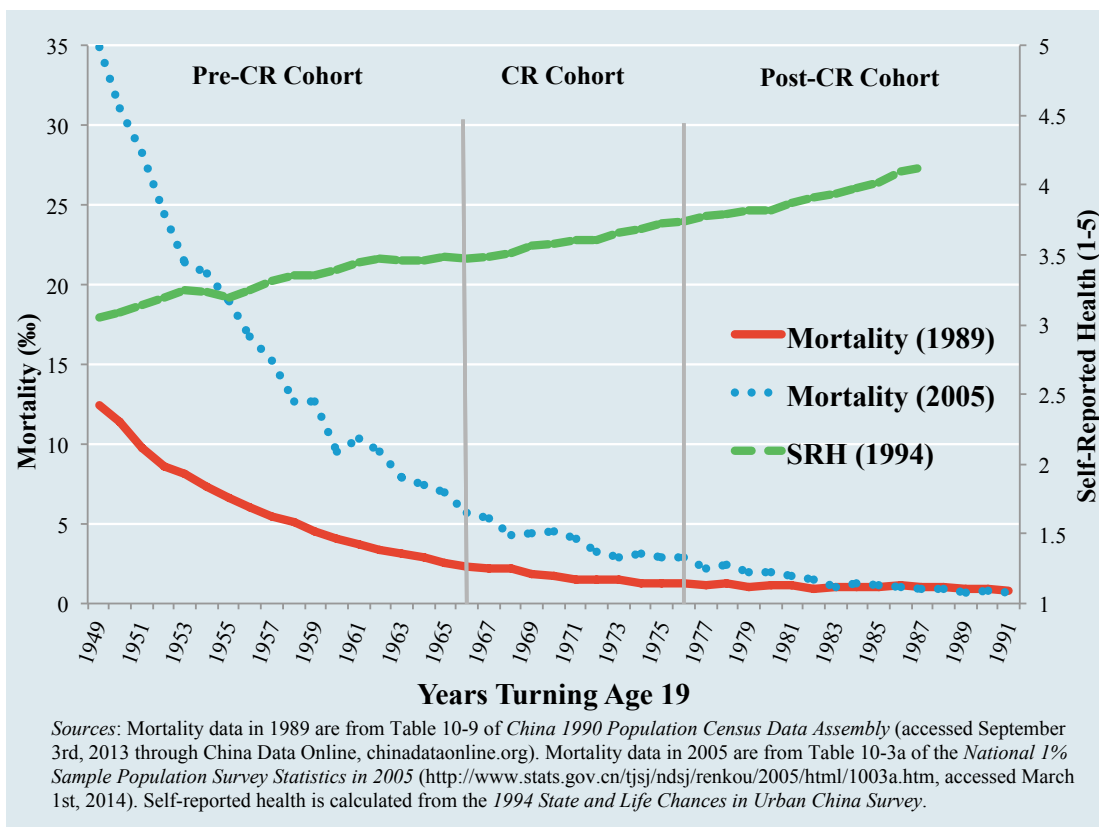


Figure 1.2: Mortality in 1989 and 2005 (Left Axis) and Self-Reported Health in 1994 (Right Axis) by Cohort



## Chapter 2

# Education Delayed but Not Denied: The Chinese Cultural Revolution Cohort Returning to School

### Abstract

Previous studies have shown the disruptive effect of the Chinese Cultural Revolution (1966-76, CR) on the educational attainment of the Culture Revolution cohort—who came of age during that turbulent decade—due to college closings. What is less known is whether this cohort compensates for their initial educational destruction by returning to school at later ages. Drawing on detailed life history data collected from the *2003 Chinese General Social Survey* of three Chinese cohorts who turned age 19 in different historical periods (pre-CR, CR, and post-CR cohort), this paper investigates to what extent cohort membership is directly associated with returning to school and moderates the effects of gender, social origins, and political credentials in returning to school. Cox proportional hazards models show that members of the CR cohort are considerably more likely to return to school from their late 20s on compared with adjacent cohorts, thereby narrowing but not closing their educational gap. Women are less likely to return compared with men regardless of cohort membership. Parental education does

not predict college reentry rates for members of the pre- and post-CR cohort, but does for members of the Cultural Revolution cohort, reflecting their early-life discrimination during the Cultural Revolution and their regained resources following it. Party members are more apt to return, suggesting party-sponsored patronage, and their advantages are most pronounced among members of the CR and post-CR cohorts. Taken together, this study highlights the roles of the state and historical timing in the shaping of decisions around returning to school.

## 2.1 Introduction

Schooling decisions made in later life tend to be overlooked in conventional studies of educational attainment. Classic human capital theory predicts that individuals make schooling investments as early as possible to minimize opportunity costs and to recoup their educational investment over a longer period of time (Becker, 1970). The status attainment theoretical framework focuses on education attained before adulthood (Blau and Duncan, 1967; Bourdieu and Passeron, 1977; Coleman, 1988; Featherman and Hauser, 1978). Whether social origins continue to influence education obtained later in adulthood has been less studied (Elman and O’Rand, 2007).

However, life course scholars frequently view a return to school as a transition located within the context of linked individual, family, and occupation pathways. This focus on individual biographies, nevertheless, does not capture the roles of historical timing and the state (for notable exceptions, see Bradburn et al., 1995; Elder, 1987).

Situated in the context of China, this paper examines returning to school among members of three Chinese cohorts who had different early-life educational experiences due to rapidly shifting state policies. During China’s Cultural Revolution (1966-76), national college entrance examinations ceased to be held from 1966 to 1971. When colleges began extremely restricted recruitment in 1972, only those of working-class origins were favored (Pepper, 1991; Unger, 1982). The Cultural Revolution (1966-76) thus created a cohort who moved into adolescence and early adulthood (i.e., turned age 19) during a decade when the chance to receive a higher education was severely reduced and when conventional social stratification mechanisms were upended (Davis, 1992; Deng and Treiman, 1997; Giles et al., 2008; Meng et al., 2007; Unger, 1982;

Zhou et al., 1998, 1996). By comparison, those who came of age before and after the Cultural Revolution, the pre-CR and post-CR cohort, were not subject to such a state intervention that deliberately demolished early-life advantages conferred by families; they were largely able to climb the educational ladder on time.

Given the unique early-life experience of this Cultural Revolution cohort (born 1947-1957, ages 9-19 in 1966), a set of theoretically interesting questions follows. First, in the aftermath of schooling disruption at conventional ages, do individuals take subsequent actions to make up for their educational losses? Although some studies have examined returns to school of those who were once sent to rural areas (Bonnin and Horko, 2013; Deng and Treiman, 1997; Xie et al., 2008; Zhou and Hou, 1999), that episode of returning occurred before the early 1980s, when the Chinese adult education system had yet to enjoy full-fledged growth. Further, no study has made between-cohort comparisons to assess the differential magnitudes of returning to college *across cohorts*. This paper is the first to systematically examine whether the CR cohort narrowed or even closed its educational gap relative to adjacent cohorts in the years following the Cultural Revolution.

The second research question asks: Do social origins, gender, and party membership predict returning to school, and are these relationships contingent on cohort membership? First, cohort membership captures differential early-life experiences due to state interventions. Unlike what is typically observed (patterns of educational stratification evident by the early 20s), members of the CR cohort began their early adulthood with considerable homogeneity in educational levels, due to the massive state intervention. Deng and Treiman (1997) showed that the association between father's socioeconomic status and son's educational attainment was dramatically weakened for the CR cohort (using the 1982 census, when they were ages 21-34). Gender inequality in education is also found to be smallest for this cohort (Hannum and Xie, 1994). But that is not the end of the story. The state intervention to eliminate educational inequality might have been successful at first when members of the CR cohort were in early adulthood, but educational inequality within this cohort could intensify and gradually become comparable to that found in other cohorts in later life stages. Second, cohort membership is characterized by individuals being in different life stages when age-sensitive policies are implemented. With its shifting focus modernizing China after the Cultural Revolution,

the state aimed to build a young and highly educated workforce. One way to achieve this goal was to send its less-educated protégés back to college to credential them (Dickson, 2014; Dickson and Rublee, 2000; Heilmann and Kirchberger, 2010; Li and Walder, 2001). To what extent different cohorts were affected by this policy, however, has not been quantitatively evaluated.

In sum, guided by a life course perspective, this paper examines the rates of returning to school by members of three Chinese cohorts who were at different life stages during the decade-long Chinese Cultural Revolution (1966-76) and the subsequent economic reform era. Doing so makes a number of contributions. First, this study emphasizes the possibility of human agency and state sponsorship in undoing the harm of large-scale social disruptions. This is encouraging from a policy perspective, especially for societies that have undergone drastic social interruptions. Second, it demonstrates that the ability to catch up is not evenly distributed across social groups. The resurgence of the role of social origins in educational attainment—even after a decade of deliberate state intervention to eliminate intergenerational transmission of educational advantage—speaks to the power of social stratification that is strongly entrenched and difficult to change. Third, along the tradition of using cohort to assess macro-to-micro links (Mayer and Schoepflin, 1989; Ryder, 1965), this study examines the dynamic interplay of individual lives and institutions over time, providing concreteness to the importance of historical timing for educational attainment and collective biographies of cohorts in the decisions around school reentry. Finally, the results regarding predictors of school reentry are important for policy development in light of the burgeoning adult education initiative in China over the last few decades (Lai, 2014).

## 2.2 Return-to-School: a Life-Course Framing

Two principles from the life course tradition are key to the research reported here. First, historical timing, captured by cohort membership, figures dominantly in life decisions, including around returning to school. A case in point: The generous educational benefits provided by the G.I. Bill after World War II led to unprecedented levels of re-enrollment in post-secondary education by men who served in the armed forces (Elder,

1987; Marcus, 1986; Nam, 1964; Sampson and Laub, 1996). A parallel pattern was observed for U.S. women born 1923-33, whose rates of returning to school were about four times that of women in the 1905-16 cohort (Bradburn et al., 1995), possibly motivated by changing values and aspirations resulting from the women's movement (Bradburn et al., 1995; Levin and Levin, 1991). There is reason to expect, therefore, that members of the Cultural Revolution cohort compensate for their collective early-life adversity by returning to school later in life.

Second, the state sets key parameters that shape the decision to return to school. Previous studies of the Western experience typically focus on individual life events: how being a student places extra burdens on adults (Sweet and Moen, 2007), or how "life-context motivators" (Kasworm, 2003, 6) such as youngest child entering school may facilitate going back to school (Hostetler et al., 2006; Sweet and Moen, 2007). But opportunities, incentives, and constraints around returning to school may well differ in countries with distinct institutional arrangements. In particular, the state may play a fundamental role in such decisions in China. After the Communist takeover in 1949, the state and the Chinese Communist Party exercised control over society. As will be discussed, the state affected the opportunity structure of returning to school through its shifting educational policies. The specific avenues for adult education also permit the state to direct these opportunities preferentially to its protégés. The state also changes relative incentives to return to school across social groups through policies favoring one group over another. Understanding these variations sheds light on how the state produces different life chances for its members at particular junctures of the biographical life course and history.

## 2.3 Unraveling Return-to-School in China

### 2.3.1 Historical background

The institution of adult higher education experienced remarkable evolutions in China. Immediately after its establishment in 1949, Communist China created a dual-education system (borrowing from the Soviet Union) operated under different divisions of the Ministry of Education (Kasworm, 1993; Lai, 2014). The "regular" system recruits graduating high school students through entrance examinations whereas the "adult" system

offers programs for out-of-school adult learners. Prior to the Cultural Revolution, the adult education system focused on remedial basic education provision, for example, “schools for accelerated education of workers and peasants” that gave priority to adults of working-class and peasant backgrounds (Deng and Treiman, 1997). When the Cultural Revolution began in 1966, regular college education based on examinations was put to an end. From 1972 until the end of the Cultural Revolution in 1976, colleges reopened but entrants were selected exclusively from peasants, workers, and soldiers, rather than high-school graduates (Bernstein, 1977; Shirk, 1979; Unger, 1982). Consequently, a large majority of youth were denied the opportunity of receiving higher education during the Cultural Revolution (Chen, 1999; Davis, 1992; Davis-Friedmann, 1985; Deng and Treiman, 1997; Meng and Gregory, 2002; Unger, 1982).

After the Cultural Revolution, regular college admission based on academic merits resumed from 1977 on. The years 1977-1978 were a period of transition when age limits for regular college attendance was relaxed to age 30 (Bonnin and Horko, 2013; Lai, 2014). The competition was fierce. In those two years, out of 11.8 million candidates, merely 680,000 people passed the examination, yielding an admission rate of 5.7% (Liu, 2008, 481-483). Most members of the Cultural Revolution cohort were not able to enter regular college even with the relaxed age limits. From 1979 on, an age limit of 25 was imposed, cutting most members of the Cultural Revolution cohort out of the competition for retraining (Bonnin and Horko, 2013; Davis-Friedmann, 1985).

The expansion of adult higher education in the 1980s provided a second chance to go back to school. Between 1978 and 1998, enrollment in the adult sector grew from 1.4 million to 2.8 million, at an annual rate of 3.5 percent. Associate (junior) colleges and other types of non-regular college programs (e.g., correspondence, television, and night colleges) mushroomed, dramatically opening the doors to higher education. These schools were in general more conveniently located, allowed more flexible scheduling of courses, and included a variety of forms such as radio and television broadcasts and evening classes, encouraging many adults to make decisions to go back to school. Credentials earned through adult education were officially treated as equivalent to those earned through the regular schooling system (Ministry of Education, 1984).

In addition to the expanding opportunity structure, the incentive structure for higher education also changed fundamentally. Education was a dubious resource throughout

much of Communist China's history, peaking during the Cultural Revolution when a higher education was conceived as a liability (Deng and Treiman, 1997; Unger, 1982; Zhou, 2010). This situation changed from the 1980s on, as China entered a period of reform from a planned to a market economy. Education became increasingly important in determining labor market outcomes such as employment and wages in the private sector. The state also responded by attaching more importance to human capital in career progression (Zhao and Zhou, 2002); a college diploma, for example, has been required as the main condition for promotion in government posts since 1983 (Zhu, 1994, 241-246). With the rising importance of education, adult education became a vehicle purposefully adopted by individuals to adapt to the rapid changes in the economy. The state and the Party also increasingly sponsored party members and cadres (governmental officials) for college-level education in order to satisfy the credentials required for state jobs (for sponsored mobility, see Li and Walder, 2001).

### 2.3.2 Cohort Variations

Returning to school in China has received scant attention in the literature. Only Lai (2014) has quantitatively investigated determinants of college reentry, but his analysis did not focus on cohort variations. Li and Walder (2001) studied career consequences—not antecedents—of returning to school. Given the unique experience of the Cultural Revolution cohort, some scholars examined how those who were sent to rural areas during the Cultural Revolution returned to school after they went back to their home cities (Bonnin and Horko, 2013; Deng and Treiman, 1997; Unger, 1982; Xie et al., 2008; Zhou and Hou, 1999). But these are essentially *intra-cohort* investigations, e.g., were those sent to rural areas more likely to return to college compared with their peers who stayed in cities? What my study aims to discover is whether there are any *inter-cohort* differences.

Specifically, I compare the rates of returning to college for members of three cohorts created based on the historical periods when they turned age 19, the typical age of entering college (see Figure 2.1): the *Pre-CR cohort* (born 1930-46, aged 20-36 in 1966), the *Cultural Revolution cohort* (born 1947-57, aged 9-19 in 1966), and the *Post-CR cohort* (born 1958-72, younger than 9 in 1966). I hypothesize that members of the Cultural

Revolution cohort should be most likely to return, given their distinctive collective biographies cutting their education short, as well as their life stages when the opportunity and incentive structures changed to encourage returning to school.

[Figure 2.1 about here]

These three cohorts were exposed to China’s expansion of adult higher education and intensification of credentialing at different life stages. Given that individuals are increasingly less likely to go back to school as they age (Elman and O’Rand, 2007; Felmlee, 1988; Hostetler et al., 2006; Jepsen and Montgomery, 2012; Light, 1995; Taniguchi and Kaufman, 2007), more recent cohorts should be generally more likely to enroll in a given historical period. However, collective life histories also matter. Unlike their counterparts in other cohorts who were able to move up the educational ladder in a regular fashion, a considerable proportion of the Cultural Revolution cohort did not have the opportunity to achieve their desired educational level at “typical” ages. Therefore, they are more likely to compensate for this initial loss by returning to college at older ages.

*Hypothesis 1: Members of the Cultural Revolution cohort were more likely to return to college, compared with those from the pre-CR and the post-CR cohort.*

### 2.3.3 Cohort Variations by Class, Gender, and Party Membership

Do social origins continue to influence education in adulthood? Studies conducted in the West suggest that, although the absence of financial resources may lead adults from lower classes to delay their education, it is advantaged socioeconomic background that promotes returning to school (Elman and O’Rand, 2007; Griliches, 1980; Jacob and Weiss, 2011; Light, 1995; Marcus, 1986; Taniguchi and Kaufman, 2007). For example, Elman and O’Rand (2007) showed that each additional unit of father’s prestige increases women’s odds of school reentry by 0.8% and men’s odds by 1.1%, for those ages 29-61. Cohort may be an important moderator, however; as shown by Elder and Hareven (1994), military recruits in the 1940s from disadvantaged backgrounds were uniquely positioned to take advantage of the G.I. Bill to return to school.

Social origins loom large in assessing school reentry in China, a country where regular college enrollment was far from typical until quite recently. In general, children born into better-educated families should be more apt to return to school for two reasons.



First, children from these families have higher educational aspirations, and any mismatch between their high aspirations and low educational achievements may provide the impetus to return for a college degree (e.g., Breen and Goldthorpe, 1997). Second, members of this advantaged group are more likely to receive resources from their families—financial and social, as well as higher levels of encouragement. Further, this social origin difference should be even more pronounced for the Cultural Revolution cohort. Children from intellectual families have been shown to be the greatest losers of the Cultural Revolution due to the biased educational policies during the decade (Broaded, 1983; Deng and Treiman, 1997; Giles et al., 2008; Zhou et al., 1998); they would logically seek to complete their educations.

*Hypothesis 2:*

*2a: Children from better-educated families are more likely to return to college than those from less advantaged families.*

*2b: Children in the Cultural Revolution cohort from better-educated families are more likely to return to college, compared with their counterparts from other cohorts.*

One theme emerging from Western studies on returned students is that women's life course trajectories in general and their educational pathways in particular are more likely to be disrupted due to family-related life events (Bradburn et al., 1995; Elman and O'Rand, 2004, 2007; Felmler, 1988; Hostetler et al., 2006; Jepsen and Montgomery, 2012; Levin and Levin, 1991; Setfstersten and Lovegreen, 1998; Taniguchi and Kaufman, 2007). In the context of China, Treiman (2013) showed that the gender gap for primary education began to close after 1950; for higher education, women's disadvantage did not close until the 1980s (also see Zhou et al. 1998). But less is known regarding gender differences in returning to college.

I hypothesize that Chinese men are more likely to return to school. Although gender equality has been an explicit policy goal in China, traditional gender ideologies remain deeply rooted in the Chinese society (Shu and Bian, 2003), with women socialized to be domestic (Chen, 2005) and expected to assume most of the burdens of household and family (Whyte and Parish, 1985), while men are expected to succeed in the workplace. Indeed, traditional beliefs about the inherent biological and intellectual inferiority of women are still popular and can even be found among college-educated women (Attané, 2012; Honig and Hershatter, 1988; Wolf, 1987). In the labor market, men are favored

over women, provided with more flexibility to make job changes and other adjustments (Shu and Bian, 2003). Chinese women are therefore less likely to perceive the need or receive necessary support to upgrade their human capital for upward mobility.

Any gender differences may be further moderated by cohort. In particular, I expect men from the Cultural Revolution cohort are more likely to return to school. Compared with men from other cohorts, men's advantage in education over women is smallest for the Cultural Revolution cohort given the egalitarian policies adopted during that decade (Hannum and Xie, 1994). But the considerably weakened gender egalitarian policies since the economic reform era (Zhao and Zhou, 2002) may have propelled men from this cohort—more than men from other cohorts or women from the Cultural Revolution cohort—to make up for their earlier educational deprivation.

*Hypothesis 3:*

*3a: Chinese women return to school at a slower rate compared with men.*

*3b: Compared with the pre- and post-CR cohorts, women's disadvantage in returning to school as compared with men is most pronounced for those in the Cultural Revolution cohort.*

Lastly, a unique contributing factor for returning to school in the Chinese institutional context is connection with the party and state apparatus. Proposed by Li and Walder (2001), the state and the Communist party systematically send its members back to school to improve their ability to perform in an administrative post or to merely serve a symbolic purpose of legitimating those without educational qualifications chosen for leadership. Hence, party members should on average be more apt to return to college compared with non-members. Again, cohort membership moderates this relationship, given the age preference the state sets regarding who is to be sent back to college. After the Cultural Revolution, the state devoted much energy to rebuilding a regular cadre system, and placed increasing importance on human capital in promotion, policies and practices, even though at that time its members were generally too old and too poorly educated. In 1980, for example, only 43% of the leaders of central government agencies had a college degree, while 24% had only attended middle school (Heilmann and Kirchner, 2010). Consequently, the state implemented new criteria for the recruitment of members and the appointment and promotion of cadres, emphasizing youth and education (Dickson and Rublee, 2000). Given the push to get middle-aged members to boost

their academic credentials in order to be eligible for many cadre posts (Dickson, 2014), members of the Cultural Revolution cohort were in a better position to take advantage of this policy tilted towards their benefits.

*Hypothesis 4:*

*4a: Party members return to school at a faster rate compared with non-party members.*

*4b: Compared with the pre- and post-CR cohorts, party members' advantage in returning to school is largest among those in the Cultural Revolution cohort.*

## 2.4 Methods

### 2.4.1 Data and Sample

I draw on data collected from the *2003 Chinese General Social Survey* (CGSS), a nationally representative survey conducted in urban China with detailed educational and job histories, recording beginning and ending years of each schooling level and each job episode with possible disruptions in between. I removed a few respondents (from all cohorts) who had at least an associate college degree before age 25, reasoning that these individuals would have no incentive to return to school. The size of the final analytic sample is 3765.

### 2.4.2 Measures

#### Outcomes

*Timing of Returning to School.* A respondent is defined as having experienced the event of a “return to school” if the following two criteria are satisfied: (1) the respondent reported (associate) college activity between age 25 and 45, regardless of subsequent graduation status (the great majority who returned graduated), and (2) there is at least a 2-year gap between the return-to-school episode and any prior educational experience. This definition takes account of (1) the discontinuity in schooling as emphasized in *return-to-school*, (2) the normative age routine of educational activities, typically completed by the early 20s or even earlier in China, as well as (3) the age limit for conventional college programs in China (age 25). Age 45 is specified as an upper limit

because returning at even older ages may be returning to colleges specifically designed for elders' enrichment. Respondents who had not returned to school by the survey date are right-censored.

### Explanatory Variables

*Cohort* is based on the calendar year when respondents turned 19, the typical age for beginning college. The *Cultural Revolution cohort* consists of those who came of age during the Cultural Revolution (born 1947-57, ages 9-19 at the beginning of the Cultural Revolution, and ages 46-56 in the 2003 CGSS). This whole cohort's opportunities to receive a normal college education were lost or at least disrupted, due to the cessation of college admission throughout that decade and the rustication policy that sent many high school children to rural areas (Bernstein, 1977; Bonnin and Horko, 2013; Zhou and Hou, 1999). The *Pre-CR cohort* refers to those who turned 19 during China's consolidation period, between the establishment of People's Republic of China in 1949 and the beginning of Cultural Revolution (born 1930-46, ages 20-36 at the beginning of the Cultural Revolution, and ages 57-73 in the 2003 CGSS). The *Post-CR cohort* is defined as those who came of age after the Cultural Revolution and before the intensification of urban China's economic reform in 1992 (born 1958-72, younger than 9 in 1966, and ages 31-45 in the 2003 CGSS).

I use *parental education* to measure respondents' social origins, the focal explanatory variable in Hypothesis 2. This is a dichotomous variable measuring the highest education of either parent, with less than high school used as the reference.

*Gender*, the principal predictor in Hypothesis 3, differentiates men from women (= 1).

*Party membership* is used to evaluate any differences in school reentry between those affiliated with the Communist party and those who are not. This is the focal predictor for Hypothesis 4.

### Covariates

I control for demographic characteristics including *age*, *age squared*, and *marital status* (married = 1, time-varying variable). Several work-related variables—all varying with time—are controlled for: *cumulative duration of unemployment or being out of the labor*

*force during the last five years, cumulative job experience, and occupation* (administrative cadres, professionals, ordinary workers, self-employed, and out of the labor force). *Prior educational level* has five levels measuring respondents' highest educational degree obtained before age 25: less than middle school (reference), middle school, academic-track high school, and vocational-track high school. *Rustication experience* measures whether or not respondents were ever sent to rural areas. The rustication movement reached its peak during the Cultural Revolution, but it was initiated as early as the 1950s and lasted until the late 1970s (Bernstein, 1977; Bonnin and Horko, 2013; Zhou and Hou, 1999). Province dummies are included in all models but their estimates are omitted from tables for simplicity (results available upon request).

### 2.4.3 Analysis Plan

I use the semi-parametric Cox proportional hazard model because of its flexibility and fewer distributional assumptions than what are required in parametric models (Klein and Moeschberger, 2003). The general form of the proportional hazard model is given as:

$$h(t) = h_0 \exp(A(t)B), \quad (2.1)$$

where  $h(t)$  represents the hazard rate of returning to school at age  $t$ ,  $h_0$  is an unspecified baseline rate, and  $B$  is the model parameter to be estimated representing the possible “influences” of a covariate vector  $A(t)$  on the hazard rate.

The analytic time is set up using a clock based on historical time. By comparing returning to school of different cohorts in the same historical period, this time clock is able to reveal any cohort effects due to life/career stage differences. All analyses are weighted to represent the Chinese urban population.

## 2.5 Results

### 2.5.1 Descriptive Summaries

About eight percent of the sample returned to college at some point between age 25 and the CGSS in 2003, when respondents were between ages 31 and 73. Returners

differ from non-returners in several aspects, as shown in Table 2.1, first for the overall sample and then disaggregated by cohort. For the three focal predictors, women are, as expected, less likely to return (9% men vs. 6% women are returners,  $p < .001$ ). More (30% to 16%,  $p < .001$ ) returners' than non-returners' parents had a high school education. Further, party members were much more apt to return; almost 13% party members returned to school, while the corresponding figure is only 6% among those not affiliated with the party ( $p < .001$ ).

[Table 2.1 about here]

Cohort membership is an important dimension in assessing these differences. First, the Cultural Revolution cohort is overrepresented in the returners group, comprising 36% of all returners (vs. 30% among non-returners,  $p < .05$ ), providing initial evidence supporting Hypothesis 1. Second, several differences between returners and non-returners as sketched above are contingent on cohort membership. Differences in parental education, for example, are noticeable across cohorts: The higher rate of returning to school among adult children of educated parents (had at least a high school degree) is most pronounced for those in the Cultural Revolution cohort.

In terms of family and work characteristics, returners were far less likely to be married at age 25 (47% among returners vs. 62% among non-returners,  $p < .001$ ) while more attached to the labor market, with fewer unemployment or out-of-the-labor-force episodes (.36 vs. 1.71,  $p < .001$ ) and having accumulated more job experiences (22 vs. 20,  $p < .05$ ) when surveyed. In addition, returners are more apt to be cadres (10% among returners vs. 2% among non-returners,  $p < .001$ ) or professionals (42% among returners vs. 13% among non-returners,  $p < .001$ ) at age 25. Not surprisingly, returners were more prepared academically before returning, as evidenced by a higher proportion holding an academic-track high school degree (53% vs. 26%,  $p < .001$ ). Finally, individuals who were once sent to rural areas are more likely to return to school (20% vs. 13%,  $p < .01$ ).

### 2.5.2 Predictors of School Reentry: Who is More Likely to Return to School?

Table 2.2 shows estimates from the Cox proportional hazards model, after taking account of socio-demographic characteristics, prior educational history, and the rustication

experience. As expected in Hypothesis 1, members of the pre- and post-CR cohorts lag behind those in the Cultural Revolution cohort in returning to college; the hazard rates are 53% ( $1 - \exp[-.763] = .53$ ,  $p < .05$ ) and 66% ( $1 - \exp[-1.069] = .66$ ,  $p < .001$ ) lower, respectively.

[Table 2.2 about here]

Turn to differences by social origins, gender, and party affiliation. Although descriptive statistics (Table 2.1) suggest that respondents whose parents hold a high school degree are more likely to return to school than those with lower-educated parents, such class differences disappear once other covariates are controlled for. Consistent with Hypothesis 3a, women are significantly less apt to return to college compared with men ( $1 - \exp[-.383] = .32$ ,  $p < .05$ ). Lastly, as expected in Hypothesis 4a, party members have significantly faster rates ( $\exp[.693] = 2$ ,  $p < .001$ ) of going back to school for further education, compared with those who are not affiliated with the party.

Findings pertaining to the other covariates indicate a curvilinear relationship between age and school reentry, with age predicting increasingly flattening rates of returning to college. Variables measuring respondents' attachment to the labor market (employment status, job experience) do not predict school reentry; neither does marital status. Being in either an administrative or a professional position, as opposed to an ordinary worker job, promotes the rates of returning to school. Prior educational level is positively associated with subsequent rates of returning to college. The unique life experience of being sent to rural areas does not seem to shape going back to school generally, but does so, (as shown in Model 3 and further discussed in Chapter 4), for the Cultural Revolution cohort alone.

### 2.5.3 Cohort Differences in Predictors of School Reentry

Are the relationships between covariates and return-to-school rates shaped by cohort membership? In this section I model return-to-school rates by cohort (Models 2-4 in Table 2.2), using interaction models to determine whether any cohort difference reaches statistical significance.

While no cohort variation is observed for gender differences in school reentry, social origins matter for the Cultural Revolution cohort only. Whereas having at least one parent who finished high school is not associated with return-to-college rates for either

the pre-CR or the post-CR cohort, the association is significantly positive for members of the Cultural Revolution cohort, for whom parental education more than doubles return-to-school rates ( $\exp[1.084] = 2.96$ ,  $p < .001$ ). An interaction model indicates that such a cohort difference in the association between parent's education and school return rates is statistically significant ( $p < .05$  compared with pre-CR cohort, and  $p < .01$  compared with post-CR cohort). Hypothesis 2b is thus supported; family resources matter more for obtaining a higher education among children of the Cultural Revolution.

I showed previously that party members are more likely to return to college, but this is only the case for the CR (1.128,  $p < .001$ ) and post-CR cohorts (.734,  $p < .01$ ). An interaction model further indicates that, although party members from the CR cohort are more likely to return to college compared with party members from the pre-CR cohort ( $p < .001$ ), party members' rates of going back to school are not significantly different between CR and post-CR cohorts. Hypothesis 4b is therefore partially supported.

## 2.6 Discussion

Many sociological investigations assess the consequences of social disruptions, providing valuable insights into the social costs (or benefits) of these events, such as [Elder's](#) classic study ([1974](#)) of the life chances of children who grew up during the Great Depression, or [Mayer's](#) ([1988](#)) research on the effects of World War II on members of West German cohorts who made the school-to-work transition at that time. This paper draws on the disruption of the Cultural Revolution in China to address equally important questions from another angle: do these affected individuals make attempts to make up for their early-life disadvantage, and if so, what are the facilitating and constraining factors? Individuals are not merely acted upon by macro-level social influences; they respond creatively to the constraints generated by even very drastic circumstances ([Hitlin and Elder, 2007](#)). Nevertheless, the ability to compensate for initial disadvantage is not evenly distributed, but often works in favor of those who are already privileged, thus perpetuating preexisting stratification patterns.

The protracted school interruption created by the Cultural Revolution (1966-76) in China represents an unusual episode in human history, and the focus of this paper is



the imprint of that historical change over 40 years later on the lives of the adults who came of age during that decade. My findings show that even educational disruptions of significant duration involving a fairly large number of students may have less striking consequences than conventional expectations would suggest. One way these children of the Cultural Revolution could compensate for their weak human capital was to return to school in their late 20s or even later on in life. Earlier deprivations, therefore, may not completely foreclose individuals' later opportunities. Social origins turn out to be a strong predictor of returning to school only among members of the CR-cohort, with those from advantaged families more likely to return. As a consequence, the initial success of the Cultural Revolution in eliminating intergenerational transmission of educational achievement was attenuated. Women, as hypothesized, are less likely to return than men, and this gender difference persists for all cohorts. Lastly, a unique Chinese process reflecting state/party sponsorship is observed, with party members returning to college at a much faster rate, especially when they are from the CR or post-CR cohorts.

One important contribution of this paper is to give substance to the notion that individual decisions such as returning to school are shaped by historical shifts in opportunity and motivation, as well as collective biography, as marked by their respective cohort membership. To be sure, several previous studies examined "recovery" from the Cultural Revolution, but they either used period effects (i.e., before, during, and after the Cultural Revolution) to investigate the *recovery of the state* (e.g., [Deng and Treiman, 1997](#)), or limited their focus to those who were uprooted to rural areas to examine the *recovery of the rusticated youth* (e.g., [Bonnin and Horko, 2013](#); [Xie et al., 2008](#); [Zhou and Hou, 1999](#)), which accounted for only a third of the Cultural Revolution cohort. A holistic cohort perspective, therefore, is essential to truly capture the costs and recoveries of all members exposed to this turbulent decade as they came of age. By contrasting the Cultural Revolution cohort and the cohorts immediately before and after it, I find members of the CR cohort are more likely to return than either of the other two, showing that those most strongly affected by historical shifts are usually persons who are at particular points in their life courses with particular biographies ([Elder et al., 2003](#)). These three cohorts are differentiated by their distinct early life educational experiences, with the CR-cohort members losing chances of a higher education at normative ages. Also important are the different life stages of these three cohorts

when structural opportunities of adult education shifted and when education became more critical in the job market in China from the 1980s on. Indeed, the two historical shifts—adult education expansion and the rising value of education—that rendered returning to school a desirable choice were experienced by all cohorts, but they were more likely to translate into actual decisions to return to school among members of the CR-cohort. This is both because of their prior educational experiences, and because they were younger (than the pre-CR cohort) when these historical shifts occurred, and as such, had lower opportunity costs and more time to eventually gain a higher educational degree.

Social origins enter into the picture of returning to school, but cohort turns out to be an important moderating factor, reflecting in part shifting educational policies over time. The pre- and post-CR cohorts were not exposed to as severe class-based discrimination in school admission as the Cultural Revolution cohort encountered in their early lives. For these two non-CR cohorts, therefore, children born into better-educated families were largely able to translate their family background into higher education on time, thereby sparing them the need to return to school. Their counterparts in the CR cohort, in contrast, suffered greatly in terms of the absence of educational opportunity during the Cultural Revolution and had to delay their higher education to a later life stage.

Combined, these variations across cohorts and social origins produce a pattern of a converging inter-cohort difference accompanied by a diverging intra-cohort difference. On the one hand, individuals in the Cultural Revolution cohort made compensatory efforts in later life to overcome their initial disadvantages in educational achievement. As a result, the gap between the CR and the pre- or post-CR cohort in college completion is narrowed (but not closed) as they age. On the other hand, the Cultural Revolution cohort sees a within-cohort widening of social origins disparities as they age, compared with the adjacent cohorts. Therefore, although the state intervention during the Cultural Revolution was successful in creating a cohort who began adult life with relatively little educational variation (in terms of associate college completion) (Deng and Treiman, 1997), such equality was gradually replaced by rising inequality. But even at later ages, the Cultural Revolution cohort still lagged behind other cohorts in college attainment, and they had lower levels of within-cohort educational inequality, showing that it is extremely difficult to reverse patterns of educational stratification once a whole

cohort loses out in early life stages.

Women are significantly disadvantaged in returning to college compared to men regardless of cohort membership. Despite the Chinese government's public commitment to promoting gender equality, it seems there is still a long way to go before women and men really stand on equal footing. Traditional gender ideology is still deeply rooted in China, especially with regard to the domestic division of labor (Chen, 2005). Given that marriage is almost universal among these three cohorts, the dual demands from both the workplace and home may severely constrain Chinese women's abilities to add on still other obligations by returning to school. Further, the state, in the form of sponsors, may also discriminate by assuming women are more burdened at home, meaning sponsors are less likely to select them as candidates. The absence of cohort variation in this case suggests that gendered expectations and bias changed little over the years investigated (from 1950 to 2003).

In the context of China, the state plays an important role in individuals returning to school. Not only does it affect opportunity and incentive structures through education and economic policies, it also directly sends its protégés back to college. As shown in this study, party members are far more apt to return, reflecting the sponsored process (Li and Walder, 2001). Importantly, such party patronage does not apply to different cohorts equally. In the aftermath of the Cultural Revolution, the state increasingly sought people who were loyal, young, and educated when filling official positions (Bian and Logan, 1996; Dickson, 2014). Party members of the Cultural Revolution cohort, therefore, were among the first beneficiaries of this policy. Also gaining from this policy are party members from the post-CR cohort, suggesting that what cohort membership represents in this case is not so much collective biography as life and career stages when new policies were implemented.

Methodologically, this study adds to the burgeoning literature raising doubts over the practice of treating educational attainment as a fixed characteristic past early adulthood. As is the case in other countries (see Light, 1995; Marcus, 1986; Taniguchi and Kaufman, 2007), returning to school in China is by no means a rare event. Thus, educational achievement might well advance as one ages for a substantial proportion of the population. Relatedly, this study reinforces the importance of incorporating timing (biographical and historical) in analysis of educational transitions and their consequences

(see, [Elman and O’Rand, 2004](#); [Leigh and Gill, 1997](#); [Light, 1995](#); [Monks, 1997](#)). For example, one year of schooling received early in life might well have different implications than the same schooling earned at age 30 due to variations in quality, remaining life to recoup the benefits, and signaling effects, etc. This timing effect might matter even more in China, given that many of the returnees are selected and sponsored by the state and party so may well follow a distinct career path ([Li and Walder, 2001](#)); additional research is needed to understand ramifications following a return to school in different contexts.

The CGSS survey was conducted in 2003; more than a decade has passed since then, an important limitation. It is possible new patterns might emerge as the cohorts move into even later life stages. It could be the case that the early-life experience of the Cultural Revolution cohort is so unique that a considerable proportion of them will return to school at even older ages than captured here, but the pattern of low enrollment rates (as found in the U.S) among those in their forties and fifties ([Light, 1995](#)) suggests that this investigation probably captured the prime age window of the return-to-school event. Nevertheless, future research is needed to provide a more complete picture of return-to-school behaviors and the consequences for the resources and attainments of these cohorts in their later life stages, as well as for more recent cohorts. Another limitation of this paper is its reliance on retrospective data. To what extent the recall error and measurement error might bias the results is unknown. Lack of more detailed measures reflecting respondents’ home demands—such as presence of children or adult care responsibilities—is yet another limitation that future studies could address.

Nevertheless, this study of returning to school fills a research gap in understanding the life courses of three Chinese cohorts moving to and through adulthood during a period of dramatic policy shifts, looking specifically at the decision to return to school over their life courses. It shows that cohort membership, as a key marker of shifting opportunity and incentive structures as well as shared educational biographies, is an important parameter to further our understanding of educational attainment and stratification. This study also sheds light on the dynamic processes whereby institutional forces and individual behaviors intersect to create educational stratification over time. Future work is needed to yield more insights regarding the complex interplays between institutions and individual lives as they evolve at other places and in other times.

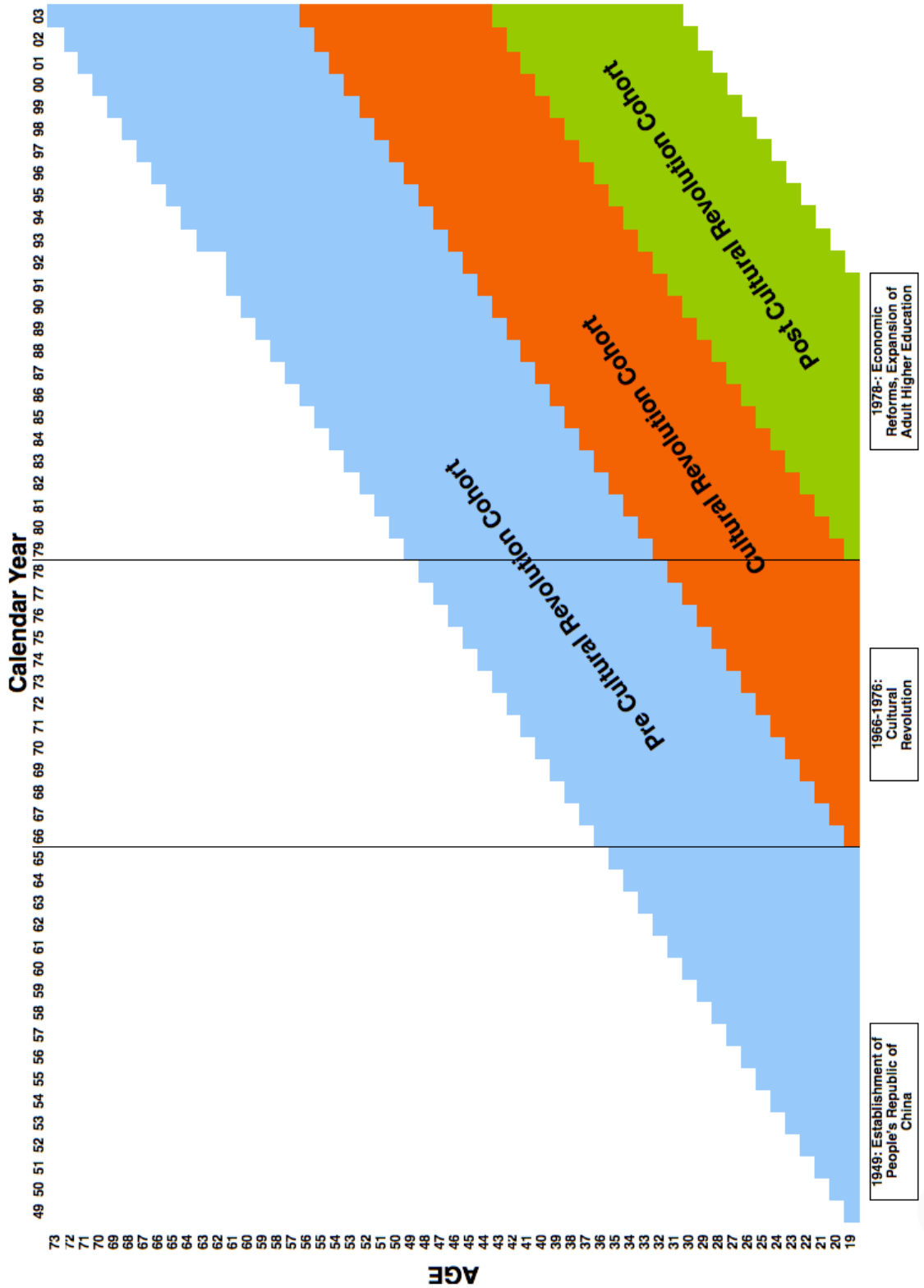


Figure 2.1: Life Course Stages and Historical Events in the Post-1949 China: An Illustration of Three Cohorts

Table 2.1: Descriptive Statistics, by Cohort Membership and Return-to-School Status, 2003 CGSS

	Overall Sample			Pre-CR Cohort (born 1930-46)			CR Cohort (born 1947-57)			Post-CR Cohort (born 1958-72)									
	Mean	SD	Returners (N = 243)	Mean	SD	Returners (N = 16)	Mean	SD	Returners (N = 88)	Mean	SD	Returners (N = 139)	Mean	SD	Returners (N = 1518)				
Age in 1994	43.42	8.11	46.4	10.28	***	59.25	2.79	62.7	3.78	***	49.89	2.97	50.3	2.97	37.5	4.21	38.08	4.27	
Women	40%	0.49	51%	0.5	***	38%	0.5	49%	0.5	***	33%	0.47	51%	0.5	***	44%	0.5	51%	0.5
Parent at least High School	30%	0.46	16%	0.37	***	12%	0.34	8%	0.27	***	30%	0.46	9%	0.29	***	33%	0.47	23%	0.42
Party Member (at age 25)	16%	0.36	7%	0.25	***	6%	0.25	11%	0.31	***	22%	0.41	8%	0.27	***	13%	0.34	5%	0.21
Married (at age 25)	47%	0.5	62%	0.49	***	50%	0.52	67%	0.47	***	27%	0.45	51%	0.5	***	60%	0.49	66%	0.47
Parent Party Member	44%	0.5	25%	0.44	***	6%	0.25	8%	0.27	***	39%	0.49	22%	0.41	***	53%	0.5	34%	0.47
Cumulative Duration of Unemployment or being Out of the Labor Force in the Past 5 Years	0.36	1.12	1.71	2.22	***	1.44	2.06	3.51	2.1	***	0.43	1.26	1.59	2.12	***	0.19	0.77	1.12	1.95
Job Experience	21.6	8.03	19.95	10.85	*	36.25	3.77	29.08	12.95	*	27.43	4.8	23.77	9.47	***	16.22	4.62	14.35	6.66
Occupation (at age 25)																			
Administrative Cadres	10%	0.3	2%	0.15	***	6%	0.25	3%	0.18	***	6%	0.23	1%	0.1	***	13%	0.34	3%	0.16
Professionals	42%	0.49	13%	0.34	***	62%	0.5	16%	0.37	***	36%	0.48	9%	0.29	***	43%	0.5	15%	0.35
Workers	43%	0.5	62%	0.49	***	31%	0.48	52%	0.5	51%	0.5	51%	0.5	68%	0.47	39%	0.49	61%	0.49
Self-Employed	0%	0.06	3%	0.17	*	0%	0	1%	0.08	0%	0	0%	0	1%	0.11	1%	0.08	5%	0.21
Out of the Labor Force	5%	0.23	20%	0.4	***	0%	0	27%	0.45	*	8%	0.27	20%	0.4	**	4%	0.2	17%	0.37
Prior Educational Attainment (at age 25)																			
< Middle School	2%	0.13	25%	0.43	***	0%	0	52%	0.5	***	3%	0.18	32%	0.47	***	1%	0.08	11%	0.31
Middle School	28%	0.45	42%	0.49	***	19%	0.4	31%	0.46	***	47%	0.5	49%	0.5	18%	0.39	42%	0.49	42%
Academic-track High School	53%	0.5	26%	0.44	***	56%	0.51	11%	0.31	***	47%	0.5	15%	0.36	***	57%	0.5	39%	0.49
Vocational-track High School	17%	0.38	7%	0.25	***	25%	0.45	6%	0.24	**	3%	0.18	3%	0.18	24%	0.43	8%	0.28	24%
Ever Sent to Rural Areas	20%	0.4	13%	0.34	**	0%	0	7%	0.26	***	44%	0.5	29%	0.46	**	6%	0.25	6%	0.24
Cohort Membership																			
Pre-CR Cohort	7%	0.25	19%	0.39	***	--	--	--	--	--	--	--	--	--	--	--	--	--	--
CR Cohort	36%	0.48	30%	0.46	*	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Post-CR Cohort	57%	0.5	51%	0.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Note: Stars indicate significance levels derived from *t*-tests between returners and non-returners for the whole sample and by cohort. \*\*\* *p*<0.001, \*\* *p*<0.01, \* *p*<0.05. Source: 2003 Chinese General Social Survey (CGSS).

Table 2.2: Cox Proportional Hazards Models Predicting Returning to School, 2003  
CGSS

	<b>Model 1: Overall</b>	<b>Model 2: Pre-CR cohort</b>	<b>Model 3: CR cohort</b>	<b>Model 4: Post-CR cohort</b>
Cohort (Ref. = CR Cohort, born 1947-57)				
Pre-CR Cohort (born 1930-46)	-0.763*			
	(0.354)			
Post-CR Cohort (born 1958-72)	-1.069***			
	(0.295)			
Women	-0.383*	-0.080	-0.942***	-0.241
	(0.155)	(0.703)	(0.269)	(0.206)
Parent at least High School	0.239	0.018	1.084***	-0.132
	(0.186)	(0.842)	(0.274)	(0.221)
Party Member <sup>1</sup>	0.693***	-1.317	1.128***	0.734**
	(0.182)	(0.869)	(0.295)	(0.232)
Age <sup>1</sup>	1.104***	1.700**	1.112***	1.516***
	(0.136)	(0.638)	(0.325)	(0.267)
Age Squared <sup>1</sup>	-0.020***	-0.032**	-0.017***	-0.028***
	(0.002)	(0.011)	(0.005)	(0.004)
Married <sup>1</sup>	-0.001	0.855	-0.317	0.006
	(0.264)	(1.108)	(0.344)	(0.354)
Cumulative Duration of Unemployment/Inactivity in the Past 5 Years <sup>1</sup>				
	0.159	-0.998	0.136	0.178
	(0.091)	(0.666)	(0.150)	(0.132)
Job Experience <sup>1</sup>	0.084	0.161	0.061	0.153*
	(0.046)	(0.146)	(0.077)	(0.067)
Occupation (Ref. = Workers) <sup>1</sup>				
Administrative Cadres	1.581***	2.121*	1.643***	1.546***
	(0.238)	(0.833)	(0.378)	(0.304)
Professionals	1.553***	0.879	2.099***	1.409***
	(0.182)	(0.719)	(0.289)	(0.262)
Self-Employed	-1.559	-36.203	-1.218	-1.797
	(0.861)	(0.000)	(1.048)	(1.023)
Out of the Labor Force	-0.869	-42.032	0.427	-1.436
	(0.491)	(0.000)	(0.559)	(0.876)
Prior Educational Attainment (Ref. = < Middle School)				
Middle School	1.276**	3.852**	1.030	1.607
	(0.481)	(1.175)	(0.619)	(1.025)
Academic-track High School	1.815***	5.767***	2.044***	2.075*
	(0.488)	(1.368)	(0.619)	(1.022)
Vocational-track High School	2.019***	5.784***	0.805	2.421*
	(0.497)	(1.337)	(0.860)	(1.028)
Ever Sent to Rural Areas	0.361	-0.403	0.539*	0.233
	(0.193)	(1.761)	(0.268)	(0.439)
Parent Party Member	0.113	0.134	-0.300	0.316
	(0.158)	(1.228)	(0.287)	(0.208)
Number of subjects	3765	823	1193	1749
Number of events	244	17	85	143

Notes: 1. These are time-varying variables. All other variables are assumed constant over time.

2. Province dummies are included in models but omitted here for simplicity.

\*\*\* p<0.001, \*\* p<0.01, \* p<0.05

Source: 2003 Chinese General Social Survey (CGSS).

## Chapter 3

# Long-term Effects of a Large Shock? The Chinese Cultural Revolution, College Attainment, and Health

### Abstract

The relationship between educational attainment and health is one of the strongest links in social sciences, and yet questions remain why this is the case. There are three dominant theoretical perspectives to account for such a robust relationship: spurious correlation, human capital, and fundamental cause theory. These perspectives have theoretical and practical implications because they point to different loci of potential intervention. This paper constructs two tests to assess these three theoretical perspectives. The first test exploits the natural experiment of the Chinese Cultural Revolution (1966-76) when colleges were closed, school quality deteriorated, and the state intervened to sever the intergenerational transmission of educational advantage, creating a cohort with distinctly low educational experiences as compared with adjacent cohorts. The second test draws on the unique Chinese institutional arrangement as a single-party state society to compare health differences of two elite groups: elites because of



higher education, and elites with both higher education and communist party membership. Using the *1994 State and Life Chances in Urban China Survey*, the *2002 Chinese Household Income Project*, and the *2010 China Family Panel Studies*, both tests provide strong support for but also complicate fundamental cause theory. These results challenge the prevailing wisdom that education has a universal beneficial effect on health, and emphasize the importance of institutional contexts in the shaping of educational gradients in health.

### 3.1 Introduction

The relationship between educational attainment and health is one of the strongest links in social sciences. There exists a large body of evidence showing that education is consequential in structuring inequality in health outcomes over the life course across time and place (e.g., Adler et al., 1994; Deaton and Paxson, 2001; Elo and Preston, 1996; Kitagawa and Hauser, 1973; Link and Phelan, 1995; Meara et al., 2008; Mirowsky and Ross, 2003; Warren, 2009). While the major causes of mortality have changed from infectious disease to chronic conditions, for example, educational disparities in health have either persisted or increased (Lauderdale, 2001; Link and Phelan, 1995; Lynch, 2003; Pappas et al., 1993). The more educated are more likely to live longer, not just in the United States, but also in Britain (Marmot et al., 1991), Denmark (Arendt, 2005), Israel (Manor et al., 2000), Sweden (Torssander and Erikson, 2010) and other Western and Eastern European countries (Shkolnikov et al., 1998). Questions remain, however, regarding why education matters.

There are at least three dominant theoretical perspectives to account for such a robust relationship between education and health: spurious correlation (a third variable predicts both education and health), human capital (knowledge and skills are the key), and fundamental cause theory (access to a wide range of flexible resources is vital). And yet it is difficult to distinguish these three explanations. To rule out “third variables” as a valid explanation, for example, one needs to find a situation in which educational achievement is exogenously determined. A formal test of the fundamental cause theory, as another example, requires one to think about a scenario in which educational attainment could be analytically separated from the ability to use socioeconomic resources

(Phelan et al., 2010).

This paper sheds new light on this old question by examining the relationship between education and health in China, a country with distinct institutional arrangements which underwent one of the largest social experiments in human history (the Cultural Revolution) by the state seeking to intervene in intergenerational mobility. The theoretical value of the China case for understanding the educational gradient in health is twofold. First, as a redistributive economy and a single-party state society, the social stratification and the rewarding system in People's Republic of China follows a different logic than Western industrialized societies (Bian, 2002; Nee, 1989, 1991, 1996; Zhou, 2010). The state and the Chinese Communist Party play a determining role in allocating resources; instead of rewarding productivity signaled by human capital, the state typically privileges those closely connected to the state apparatus as marked by party membership. Therefore, a college diploma in itself does not guarantee "access to flexible and multipurpose health-promoting resources" (Link and Phelan, 1995; Link et al., 2008; Phelan et al., 2004; Phelan and Link, 2005), as what occurs in Western societies.

Second, the Chinese Cultural Revolution (1966-76) produced a naturally occurring experiment, creating a whole cohort who were subject to distinct opportunity and allocative mechanisms of college education, compared with adjacent cohorts (Davis, 1992; Deng and Treiman, 1997; Qian and Hodson, 2011; Xie et al., 2008; Zhou and Hou, 1999). The Cultural Revolution cohort, also referred to as the lost generation (Hung and Chiu, 2003) or children of the Cultural Revolution (Zang, 2000; Zhou and Hou, 1999), is defined in this paper as those who turned age 19 during the Cultural Revolution (i.e., born between 1947 and 1957). A decade-long major social initiative, the Cultural Revolution severed the intergenerational transmission of advantages by closing colleges (Pepper, 1991; Unger, 1982) and sending intellectuals and their children to work in the countryside (Zhou and Hou, 1999). Further, because the Cultural Revolution deliberately aimed at penalizing existing high SES groups (Deng and Treiman, 1997; Walder and Hu, 2009; Zhou et al., 1996), coming from an advantaged family signaled a "status dishonor" in obtaining a higher education. Examining subsequent health for members of this cohort, therefore, sheds light on the key parameter underneath the education-health link.

The aim of this paper is to test three dominant theoretical perspectives in explaining educational gradients in health: spurious correlation, human capital, and fundamental

cause theory. It does so by examining the education-health relationship across three Chinese cohorts divided by the Chinese Cultural Revolution (1966-76). All three cohorts turned age 19 between the establishment of the People’s Republic of China (1949) and the intensification of urban China’s economic reform (beginning in 1992). Their life chances are heavily affected by the unique institutional configurations of China as a single-party state society, and were subject to dramatically shifting educational policies that put them at differential odds of getting a higher education (Zhou et al., 1998). Relying on two different tests—one based on cohort differences and the other differences across elite groups—my findings support but also complicate fundamental cause theory, showing that advantaged access to resources is the key reason why education matters for health, even though the degree to which education brings about these advantages might differ across societies.

The contribution of the paper is multifold. First, the Chinese society and the Cultural Revolution provide a distinct but ideal research site to assess current Western theories, especially to what extent the education-health relationship holds in societies with different institutional arrangements from those in the West. Second, from a methodological angle, this paper adds empirical evidence to the lively debate between the “reductionist” and “structural” school for causal inference (Deaton, 2010a; Heckman, 2010; Imbens, 2010), emphasizing that understanding concrete social mechanisms and contexts can at times yield more fruitful sociological insight than searching for instrumental variables to identify “treatment effects.” Third, distinguishing the three perspectives has important policy implications as well, because each points to different loci of intervention. The strong supportive evidence for fundamental cause theory reported in this paper, therefore, suggests that interventions to reduce health disparities should focus on the social processes that almost universally link socioeconomic status to access to health-promoting resources.

## 3.2 Previous Studies

### 3.2.1 Theoretical Perspectives on the Educational-Health Relationship

One explanation for the relationship between education and health (see Figure 3.1 for an illustration) views the education-health link as a *spurious correlation*. In other words, it is not education but some omitted variables that are the driving forces of the association between education and health (Figure 3.1A). Potential candidates of omitted variables include family background (Power and Hertzman, 1997), native ability (Gottfredson, 2004; Heckman, 2008, but see Link et al., 2008), conscientiousness (Savellyev, 2014), time preference or future orientation (Fuchs, 1982, but see Cutler and Lleras-Muney, 2010), poor health in early life (Adams et al., 2003; Case et al., 2002; Conley and Bennett, 2000; Jefferis et al., 2002), and macro-level life expectancy (Jayachandran and Lleras-Muney, 2009). These confounders, or “third variables,” lead to both higher levels of educational attainment and better health, creating between them a spurious link. For example, there is mounting evidence showing the transmission of educational advantage from parents to children (Blau and Duncan, 1967; Sewell and Hauser, 1972). Given the importance of early-life family environments in shaping health (Case and Paxson, 2011; Cohen et al., 2010), family background might confound the education-health link.

[Figure 3.1 about here]

In contrast to researchers viewing education as a spurious correlate, the other two theoretical perspectives hold that education is a cause of health, but locate mechanisms in different places. Human capital theorists highlight the knowledge as well as the cognitive and non-cognitive skills education brings about (Figure 3.1B). Health economists, for example, emphasize that education shapes people into better decision makers (“productive efficiency,” see Grossman, 1972) and that more educated people have more information about the true nature of health production (“allocative efficiency,” see Rosenzweig and Schultz, 1983). From another angle, sociologists Mirowsky and Ross (2003) argue that education promotes “learned effectiveness,” such that better-educated persons tend to have greater control over all aspects of their lives, which in turn improves their health. In sum, proponents of the human capital perspective and its variants tend to view the beneficial effect of education on health as inherent and

within education itself.

By contrast, researchers from the third camp argue that health disparities are a reflection of the unequal social distribution of resources. The most well-known argument comes from Link and Phelan (Link and Phelan, 1995; Link et al., 2008; Phelan et al., 2004; Phelan and Link, 2005), who suggest education operates as a fundamental cause of health, providing individuals with a wide range of serviceable resources, including money, knowledge, prestige, power and beneficial social connections that can be used to their health advantage (Figure 3.1C). This perspective predicts education to be a cause antecedent of health, but, unlike human capital theorists, its core feature centers on the omnipresent ability of education to bring about health-promoting resources, rather than education in and of itself. In other words, it is the differential access to and utilization of resources, rather than education alone, that gives rise to health disparities. Note that there are two components in fundamental cause theory: individuals as decision-makers who typically use resources available to maximize their health, and social institutions that determine how health-promoting resources are allocated. To date, most empirical tests of the fundamental cause theory focus on the individual end and their *agentic* use of advanced medical knowledge and technology (see a review by Freese and Lutfey, 2011), ranging from the release of the Surgeon General's report on smoking (Rubin et al., 2014; de Walque, 2004) to the use of Statin (Chang and Lauderdale, 2009) or Pap smears and mammography (Link et al., 1998), and to technological innovations in general (Glied and Lleras-Muney, 2008; Goldman and Smith, 2005). In comparison, less attention has been devoted to the roles of social institutions in deciding who gets what.

Questions emanating from an institutional framing include: What would the education-health link be under a different social stratification system? What if the state intervenes in the stratification system? Cross-country analysis sheds light on this important issue. A few studies have been conducted among welfare states. Olafsdottir (2007), for example, compares the relationship between education and health in the United States and Iceland, two capitalist societies at opposite ends of the stratification continuum among Western, industrialized democracies. Her findings show that, despite different efforts states put into equalizing life chance outcomes, higher levels of educational attainment translate into better health in both countries. Recent studies conducted among European countries show similar results (Huisman et al., 2005; Mackenbach et al., 2014).

Less is known, however, whether a different pattern would emerge in a state socialist country, in which the state has even great latitude to shape social structures.

### 3.2.2 Empirical Evidence of the Educational-Health Relationship

Distinguishing the three theoretical perspectives is important but difficult. To tease out selectivity as a confounder, recent studies of the education-health relationship reflect the growing popularity of the instrumental variable (IV) method. An instrumental variable is one that is correlated with the predictor (education) but not with the outcome (health) other than through its correlation with the predictor (Angrist et al., 1996). For example, instruments that have been used in education-health research include: state-level per-capita expenditures on education (Berger and Leigh, 1989; Kenkel et al., 2006), exemptions from military service (de Walque, 2007), changes in requirements for high school completion (Kenkel et al., 2006), and college openings (Currie and Moretti, 2003). In particular, one set of studies examines whether individuals who were forced to continue schooling through various policies were subsequently healthier than those who were not. In a pioneering study, Lleras-Muney (2005) employed the U.S. compulsory schooling laws in effect from 1915 to 1939. Drawing on the successive 1960-80 U.S. censuses, the IV estimate showed that individuals born in states forcing them to remain in school longer enjoyed significantly higher survival rates in adulthood (3.6 percentage points higher). Similarly, Arendt (2005); Costas Meghir (2012); Kemptner et al. (2011); Oreopoulos (2006); Spasojevic (2010) found that increases in minimum schooling laws in Denmark, England and Ireland, West Germany, and Sweden, improved health for those who were affected. Contradictory evidence exists as well, such as Albouy and Lequien (2009) who do not find a causal effect of education on health in France using this method.

Several studies conducted in China utilize IV methods as well, exploiting closings and re-openings of high schools and colleges. Consistently, none of them uncover a significant relationship between education and health, for either urban (Giles et al., 2008; Meng et al., 2007; Xie and Mo, 2014) or rural China (Zhang, 2014). I replicated these null findings drawing on my data sets using the interaction term between cohort membership and family background as an instrument (rationale elaborated below; results shown in Appendix Table A). Taken together, the causal link from education to health, if exists

at all, seems to be at least quite weak in China.

How to reconcile these null findings with the significant effects detected in other countries? More generally, how to assess the validity of the instrumental variables method? The IV studies, by taking advantage of exogenous shocks, are helpful in addressing selection due to unobserved heterogeneity. But at times it is unable to distinguish alternative theories. Take the three theoretical perspectives discussed above as an example. Although a significant IV estimate may eliminate selection as a candidate explanation, it cannot discriminate between the other two. Even worse, a non-significant IV estimate could be due to the existence of “omitted variables,” or the fact that schools may fail to transmit human capital, or that particular institutional arrangements constrain the college-educated from profiting from their higher education. This limitation echoes [Deaton \(2010a,b\)](#) and [Heckman \(2010\)](#), who emphasize that effects occur in time and in space, and deeper institutional knowledge is needed to advance understanding of the social world.

To test the human capital thesis, researchers exploit variations in school quality or look at differential rates of health technology adoption that requires possession and processing of knowledge. [Frisvold and Golberstein \(2011\)](#), for example, exploit the substantial improvements in the quality of schools attended by black students in the segregated southern states during the mid-1900s to show that school quality amplifies the beneficial effects of education on self-rated health, smoking, obesity, and mortality. From a different angle, in their study of the educational gradient among HIV patients, [Goldman and Smith \(2002\)](#) show that more educated HIV+ patients are more likely to adhere to therapy, which in turn improves their self-reported health. A similar pattern is observed for diabetics, with the ability to maintain a better health regimen—which varies by levels of schooling—an important independent determinant of subsequent health outcomes ([Goldman and Smith, 2002](#)). Taken together, this evidence points to the advantages more educated persons have in uptake of and acting on new medical information as well as self-management, possibly developed through the schooling they received.

Lastly, a good test of fundamental cause theory occurs when socioeconomic status can be analytically separated from the ability to use socioeconomic resources ([Phelan et al., 2010](#)). One such situation is when resources associated with higher status are useless in preventing death ([Deaton, 2011](#); [Phelan et al., 2010](#)), for example, potentially

fatal diseases that no one knows how to prevent or treat. In this case, individuals are unable to “agentically use” resources. Supportive evidence has been found along this line. [Livi-Bacci \(1991\)](#) showed that from the sixteenth to the eighteenth centuries, English aristocrats had no life expectancy advantage over the rest of the population, despite their presumably high SES. Likewise, [Preston and Haines \(1991\)](#) reported that parental education had no bearing on children survival in the last decade of the nineteenth century U.S. These findings suggest that having more education is useless in promoting health when nothing is known about how to fight particular afflictions ([Deaton, 2011](#); [Phelan et al., 2004](#)). Conversely, when diseases, treatments, risks, and knowledge about risks change, fundamental cause theory predicts corresponding changes in the educational gradients in health ([Miech et al., 2011](#)), as documented, for instance, by [Chang and Lauderdale \(2009\)](#) showing how income disparities in cholesterol levels have changed with the emergence of statins. These studies point to the importance of context in shaping the education-health relationship. Less attention, however, has been paid to the level of society, to examine how alternative social institutions with differential “who gets what” rules may alter the taken-for-granted link between education and health.

### 3.3 The China Case

How does the China case illuminate the relationship between education and health? I elaborate on three distinct aspects of China that in tandem permit two tests to shed light on the relative validity of each argument. The hypotheses are summarized in [Table 3.1](#).

[[Table 3.1](#) about here]

#### 3.3.1 Test 1: The Chinese Cultural Revolution (1966-76) as a Structural Break

First, the Cultural Revolution provides a rare opportunity to examine health implications when the selection criteria for college admission change and when schooling quality suffers a marked decline. After the Communist takeover in 1949, China’s political priorities have shifted dramatically, directly affecting opportunity structures and allocative mechanisms of educational attainment ([Hannum, 1999](#); [Pepper, 1991](#); [Zhou et al., 1996](#)).



Before the Cultural Revolution, academically talented students—disproportionately from intellectual families—were much more likely to test into high-quality schools and colleges. This situation changed during the Cultural Revolution (1966-76), when the education system was disrupted in order to achieve Chairman Mao’s vision of a society with little intergenerational transmission of educational advantage (Pepper, 1991; Shirk, 1979). The disruption was most pronounced and persistent at the college level (Shirk, 1979), with national college entrance examinations ceasing to be held from 1966 to late 1977. Colleges began extremely restricted recruitment from 1972 on, based on family background rather than academic merit (Meng et al., 2007; Pepper, 1991; Unger, 1982), favoring those from worker, peasant, and soldier families. Children of the intellectuals, who before 1966 were among the best students, were the biggest losers of the Cultural Revolution (Broaded, 1983; Deng and Treiman, 1997; Giles et al., 2008; Unger, 1980).<sup>1</sup>

Further, the Cultural Revolution was characterized as a decade of declining educational quality (Broaded, 1991; Jiang and Ashley, 2013). After a brief moment of school closings, primary and middle school recommenced in 1968 and colleges began extremely limited admission in 1972, but actual learning was dubious at all levels. In addition to receiving military training and Mao Thought study classes, students were organized to criticize their textbooks and other features of the school system, or else go to factories and the countryside to do manual work (Hannum, 1999; Meng et al., 2007). Midterms and final exams were given, but students were to repeat grades only if they and their parents agreed (Pepper, 1991). Not surprisingly, Treiman (2002, 18) showed that “the cost of the Cultural Revolution, at least at the outset, was to reduce literacy scores by about one grade level—a strong effect.”

Taken together, if either the selection or the human capital thesis is true, individuals from the Cultural Revolution cohort would be expected to gain less health advantage based on their educational levels, as compared to members in the cohorts preceding or following them. This is so given that the Cultural Revolution changed the types

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<sup>1</sup> Note that some members of the Cultural Revolution cohort—mostly from intellectual families—returned to college after the ending of the Cultural Revolution (see Chapter 2). Given that the composition of and the nature of the higher education received by these returners differ from that of those who went to college during the Cultural Revolution, I did a sensitivity analysis by excluding these returnees when conducting Test 1, finding results similar to those presented here.

of children eligible to climb the educational ladder (see Figure 3.1A), and that the schooling they received during the Cultural Revolution decade failed to transmit into actual human capital (see Figure 3.1B). Therefore, the first hypothesis is:

*Hypothesis 1a: Any health advantage associated with education is weakened for members of the Cultural Revolution cohort, compared with members in adjacent cohorts, because the highly educated from the Cultural Revolution cohort tend to come from less advantaged families due to the state intervention (selection thesis) or received schooling of lower quality when they came of age (human capital thesis).*

What varies little across these three cohorts, however, constitutes the second distinct aspect of the China case: the institutional arrangement of China as a single-party state society. As many social stratification scholars (Bian, 1994; Nee, 1989; Zhou, 2010) have insightfully pointed out, membership in the Communist Party became a key basis of social stratification after the Communist seizure of state power (Szelenyi, 1978). Given that the Communist Party and the state, not the market, play a fundamental role in allocating resources—health-promoting resources included—educational degrees may not be sufficient to gain access to these resources. Even with the economic reform (initiated in the mid-1980s in urban China, and intensified in 1992) and the resulting rising role of education in getting ahead (Zhang et al., 2005), the state and the party remain a strong force in China (Bian and Logan, 1996; Bian et al., 2001; Hauser and Xie, 2005). This is especially the case for the three cohorts examined in this paper, who entered the labor force before the intensification of urban China’s economic reform. According to fundamental cause theory, given the similar institutional arrangements these three cohorts have been exposed to, no cohort difference in the education-health link should be expected:

*Hypothesis 1b: Any health advantage associated with education remains similar for members of the Cultural Revolution cohort compared with members in adjacent cohorts, because China’s institutional arrangements regarding resource allocation—that the party and the state play a decisive role—have not changed (fundamental cause thesis).*

### 3.3.2 Test 2: Two-Career Path and Sponsored Mobility

A third distinct aspect of China lies in its two-career path for the college educated. Recall that one obstacle in testing fundamental cause theory is to find a situation in which

socioeconomic status could be analytically separated from the ability to use socioeconomic resources (Phelan et al., 2010). The distinct Chinese two-career path provides just such a scenario. Specifically, the Chinese regime has created two segmented elite “markets”: elite professionals and elite administrative positions, reserved for persons with different types of credentials. College education has been a persistently vital prerequisite for professional positions but party membership has never been a criterion for such positions; for administrative posts, however, party membership is always a prerequisite and a college education has become a criterion after the Cultural Revolution (Dickson and Rublee, 2000; Walder, 1995; Walder et al., 2000). Given the distinct requirements for each career path, I distinguish two groups of elites among the college educated: those with both educational and political credentials (*the dual elite*) and those with only a college degree (*the education-only elite*). In terms of access to a flexible range of resources, research shows that the dual elite enjoy a noticeable advantage over the education-only elite because of their closer connection with the state and the party (Bian, 2002; Li and Walder, 2001; Walder et al., 2000). Given these differences in resource access, fundamental cause theory predicts that only members of the dual elite enjoy a health advantage. This prediction contrasts with expectations related to the selection thesis or human capital theory, which will predict no difference in health between the education-only elite and the dual elite, given that both groups have a college degree.

Furthermore, the ways through which the dual elite (college educated and party members) obtained both credentials differ. Previous stratification research revealed two distinct processes: political incorporation of the already highly educated (Bian et al., 2001) and party-sponsored returning-to-school of party members (Li and Walder, 2001). To quickly develop personnel that were both “Red” (politically loyal) and experts, a large number of party members were sent back to school to upgrade their human capital (Li and Walder, 2001, also see Chapter 2). Over time, however, a political incorporation model gradually dominates, given the growing educational level of the general population (Bian et al., 2001). I therefore further separate the dual elite into *the incorporated dual elite* and *the sponsored dual elite*, based on the timing of each obtaining educational credentials.

The sponsored dual elite group deserves special attention, given their unique educational experience. They tend to come from working-class families (given the recruiting criteria adopted by the party), and the college education they received later in life is widely considered as lower quality and of dubious merit (Dickson, 2014). Therefore, if the selection or human capital thesis is true, members of the sponsored dual elite should have lower levels of health compared with either the education-only elite or the incorporated dual elite, who received their higher education on time. By contrast, given the sponsored elite's connection with the state/party and its advantages in gaining access to health-promoting resources, fundamental cause theory predicts that they should enjoy better health than the education-only elite.

*Hypothesis 2a: Members of the sponsored dual elite have lower levels of health, compared with either the education-only elite or the incorporated dual elite, even though all have a college degree (selection thesis and human capital thesis).*

*Hypothesis 2b: Members of the education-only elite have lower levels of health, compared with either the sponsored dual elite or the incorporated dual elite (fundamental cause thesis).*

## 3.4 Data, Measures, and Methods

### 3.4.1 Data and Sample

I draw on three surveys collected eight years apart over a span of almost 20 years: the 1994 *State and Life Chances in Urban China Survey* (Life Chances), the 2002 *Chinese Household Income Project* (CHIP), and the 2010 *China Family Panel Studies* (CFPS). The Life Chances survey used retrospective interview questions to collect life chances measures among urban residents of China. Through a multistage sampling procedure, this survey covered 20 cities in 6 provinces representing a variety of geographic locations and types of urban economies in China (Zhou and Moen, 2002). The 2002 Chinese Household Income Project (CHIP) aims to measure and estimate the distribution of personal income and related economic factors in China. Data were collected through a series of questionnaire-based interviews conducted in urban and rural areas at the end of 2002. The CHIP sampling methods were designed to represent the four regions of China—coastal, central, western, and a separate category for large municipalities with

provincial status (Beijing, Tianjin, and Shanghai). Provinces were then selected from each region to reflect its economic characteristics. The urban data set contains 20,632 individual household members residing in 6,835 households (Li et al., 2008). The 2010 China Family Panel Studies (CFPS) adopted multistage, implicit stratification, and probability-proportion-to-size sampling methods to obtain a nationally representative sample (Xie et al., 2012). The sample included 14,960 households; interviews were conducted with all family members aged 10 or older. I choose these three surveys because all of them collected health-related measures, which is rare in Chinese surveys especially before the mid-2000s. All three have reasonable regional coverage, with two of them nationally representative. Further, these three surveys in combination span almost 20 years, permitting analysis of whether new patterns emerge as these cohorts move into later life stages and as the Chinese economic transition intensifies.

I construct my analytic sample based on the following criteria. First, samples are restricted to those born between 1930 and 1972 to capture the three cohorts (described below). Second, respondents are restricted to those holding an urban *hukou* (registration of household residence), given China's distinct educational opportunity structures between urban and rural areas. Respondents from all three surveys lived in urban areas during the survey, but some may have migrated from rural areas. Based on data availability, I remove respondents who did not have an urban *hukou* by age 15 for the 2002 CHIP survey and by age 12 for the 2010 CFPS survey. For the 1994 Life Chances survey, I exclude respondents who received their primary school education in rural areas. Third, for the Life Chances survey, I drop two provinces (Jiangsu and Guangdong) because information on party membership was deleted in these provinces upon local government request (Zhou and Moen, 2002).

### 3.4.2 Measures

#### Outcome

I examine *self-reported health*, which has been validated as a reliable predictor of subsequent survival (Idler and Angel, 1990; Idler and Benyamini, 1997) and has been widely used in previous health research conducted in China (e.g., Chen et al., 2010; Hu, 2013).

As a global measure, self-reported health is consistent with the definition of health provided by the [World Health Organization \(1946\)](#), that “Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity.” This health measure is included in all three surveys. The 1994 Life Chances survey asked respondents to rate their health status on a scale from 1 to 10. In the 2002 CHIP and the 2010 CFPS surveys, the scales ran from 1 to 5.

### Key Explanatory Variables

*Cohort Membership.* Cohort is created based on the calendar year when respondents turned 19, the typical age for entering college in China. The *Cultural Revolution cohort* consists of those who came of age during the Cultural Revolution (born 1947-57, aged 9-19 in 1966). This cohort’s opportunities to receive a normal college education were lost or at least disrupted, due to the cessation of regular college admission throughout that decade and the rustication policy that sent many high-school children to rural areas ([Zhou and Hou, 1999](#)). The *Pre-Cultural Revolution (pre-CR) cohort* refers to those who turned 19 between the establishment of People’s Republic of China in 1949 and the beginning of the Cultural Revolution in 1966 (born 1930-46, aged 20-36 in 1966). The *Post-Cultural Revolution (post-CR) cohort* is defined as those who turned 19 after the Cultural Revolution and before the intensification of urban China’s economic reforms in 1992 (born 1958-72, younger than 9 in 1966). Table 3.2 summarizes the operational definitions of these three cohorts, as well as their ages in some important years.

[Table 3.2 about here]

*Elite Groups based on Educational and Political Credentials.* This measure takes two forms. First, I create a four-category measure taking into account the political credential (measured by party membership) of the highly educated: (1) less than high school; (2) high school; (3) the education-only elite (at minimum associate college but not party members); and (4) the dual elite (at minimum associate college and party members). Second, I divide the fourth group into two subgroups based on their obtaining educational and political credentials in different orders to create a five-category measure: (4) the incorporated dual elite, college completed before joining the party; and (5) the sponsored dual elite, beginning college after joining the party.<sup>2</sup>

<sup>2</sup> The timing variables were collected in the 1994 Life Chances survey and the 2010 CFPS. For the

### Mediators

As an explorative analysis, I investigate whether health disparities among different groups may be mediated by the following variables detected to be important in prior literature. Note that not all variables were collected in all three surveys.

1. Material resources:

- (a) *Personal income*, wealth measured by *house ownership*, and *health care eligibility*.
- (b) *Occupation*: professionals and cadres, the two elite occupations in China, are compared against ordinary workers. The dichotomous cadre variable equals 1 if the respondent reported to hold the position of bureaucratic administrator at the rank of department level, *ke ji*, or above.
- (c) *Subjective SES* is the response individuals gave when asked to evaluate their socioeconomic status on a 1 (“very low”) to 5 (“very high”) scale.

2. Social support:

- (a) *Marital status*: I contrast respondents who were married and those who were not.
- (b) *Spouse characteristics*: This set of variables includes *spouses’ educational attainment*, *income*, or *occupation* (cadre, professional, ordinary workers).
- (c) *Social support scale*, the mean response to five questions assessing emotional (e.g., “Who do you talk to for support and understanding when things get rough?”) and instrumental support (e.g. “Who would take care of you if you were sick?”).

3. Health behaviors:

- (a) *Smoking*: whether respondents never smoked (reference), quit smoking, currently smoke at most 10 cigarettes per day, or currently smoke more than 10 cigarettes per day.

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2002 CHIP, I distinguish the incorporated dual elite and the sponsored dual elite based on the question “Have you tested into college?” This is reasonable because to attend college on time requires one to pass the national entrance examination except the very few (less than .5%) who were exempted from standardized exams because of exceptional or special talent.

- (b) *Drinking*: whether respondents never drank excessively (reference), quit drinking excessively, or currently drink excessively.
- (c) *Exercise*: a dichotomous variable contrasting those who exercise versus those who do not.

### Covariates

I control for *gender* (women = 1), *age*, *age squared*, and *province of residence*. Social origins were assessed by either *family background* or *parental education*, depending on measure availability. Family background is a label assigned by the state and served as a critical basis for political discrimination during the Maoist era (1949-76). Before its abolition in 1979, individuals were routinely required to report this label on applications for educational enrollment, jobs, and promotions. Following [Zhou \(2010\)](#), I collapse these labels into four categories in the 1994 Life Chances Survey: (1) Cadre, (2) Working Class, (3) Intellectual, and (4) Exploiting Class. These categories were also collected in the 2010 CFPS survey, but because very few respondents reported the backgrounds of cadre or exploiting class, I only distinguish working class and intellectuals. Parental education (high school or above = 1) is used to capture social origins in the 2002 CHIP survey. Finally, I adjust for the rustication experiences ([Zhou and Hou, 1999](#)), with those once sent to rural areas coded as 1.

### 3.4.3 Methods

I draw on ordinal logit models to test my hypotheses. To examine whether the relationship between education and health differs for members from different cohorts (Test 1), I investigate whether the interaction terms between education and cohort are statistically significant when predicting self-reported health. For Test 2, post-estimation *t*-test is used to determine whether the education-only elite and the dual elite have significantly different levels of health. I then divide the dual elite into the incorporated elite and the sponsored elite, to see whether these two groups, as well as when compared against the education-only elite, are significantly different from each other. Lastly, to determine possible mechanisms underlying the observed health differences, I add theorized mediators. Analyses for the 2002 CHIP survey and the 2010 CFPS survey are



weighted to represent the urban Chinese population.

## 3.5 Results

### 3.5.1 Descriptive Statistics

Table 3.3 provides summary statistics for the three survey samples by educational and political credentials: high school or less, the education-only elite, the incorporated dual elite, and the sponsored dual elite. My discussion focuses on comparisons between the three elite groups. Statistically significant age and cohort differences are observed for the three elite groups. In general, members of the education-only elite are the youngest, especially when compared with the sponsored dual-elite ( $p < .01$  for each of the three survey samples). Correspondingly, members of the education-only elite are overrepresented in the post-CR cohort, while those of the sponsored dual-elite are overrepresented in the CR cohort. Women's disadvantage in becoming an elite member is observed in all three cohorts and all three surveys, but their gap with men is particularly noticeable for the dual elite, reflecting men's higher odds of joining the party. Family background also differs greatly across these three elite groups. Individuals from intellectual families (or whose parents had a high school degree) are more likely to belong to the education-only elite or the incorporated dual elite as opposed to the sponsored dual elite, whereas those born into working-class families are more likely to be members of the dual elite, especially the sponsored dual elite.

[Table 3.3 about here]

Turning to socioeconomic achievements, members of the education-only elite earned more than those of the dual elite in 1994; the incorporated dual-elite caught up with the highest earnings in both 2002 and 2010. There is not much difference in house ownership. Consistent with previous studies, a clear two-career path is evident for these three groups. Members of the education-only elite are the most likely to be professionals and the least likely to be cadres; by contrast, members of the dual elite—especially the sponsored dual elite—are the most likely to be cadres and the least likely to be professionals. Further, compared with the dual elite, members of the education-only elite have significantly lower levels of health care coverage ( $\approx 70\%$  vs.  $\approx 80\%$ ). These three groups also locate themselves differently when asked to assess their socioeconomic

status, with the sponsored dual elite placing themselves highest (3.22 on a 1-5 scale), followed by the incorporated dual elite (2.9) and the education-only elite (2.8).

### 3.5.2 Cohort Differences in the Relationship between Educational Attainment and Health (Test 1)

Given the dramatically different early-life experiences of the three cohorts, a cohort difference in the education-health link is expected if either the selection or the human capital theses was true. Specifically, from these perspectives, the highly educated from the Cultural Revolution cohort should have significantly lower health later in life, compared with their counterparts in other cohorts. However, no such differences are observed (Table 3.4). The signs of the interaction terms between associate college and cohort membership are not consistent across years, and none of them are statistically significant. Moreover, the only significant interaction term is a positive one between high school and the Cultural Revolution cohort, opposite to what is expected based on the selection or the human capital thesis. Therefore, Hypothesis 1b is supported, suggesting that the key for health is institutional arrangements that set parameters determining who gets what, which remains largely stable for these three Chinese cohorts.

[Table 3.4 about here]

### 3.5.3 Differences in Health across Elite Groups (Test 2)

Table 3.5 reports estimates from ordinal logit models regressing self-reported health on elite group membership. Models 1, 3 and 5 use a four-category measure distinguishing the education-only elite from the dual elite, while Models 2, 4, and 6 further separate the sponsored dual elite from the incorporated dual elite. Across all surveys, members of the dual elite enjoy significantly better health than those who do not go to high school (.308,  $p < .01$ ; .446,  $p < .001$ ; .368,  $p < .05$ , respectively). By contrast, compared with those who do not have a high school degree, members of the education-only elite have marginally better health only in year 2002. Further, post-estimation tests indicate that differences in health between the education-only elite and the dual elite are statistically distinguishable from 0 in 2002 ( $p < .05$ ) and 2010 ( $p < .05$ ). Taken as a whole, these results provide supportive evidence for Hypothesis 2b (derived from fundamental cause

theory) rather than Hypothesis 2a (based on selection or human capital thesis).

[Table 3.5 about here]

Next, I distinguish the dual elite based on the temporal order when they obtained each credential (Models 2, 4, and 6). Both groups—the incorporated dual elite and the sponsored dual elite—have significantly better self-reported health compared with those who do not go to high school. For the incorporated dual elite, the estimated coefficients are .299 ( $p < .05$ ) in 1994, .462 ( $p < .05$ ) in 2002, and .491 ( $p < .05$ ) in 2010. For the sponsored dual elite, the corresponding estimates are .323 ( $p < .1$ ) in 1994, .438 ( $p < .01$ ) in 2002, and .173 ( $p < .05$ ) in 2010. Further, members from either dual-elite group have significantly higher levels of health as compared with those from the education-only elite ( $p < .05$ , except in year 1994). The differences between the two dual-elite groups, by contrast, do not reach statistical significance in any of the three surveys. Taken together, these findings suggest that the difference in health exists primarily between the education-only elite and the dual elite, as opposed to within the dual elite group, further supporting Hypothesis 2b.

#### 3.5.4 Mechanisms between Educational Attainment and Health

Lastly, I examine several mechanisms that presumably explain the relationship between education and health. The first set of mediators includes material resources such as income, wealth (home ownership), and medical care. Next, the unique two-career paths for the college educated are considered by adjusting for occupation (professionals and cadres). Social relationships such as marital status, spouses' characteristics and social support, as well as health behaviors, are also potential mechanisms linking education and health. Table 3.6 shows that, among all mediators, adding occupational tracks attenuates the health gap between the dual elite and the education-only elite the most (for the 1994 and 2002 surveys). In particular, being a cadre has tremendous health benefits. The 2010 CFPS survey did not collect occupation, so I add subjective evaluation of socioeconomic status. Again, this variable alone closes the health gap between the dual elite and the education-only elite.

[Table 3.6 about here]

### 3.6 Discussion

The powerful role of education in determining health-related outcomes in the United States and other Western countries has motivated some scholars to refer to education as a “fundamental cause” (Link and Phelan, 1995) or “root cause” (Mirowsky and Ross, 2003, 31) of health. Yet, what is less understood is what aspect of education matters. Human capital theorists emphasize knowledge and skills obtained through learning, fundamental cause theory highlights social institutions that almost universally link educational advantage with advantages in other aspects, while scholars who see education as a spurious correlate argue that it is unobserved heterogeneity such as family background and ability that confounds the relationship between education and health. Distinguishing these perspectives has important theoretical and practical implications. In this paper, I test these three theoretical perspectives drawing on survey data collected in an institutional context different from that of the West, which presents a unique research site to analytically separate the components emphasized in different perspectives. My findings provide strong support for and extend fundamental cause theory. I discuss below the theoretical, methodological and practical implications of this study.

Theoretically, my findings cast doubt on education’s universal role in structuring health disparities. One contribution of this paper, therefore, is to show that particular institutional arrangements figure dominantly in determining educational gradient in health. In industrialized market societies, the market plays a central role in allocating resources; education, as a signal of human capital and productivity, is consequently rewarded and associated with a wide range of flexible and desirable resources beneficial for health. This is the case for both “liberal” countries such as the United States (Adler et al., 1994; Elo and Preston, 1996; Kitagawa and Hauser, 1973; Meara et al., 2008) and countries where the welfare state plays an active role in resource redistribution such as the Nordic nations (Olafsdottir, 2007).

However, the importance of education for getting ahead is not necessarily a natural or fixed feature of society. In China’s particular macropolitical environment, it is the state and the Communist Party—rather than the market—that distribute and allocate resources (Bian, 2002; Nee, 1989, 1996; Walder et al., 2000; Zhou, 2010; Zhou et al., 1996). State/party policies can even change the very meaning of “resources,” the most

extreme case being the Cultural Revolution decade when parents' education was considered as a liability rather than an asset (Deng and Treiman, 1997; Unger, 1982; Zhou and Hou, 1999; Zhou et al., 1996). Even with the ending of the Cultural Revolution and the burgeoning economic reform in urban China, education has yet to become a fundamental force in shaping life chances as it is in Western societies (Walder, 1996; Zhao and Zhou, 2002; Zhou, 2000). By contrast, party affiliation, as an indicator of one's loyalty to and connection with the state/party apparatus, turns out to play a more important role in structuring health disparities. Irrespective of the order in which educational and political credentials are obtained, members of the incorporated and the sponsored dual elite enjoy significantly better health than those in the education-only elite, even though all three groups have a college degree. This also explains why no cohort difference is observed for the education-health relationship,<sup>3</sup> even though members of the Cultural Revolution cohort suffered declining schooling quality (key to human capital theory) and for this cohort, only those from the working class were eligible to attend college (key to the spurious correlation thesis). What largely remains the same for the three cohorts, however, is the single-party state society of China. Even with the economic transition China has experienced and the growth of the market, party members use various overt and covert ways to maintain their power, as pointed out by the "power conversion" (Rona-Tas, 1994) and "power persistence" (Bian and Logan, 1996) theses in the social stratification literature. Therefore, the meaning of education and its health implication could well exhibit different patterns in societies with alternative institutional arrangements. Accordingly, there is no way to map education and life chances without locating individuals in a socially and historically bounded life course context; recognizing that variations by social contexts and historical timing are key to unravel social determinants of health. Echoing a very recent study (Hayward et al., 2015), it is perhaps more fruitful to ask under what conditions (time, place, institutions) education is associated with health, rather than whether or not education has a causal effect on health.

Another theoretical contribution of this paper is to show the value of distinguishing

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<sup>3</sup> One previous study showed a significant cohort by education interaction. Using growth curve models, Chen et al. (2010) reported significant cohort variations in educational disparities in self-reported health. But the size of the education by cohort (coded 1 to 6) interaction is small, -0.01 for an outcome ranging from 1-4 (Table 2, 136).

alternative types of resources key to the fundamental cause theory: knowledge/skills (concrete knowledge, as well as cognitive and non-cognitive skills), money, power, prestige, and desirable social connections. Previous tests of fundamental cause theory concentrate on human resources, for example, how high SES individuals act upon new medical knowledge (e.g., smoking is harmful), thereby gaining health advantage over low SES individuals (Chang and Lauderdale, 2009; Glied and Lleras-Muney, 2008; Goldman and Smith, 2005; Link et al., 1998; Rubin et al., 2014; de Walque, 2004). This focus makes it difficult to differentiate fundamental cause theory and human capital theory. Further, it has the tendency to “blame the victim” and leads to interventions focusing on disseminating new medical knowledge rather than reforms beyond the medical arena. Future studies need to direct more attention to the roles of resources other than knowledge/skills in the shaping of health disparities.

Concentrating on knowledge and skills is even more problematic in the case of China. As shown, health behaviors—the type of resources most relevant to knowledge/skill—do not seem to explain much the health gap between the education-only elite and the dual elite. In fact, it is surprising to see that it is the sponsored dual elite, who supposedly have accumulated less knowledge and skills, who are most likely to exercise and least likely to smoke, suggesting other factors are operating to shape health behaviors. In comparison to health behaviors, occupational track is a more important factor; becoming a cadre brings about great health benefits. The question then becomes: what it is about the cadre occupation that yields health advantages? One possibility could be income. Although I control for income, to what extent this measure truthfully captures the real incomes obtained by cadres is questionable; rent-seeking and grey income acquired by exploiting their strategic positions in the state hierarchy is not an uncommon practice for cadres. Subjective SES is also worth examining. That the education-only elite and the incorporated dual elite evaluate themselves as located lower than the sponsored dual elite in the social hierarchy point to the limitation of merely relying on objective SES measures to study health, especially in societies with distinct social stratification systems.

From a methodological perspective, this paper adds to the lively debate between the “structural” and “reductionist” schools of causal inference. There is interest in using instrumental variables (IV) to identify the “causal effect” of education on health (e.g.,

Lleras-Muney, 2005). But scholars have voiced cautions against a simple reductionist approach. Among other critiques, Deaton (2010a) highlights that context and mechanism are missing in the reductionist approach (also see Pawson and Tilley, 1997), leading to little learning regarding potentially generalizable mechanisms. This study illustrates the limitation of the IV method through a comparison between IV results and results based on theoretical-driven contextual analyses. As described, previous studies using the Chinese Cultural Revolution as an instrument show that education has no “causal effect” on health. This statement, however, does not point to the source of this null effect.

Indeed, “null effects” are subject to multiple interpretations, but previous studies focus exclusively on the spurious correlations explanation. Because the IV method relies on “exclusion restriction” to eliminate influences of confounders (“third variables”), the reasoning goes, a null IV estimate means that the significant association between education and health as found in conventional models (e.g., OLS) is driven by those third variables. In other words, spurious correlations explain why educational gradients in health are so persistently observed. However, this interpretation ignores the social contexts that assign meanings to education. While IV methods pay due attention to the process determining educational attainment, it overlooks what follows once one obtains a diploma, or the “life circumstances” (Link et al., 2013) a higher education degree brings about, which is highly dependent on the specific institutional configurations of a society and requires a case-by-case study. In the presence of institutional variations, therefore, estimated policy effects from one setting are less likely to be externally valid in others.

The Cultural Revolution represents an extreme case in human history. This naturally leads to the question of generalizability as well as the practical value of the current study. Although focusing on three Chinese cohorts, this paper is motivated by the broad sociological question of why education matters for health, as well as how particular institutional arrangement and dramatic social upheavals produce variations in individual life chances. The Cultural Revolution, rare as it was, provides a unique natural experiment where some key social parameters were reversed sharply (e.g., intergenerational transmission of education). Further, the Chinese institutional configuration offers a rare

situation in which “the ability to use socioeconomic resources can be analytically separated from SES itself” (Phelan et al., 2010). The arguments and findings, accordingly, have implications for many other societies—such as the post-Communist countries—where macropolitical environment matters strongly for individual life chances; more generally, this research sheds light on the role of education in structuring health.

From a policy perspective, assessing the validity of three theoretical perspectives suggests in turn different types of possible interventions. Knowledge or skills as highlighted in human capital theory, for example, is usually learned in the educational system and thus calls for high quality education. Socially rewarding and redistributive institutions play key roles in the connection between education and health-beneficial resources, as emphasized by fundamental cause theory. The spurious correlation thesis, in comparison, argues for a still different set of policies, for example, early-life interventions developed to promote specific characteristics (i.e., the “third variables”). Given my findings, a more appropriate way to fight health disparities by SES seems to be to target social reward and redistribution mechanisms in order to weaken the link between advantaged social status and other resources. This is without doubt a difficult social endeavor. And, as pointed out by Freese and Lutfey (2011), it may have unintended consequences. Care should be exercised to weigh benefits and costs.

This study has several limitations. First, although I draw on three surveys collected in different historical periods, all of them are cross-sectional. Future studies with longitudinal data are necessary to examine questions about health trajectories. Second, more detailed measures of potential mediators are needed to better understand why members of the education-only elite lag behind those of the dual elite in health, and to understand what this means for policy interventions. Third, self-reported health is a widely used and well-recognized health measure that is highly predictive of subsequent mortality, but more objective health measures such as morbidity or mortality are better positioned to address any bias related to self reports. Fourth, this study examines three Chinese cohorts who entered the labor market before the intensification of the economic reform in urban China (1992). What is it like for more recent cohorts whose career coincides with China’s transition from a redistributive to a market economy? Market transition theory predicts that returns to human capital will increase in such a transition (Nee, 1989), but power persistence and power conversion theses argue the opposite (Bian and



Logan, 1996). To what extent the patterns detected in this research are generalizable to even more recent Chinese cohorts is an empirical question.

To conclude, this study casts doubt on the universal beneficial effect of educational attainment on health. It supports but also complicates fundamental cause theory, revealing that institutional arrangements that shape access to resources are important parameters for understanding the powerful link between education and health. Only through discoveries of how education is linked to different health outcomes in societies with different institutional arrangements and at different historical times can our understanding of the society advances.

Table 3.1: Summary of Hypotheses

	<b>Spurious Correlation</b>	<b>Human Capital</b>	<b>Fundamental Cause</b>
<b>Test 1</b>			
Cohort Differences	Yes	Yes	No
<b>Test 2</b>			
Education-Only Elite	+	+	0
Dual Elite	+	+	+
Incorporated Dual Elite	+	+	+
Sponsored Dual Elite	0	0	+

*Notes:* 1. The symbol "+" represents better health than those without an associate college degree; "0" represents similar levels of health compared with those without an associate college degree.

2. The education-only elite refer to those with at minimum an associate college degree but who are not party members. The dual elite refer to those with at minimum an associate college degree and who are also party members. The dual elite are further divided into two groups. The incorporated dual elite have their college completed before joining the party, while the sponsored dual elite begin college after joining the party.

Table 3.2: Definitions of Pre-Cohort, CR-Cohort, and Post-Cohort, and their Ages at Various Years

	Pre-CR Cohort	CR Cohort	Post-CR Cohort
Birth Year	1930-46	1947-57	1958-72
Ages at 1966 (Note 1)	20-36	9-19	$\leq 8$
Ages at 1994 (Note 2)	48-64	37-47	22-36
Ages at 2002 (Note 3)	56-72	45-55	30-44
Ages at 2010 (Note 4)	64-80	53-63	38-52

*Notes:* 1. This is the year when the Cultural Revolution began.

2. This is the year when the 1994 States and Life Chances in Urban China Survey was conducted.

3. This is the year when the 2002 Chinese Household Income Project (CHIP) was conducted.

4. This is the year when the 2010 China Family Panel Studies (CFPS) was conducted.

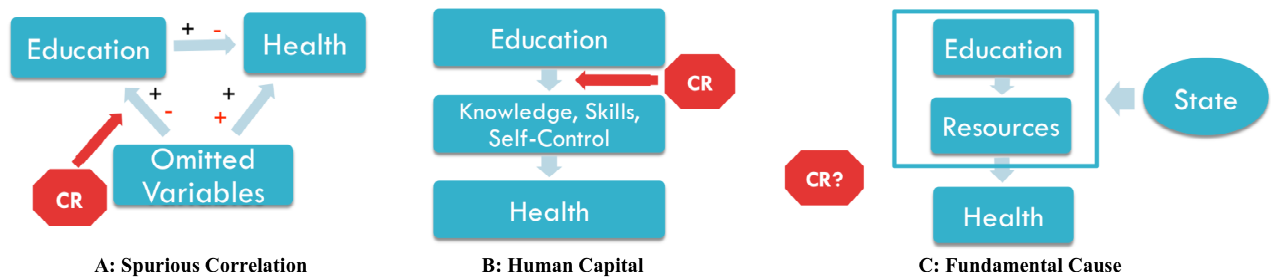


Figure 3.1: Diagrams Illustrating Three Theoretical Perspectives regarding the Relationship between Education and Health

Table 3.3: Descriptive Statistics of Analytic Variables, Years 1994, 2002, and 2010

Panel A: 1994 Life Chances Survey										T-tests		
	<= High School (N = 3152)		Education-Only Elite (N = 251)		Incorporated Dual Elite (N = 112)		Sponsored Dual Elite (N = 84)		Edu. vs. Inc.	Edu vs. Spon.	Inc.vs. Spon.	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD				
Self-Reported Health	7.15	1.96	7.43	1.68	7.46	1.57	7.45	1.66				
Age	41.07	8.89	38.83	9.73	43.32	9.58	42.87	6.13	***	***		
Cohort Membership												
Pre-CR Cohort (born 1930-46)	26%	0.44	23%	0.42	41%	0.49	25%	0.44	***		*	
CR Cohort (born 1947-57)	40%	0.49	29%	0.45	30%	0.46	58%	0.5		***	***	
Post-CR Cohort (born 1958-72)	33%	0.47	49%	0.5	29%	0.45	17%	0.37	***	***		
Women	52%	0.5	43%	0.5	29%	0.46	30%	0.46	*	*		
Family Background												
Cadre	7%	0.25	22%	0.41	25%	0.43	24%	0.43				
Working Class	83%	0.37	47%	0.5	60%	0.49	69%	0.47	*	***		
Intellectual	7%	0.26	27%	0.44	12%	0.33	6%	0.24	**	***		
Exploiting Class	3%	0.16	5%	0.21	3%	0.16	1%	0.11				
Ever Sent Down	13%	0.34	12%	0.33	9%	0.29	23%	0.42		*	**	
Married	96%	0.21	90%	0.31	98%	0.13	100%	0	**	**		
Personal Income	4654	7512	8502	23344	7146	4294	7771	6932				
House Ownership	25%	0.43	13%	0.34	11%	0.32	5%	0.22				
Administrative Cadres	13%	0.33	25%	0.43	40%	0.49	70%	0.46	**	***	***	
Professionals	11%	0.31	65%	0.48	54%	0.5	27%	0.44		***	***	
Spouse Elite Status												
Spouse < High School	61%	0.49	22%	0.42	25%	0.43	22%	0.42				
Spouse High School	32%	0.47	27%	0.45	23%	0.42	38%	0.49			*	
Spouse Education-Only Elite	4%	0.19	31%	0.46	31%	0.46	16%	0.37		**	*	
Spouse Incorporated Dual Elite	2%	0.16	23%	0.42	25%	0.43	4%	0.19		***	***	
Spouse Sponsored Dual Elite	1%	0.11	8%	0.27	6%	0.24	12%	0.32				
Panel B: 2002 CHIP										T-tests		
	<= High School (N = 6981)		Education-Only Elite (N = 964)		Incorporated Dual Elite (N = 382)		Sponsored Dual Elite (N = 720)		Edu. vs. Inc.	Edu vs. Spon.	Inc.vs. Spon.	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD				
Self-Reported Health	3.64	0.88	3.78	0.79	3.87	0.79	3.85	0.83	*			
Age	47.95	9.16	42.26	8.99	45.91	10.32	46.63	8.48	**	**		
Cohort Membership												
Pre-CR Cohort (born 1930-46)	18%	0.39	10%	0.3	21%	0.4	13%	0.33	**	*	**	
CR Cohort (born 1947-57)	46%	0.5	23%	0.42	30%	0.46	47%	0.5	*	*	*	
Post-CR Cohort (born 1958-72)	36%	0.48	67%	0.47	50%	0.5	40%	0.49	**	*		
Women	55%	0.5	50%	0.5	29%	0.46	37%	0.48	*	**		
Parent High School or Above	17%	0.37	47%	0.5	41%	0.49	34%	0.47	*	*		
Ever Sent Down	25%	0.43	15%	0.37	16%	0.36	28%	0.45		*	**	
Married	97%	0.17	98%	0.16	98%	0.14	98%	0.15	+			
Personal Income	10021	7418	15908	10191	20326	12565	16112	8754	***		**	
House Ownership	78%	0.41	84%	0.38	86%	0.35	86%	0.34	+			
Health Insurance	59%	0.49	73%	0.44	85%	0.34	83%	0.36	**	**		
Administrative Cadres	7%	0.26	10%	0.29	39%	0.49	38%	0.49	***	**		
Professionals	12%	0.33	48%	0.5	44%	0.5	25%	0.44	!	**	**	
Spouse Elite Status												
Spouse < High School	46%	0.5	10%	0.29	11%	0.31	19%	0.39		*	**	
Spouse High School	41%	0.49	32%	0.47	29%	0.44	36%	0.48				
Spouse Education-Only Elite	5%	0.23	34%	0.47	26%	0.44	17%	0.38		*	*	
Spouse Incorporated Dual Elite	2%	0.12	17%	0.37	18%	0.38	2%	0.14		**	**	
Spouse Sponsored Dual Elite	4%	0.2	17%	0.39	9%	0.28	15%	0.36			*	

Table 3.3 (cont.)

	Panel C: 2010 CFPS								t-tests		
	<= High School (N = 2576)		Education-Only Elite (N = 212)		Incorporated Dual Elite (N = 104)		Sponsored Dual Elite (N = 54)		Edu. vs. Inc.	Edu vs. Spon.	Inc.vs. Spon.
	Mean	SD	Mean	SD	Mean	SD	Mean	SD			
Self-Reported Health	4.11	0.93	4.12	0.91	4.37	0.62	4.33	0.89	*		
Age	53.34	9.45	48.74	10.76	50.24	10.62	53.93	7.77		**	+
Cohort Membership											
Pre-CR Cohort (born 1930-46)	14%	0.38	8%	0.38	11%	0.36	6%	0.29			
CR Cohort (born 1947-57)	33%	0.49	17%	0.4	26%	0.44	62%	0.5		***	**
Post-CR Cohort (born 1958-72)	52%	0.5	75%	0.48	64%	0.49	32%	0.47		***	*
Women	50%	0.5	47%	0.5	36%	0.48	42%	0.49	+		
Family Background											
Working Class	92%	0.28	78%	0.34	87%	0.41	83%	0.42			
Intellectual	8%	0.28	22%	0.34	13%	0.41	17%	0.42			
Ever Sent Down	20%	0.42	11%	0.34	17%	0.38	27%	0.44	*	**	+
Married	88%	0.32	93%	0.29	93%	0.27	88%	0.26			
Health Insurance	53%	0.5	70%	0.48	85%	0.45	85%	0.44	*	**	
Personal Income	12358	17338	30557	47312	32387	55102	31315	34202			
Subjective SES	2.5	1	2.8	0.86	2.9	0.9	3.22	0.72		***	*
Smoking Status											
Never Smoked	58%	0.49	61%	0.47	54%	0.5	66%	0.5			
Quitted Smoking	8%	0.27	6%	0.24	11%	0.27	9%	0.38			
Currently Smoke <= 10/day	12%	0.32	14%	0.33	13%	0.34	11%	0.38			
Currently Smoke > 10/day	22%	0.4	19%	0.36	22%	0.42	14%	0.34			**
Drinking Status											
Never Drank Excessively	74%	0.43	75%	0.41	82%	0.41	72%	0.48	*		**
Quitted Drinking Excessively	7%	0.24	9%	0.22	5%	0.19	4%	0.34	*		
Currently Drink Excessively	19%	0.38	16%	0.37	13%	0.38	24%	0.42			
Exercise	58%	0.5	65%	0.48	79%	0.44	93%	0.39	*	**	*
Social Support	3.72	0.9	3.63	0.9	3.81	0.84	3.83	0.81			

Notes: 1. Stars indicate significance levels derived from t-tests between the three elite groups. \*\*\* p<0.001, \*\* p<0.01, \* p<0.05

2. The education-only elite refer to those with at minimum an associate college degree but who are not party members. The dual elite refer to those with at minimum an associate college degree and who are also party members. The dual elite are further divided into two groups. The incorporated dual elite have their college completed before joining the party, while the sponsored dual elite begin college after joining the party.

Sources: 1994 States and Life Chances in Urban China Survey (Life Chances), 2002 Chinese Household Income Project (CHIP), and 2010 China Family Panel Studies (CFPS).

Table 3.4: Estimates of Cohort Differences from Ordinal Logit Models Predicting Self-Reported Health, Years 1994, 2002, and 2010

	1994	2002	2010
Educational Attainment (Ref. = < High School)			
High School	0.053 (0.110)	0.090 (0.066)	0.061 (0.047)
Associate College or Above	0.302* (0.150)	0.199 (0.122)	0.200 (0.110)
Cohort (Ref. = Post-CR Cohort, born 1958-72)			
Pre-CR Cohort (born 1930-46)	0.326 (0.227)	-0.123 (0.119)	0.428* (0.107)
CR Cohort (born 1947-57)	0.152 (0.151)	-0.127 (0.116)	0.127 (0.071)
Educational Attainment * Cohort (Ref. = < High School * Post-CR Cohort)			
High School * Pre-CR Cohort	0.043 (0.173)	0.198 (0.170)	0.258 (0.222)
High School * CR Cohort	0.033 (0.154)	0.036 (0.102)	0.253* (0.066)
Associate College or Above * Pre-CR Cohort	-0.166 (0.204)	0.195 (0.232)	-0.709 (0.370)
Associate College or Above * CR Cohort	-0.044 (0.206)	0.227 (0.164)	-0.112 (0.128)
Age	-0.126*** (0.033)	-0.038 (0.030)	-0.036 (0.022)
Age Squared	0.001* (0.000)	-0.000 (0.000)	-0.000 (0.000)
Women	-0.464*** (0.046)	-0.257*** (0.016)	-0.152* (0.052)
Family Background (Ref. = Working Class)			
Cadre	-0.179 (0.113)		
Intellectual	-0.158 (0.111)		
Exploiting Class	-0.161 (0.167)		
Working Class			-0.046 (0.090)
Parent High School or Above		-0.049+ (0.019)	
Ever Sent to Rural Areas	-0.026 (0.097)	0.097*** (0.007)	-0.064 (0.071)
Observations	4,240	9,047	3,145

*Note:* Standard errors in parentheses. Province dummies are included in models but omitted here for simplicity. Constants (cutoff points) are omitted for simplicity.

\*\*\* p<0.001, \*\* p<0.01, \* p<0.05, + p<0.1

*Sources:* 1994 States and Life Chances in Urban China Survey (Life Chances), 2002 Chinese Household Income Project (CHIP), and 2010 China Family Panel Studies (CFPS).

Table 3.5: Estimates from Ordinal Logit Models Predicting Self-Reported Health, Years 1994, 2002, and 2010

	1994		2002		2010	
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Elite Groups 1 (Ref. = < High School)						
High School	0.068 (0.069)		0.147+ (0.060)		0.142* (0.049)	
Education-Only Elite	0.176 (0.113)		0.175+ (0.059)		-0.050 (0.077)	
Dual Elite	0.308** (0.110)		0.446*** (0.027)		0.368* (0.122)	
Elite Groups 2 (Ref. = < High School)						
High School		0.068 (0.069)		0.147+ (0.059)		0.143* (0.049)
Education-Only Elite		0.175 (0.113)		0.175+ (0.060)		-0.049 (0.078)
Sponsored Dual Elite		0.323+ (0.181)		0.438** (0.040)		0.173* (0.052)
Incorporated Dual Elite		0.299* (0.126)		0.462* (0.087)		0.491* (0.171)
Cohort (Ref. = Post-CR Cohort, born 1958-72)						
Pre-CR Cohort (born 1930-46)	0.318 (0.209)	0.318 (0.209)	-0.009 (0.093)	-0.010 (0.092)	0.470** (0.086)	0.465** (0.086)
CR Cohort (born 1947-57)	0.160 (0.130)	0.160 (0.130)	-0.064 (0.059)	-0.064 (0.059)	0.203* (0.064)	0.208* (0.060)
Age	-0.129*** (0.033)	-0.129*** (0.033)	-0.038 (0.030)	-0.038 (0.030)	-0.050+ (0.022)	-0.050+ (0.022)
Age Squared	0.001* (0.000)	0.001* (0.000)	-0.000 (0.000)	-0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
Women	-0.461*** (0.046)	-0.461*** (0.046)	-0.253*** (0.017)	-0.253*** (0.016)	-0.148* (0.050)	-0.148* (0.050)
Family Background (Ref. = Working Class)						
Cadre	-0.169 (0.113)	-0.169 (0.113)				
Intellectual	-0.155 (0.111)	-0.154 (0.111)				
Exploiting Class	-0.156 (0.166)	-0.156 (0.166)				
Working Class					-0.037 (0.098)	-0.039 (0.096)
Parent High School or Above			-0.049+ (0.020)	-0.049+ (0.019)		
Ever Sent to Rural Areas	-0.027 (0.097)	-0.027 (0.097)	0.100** (0.008)	0.100** (0.008)	-0.050 (0.066)	-0.050 (0.065)
Observations	4,240	4,240	9,047	9,047	3,145	3,145

Notes: 1. The education-only elite refer to those with at minimum an associate college degree but who are not party members. The dual elite refer to those with at minimum an associate college degree and who are also party members. The dual elite are further divided into two groups. The incorporated dual elite have their college completed before joining the party, while the sponsored dual elite begin college after joining the party.

2. Standard errors in parentheses. Province dummies are included in models but omitted here for simplicity. Constants (cutoff points) are omitted for simplicity.

\*\*\* p<0.001, \*\* p<0.01, \* p<0.05, + p<0.1

Sources: 1994 States and Life Chances in Urban China Survey (Life Chances), 2002 Chinese Household Income Project (CHIP), and 2010 China Family Panel Studies (CFPS).



Table 3.6: Estimates from Ordinal Logit Models Predicting Self-Reported Health with Potential Mediators, Years 1994, 2002, and 2010

	1994		2002		2010		
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Elite Groups (Ref. = < High School)							
High School	-0.035 (0.075)	-0.002 (0.071)	0.099 (0.072)	0.141 (0.083)	0.106+ (0.046)	0.129* (0.041)	0.118+ (0.054)
Education-Only Elite	-0.014 (0.134)	0.020 (0.118)	0.124* (0.027)	0.134* (0.033)	-0.114+ (0.049)	-0.064 (0.080)	-0.063 (0.060)
Dual Elite	0.061 (0.127)	0.207+ (0.112)	0.322* (0.055)	0.391** (0.033)	0.219+ (0.107)	0.359* (0.131)	0.315* (0.117)
<b>Material Resources</b>							
Logged Personal Income	0.034* (0.017)		0.044 (0.021)		0.006 (0.006)		
House Ownership	0.043 (0.087)		0.137* (0.034)				
Health Insurance			-0.028 (0.064)		-0.011 (0.057)		
Administrative Cadres	0.272** (0.090)		0.166* (0.044)				
Professionals	0.204* (0.095)		-0.016 (0.079)				
Subjective SES					0.268*** (0.008)		
<b>Social Relationships</b>							
Married		-0.138 (0.192)		0.070 (0.059)		0.384* (0.112)	
Spouse Elite Status (Ref. = < High School)							
High School		0.075 (0.144)		-0.084 (0.052)			
Education-Only Elite		0.116 (0.138)		-0.119* (0.033)			
Dual Elite		-0.017 (0.169)		-0.074 (0.045)			
Spouse Personal Income		-0.000 (0.000)		0.000 (0.000)			
Spouse Administrative Cadres		0.078 (0.095)		0.116 (0.060)			
Spouse Professionals		0.144 (0.102)		0.007 (0.052)			
Social Support						-0.011 (0.008)	

Table 3.6 (cont.)

**Health Behaviors**

Smoking Status (Ref. = Never Smoked)							
Quitted Smoking							-0.433***
							(0.044)
Currently Smoke <= 10/day							-0.189+
							(0.089)
Currently Smoke > 10/day							0.121
							(0.098)
Drinking Status (Ref. = Never Drank Excessively)							
Quitted Drinking Excessively							-0.993**
							(0.155)
Currently Drink Excessively							0.306*
							(0.079)
Exercise							
							0.264**
							(0.042)
Cohort (Ref. = Post-CR Cohort, born 1958-72)							
Pre-CR Cohort (born 1930-46)	0.329	0.216	-0.001	0.068	0.401**	0.451**	0.442**
	(0.219)	(0.230)	(0.131)	(0.099)	(0.096)	(0.095)	(0.069)
CR Cohort (born 1947-57)	0.104	0.157	-0.063	-0.017	0.179*	0.185*	0.135*
	(0.134)	(0.140)	(0.088)	(0.075)	(0.065)	(0.059)	(0.045)
Age	-0.136***	-0.134***	-0.045	-0.055	-0.045	-0.059*	-0.063*
	(0.035)	(0.040)	(0.031)	(0.053)	(0.028)	(0.022)	(0.021)
Age Squared	0.001*	0.001*	0.000	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Women	-0.417***	-0.511***	-0.233***	-0.288**	-0.153+	-0.119+	-0.202
	(0.050)	(0.051)	(0.015)	(0.040)	(0.062)	(0.058)	(0.101)
Family Background (Ref. = Working Class)							
Cadre	-0.224+	-0.104					
	(0.118)	(0.120)					
Intellectual	-0.148	-0.186					
	(0.115)	(0.120)					
Exploiting Class	-0.179	-0.274					
	(0.175)	(0.174)					
Working Class					-0.022	-0.037	-0.050
					(0.115)	(0.099)	(0.098)
Parent High School or Above			-0.043	-0.072+			
			(0.023)	(0.028)			
Ever Sent to Rural Areas	-0.023	-0.035	0.111**	0.102**	-0.050	-0.044	-0.012
	(0.101)	(0.104)	(0.019)	(0.016)	(0.063)	(0.064)	(0.070)
Observations	3,754	3,502	8,533	7,581	3,134	3,145	3,136

Notes: 1. The education-only elite refer to those with at minimum an associate college degree but who are not party members. The dual elite refer to those with at minimum an associate college degree and who are also party members. The dual elite are further divided into two groups. The incorporated dual elite have their college completed before joining the party, while the sponsored dual elite begin college after joining the party.

2. Standard errors in parentheses. Province dummies are included in models but omitted here for simplicity. Constants (cutoff points) are omitted for simplicity.

\*\*\* p<0.001, \*\* p<0.01, \* p<0.05, + p<0.1

Sources: 1994 States and Life Chances in Urban China Survey (Life Chances), 2002 Chinese Household Income Project (CHIP), and 2010 China Family Panel Studies (CFPS).

Table 3.7: (Appendix A) Instrumental Variables Estimates of Educational Effects on Self-Reported Health

VARIABLES	1994	2002	2010
Associate College or Above	0.461 (1.271)	0.176 (0.439)	1.050 (1.138)
Age	-0.079+ (0.042)	-0.021 (0.017)	0.042 (0.056)
Age Squared	0.000 (0.001)	0.000 (0.000)	-0.000 (0.000)
Women	-0.364*** (0.098)	-0.110* (0.048)	-0.043 (0.061)
Family Background (Ref. = Working Class)			
Cadre	-0.201 (0.313)		
Intellectual	-0.167 (0.268)		
Exploiting Class	-0.245 (0.208)		
Working Class			0.121 (0.187)
Parent High School or Above		-0.026 (0.099)	
Ever Sent to Rural Areas	-0.028 (0.093)	0.039+ (0.023)	-0.020 (0.048)
Constant	10.027*** (0.928)	4.880*** (0.547)	2.912 (2.030)
Observations	3,599	9,047	2,952
R-squared	0.113	0.079	-0.068
Cragg-Donald Stat.	20.30	22.77	6.637
Prob > F	6.83e-06	1.86e-06	0.0100

*Notes:* 1. The instrument is an interaction term between cohort membership and coming from an intellectual family, the type of family background most discriminated against during the Cultural Revolution. Using cohort membership alone yields similar results.

2. Standard errors in parentheses. Province dummies are included in models but omitted here for simplicity.

\*\*\*  $p < 0.001$ , \*\*  $p < 0.01$ , \*  $p < 0.05$ , +  $p < 0.1$

*Sources:* 1994 States and Life Chances in Urban China Survey (Life Chances), 2002 Chinese Household Income Project (CHIP), and 2010 China Family Panel Studies (CFPS).

## Chapter 4

# Turning Point or Selection? Rustication and Midlife Health of Chinese Cultural Revolution Cohort

### Abstract

The rustication policy implemented during the Chinese Cultural Revolution (CR) (1966-76) sent more than 17 million urban youth—a third of the Cultural Revolution cohort (i.e., those turning age 19 during Cultural Revolution)—to rural areas. The life chances of these rusticated youth subsequent to their returning to cities have been the focus of much research, but no study has examined the long-term consequences of rustication for midlife health. Further, existing literature typically treats the Cultural Revolution cohort as a uniform whole, even though those in its leading and trailing edges were subject to different types of selection criteria given shifting rustication policies. Based on life history data collected from the *1994 State and Life Chances in Urban China Survey*, I show that duration spent in rural areas and cohort membership combine to shape midlife health, with health disadvantage mostly borne by members of the trailing-edge CR cohort who lived in rural areas for more than 5 years. Two potential explanations for this finding are selection and turning-point. Results from propensity

score matching support the selection explanation; because the rustication policy became less strictly implemented in the later stages of Cultural Revolution, those who were sent to rural areas and stayed there for a long time from trailing-edge CR cohort were disadvantaged in many other ways, accounting for their poorer health later in life. In addition, the absence of running water in rural areas when these late returners were rusticated exacerbated their disadvantages. By contrast, measures of life chances following rusticated youth's home returning—their marital status, occupation, income, and work unit—differ little from those who stayed in cities, thereby refuting the turning-point view.

## 4.1 Introduction

Recent decades have witnessed a growing interest in adopting a life-course perspective to study health-related outcomes (Ben-Shlomo and Kuh, 2002; Blackwell et al., 2001; Elo and Preston, 1992; Hayward and Gorman, 2004; Preston et al., 1998). A number of early-life conditions—exposure to adverse conditions *in utero*, nutritional deficits, poverty, and stressful family conditions—have been shown to have far-reaching associations with subsequent health (Barker, 1998; Ben-Shlomo and Kuh, 2002; Blackwell et al., 2001; Elo and Preston, 1992; Fan and Qian, 2015).

Guided by this literature, this paper examines the relationship between the early-life experience of being sent by the state to rural areas and subsequent midlife health among members of the Chinese Cultural Revolution cohort, defined as those who turned age 19 during the Cultural Revolution (1966-76). Initiated by Mao, the Cultural Revolution was a decade-long political campaign lasting from 1966 to 1976 with a radical agenda to implement Mao's vision of socialism (Tsou, 1999). In addition to disrupted educational opportunities due to the prolonged attack on the education system during that turbulent decade (Davis, 1992; Davis-Friedmann, 1985; Deng and Treiman, 1997; Meng and Gregory, 2002; Pepper, 1991; Unger, 1982), many members of the Cultural Revolution cohort were severely affected by the rustication policy, otherwise known as the “up to the mountains and down to the villages” or the send-down movement that sent children in their late teens and early twenties to the countryside (Bernstein, 1977; Bonnin and Horko, 2013; Esherick et al., 2006; Zhou and Hou, 1999).

The rustication policy, formally implemented in 1968, required all eligible “young intellectuals,” by and large graduating classes from middle and high schools who barely reached the age of 18, to leave the cities and move into the countryside to be “reeducated” by the peasants (Bernstein, 1977; Bonnin and Horko, 2013; Esherick et al., 2006; Zhou and Hou, 1999). The practice continued for more than ten years until it was abolished in 1980, leading to an estimated 17 million—about a third of—urban youth sent to work as peasants in the countryside over the entire Cultural Revolution decade (Esherick et al., 2006; Zhou and Hou, 1999). Most of these young people—known as the “intellectual youth” or the “rusticates”—returned home eventually,<sup>1</sup> but many did so only after a period of up to 10 years, creating three distinct groups: *stayers* (i.e., those who did not go to the countryside), *early returners* (i.e., those sent down who returned home within 5 years), and *late returners* (i.e., those sent to rural areas who returned home at least 5 years later); five years is a cutting point typically used in previous literature (e.g., Lin, 2013; Qian and Hodson, 2011; Xie et al., 2008; Zhou and Hou, 1999). As Xie et al. (2008, 688) argued, an early return was extremely valuable, “social inequality in the execution of the send-down policy may have lain more in the duration of time spent in the countryside than in the probability of being sent down.”

Given the magnitude, intensity, and rareness of the rustication movement, subsequent life chances of those rusticated youth have been the focus of several scholarly investigations (Chen, 1999; Hung and Chiu, 2003; Qian and Hodson, 2011; Xie et al., 2008; Zang, 2000; Zhou and Hou, 1999). I seek to add to this body of research in two ways. First, scholarship to date has examined outcomes including education (Qian and Hodson, 2011; Xie et al., 2008; Zhou and Hou, 1999), employment (Chen, 1999; Hung and Chiu, 2003; Qian and Hodson, 2011; Xie et al., 2008; Zhou and Hou, 1999), earnings (Qian and Hodson, 2011; Xie et al., 2008; Zhou and Hou, 1999), marriage (Qian and Hodson, 2011; Zhou and Hou, 1999), political behavior (Zang, 2000), and happiness (Qian and Hodson, 2011). But no study has investigated the extent to which the rustication experience is linked to health, an important wellbeing component. Second,

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<sup>1</sup> Not every one returned to cities, however. Even after the official revocation of the rustication policy in 1980, an estimated 0.8 million Rusticates—approximately 4 percent of those who were pulled to rural areas—were still in the countryside (Bonnin and Horko, 2013). Most of them were not eligible to return because they got married to local peasants (Bonnin and Horko, 2013; Deng, 2005; Zhou and Hou, 1999). Given data availability, my analysis focuses on those who survived the harsh conditions in the rural areas and successfully returned to cities.

existing literature has not attended to the vast heterogeneity within the Cultural Revolution cohort. For example, the oldest of this cohort had graduated from high school at the outset of the Cultural Revolution, while the youngest were just beginning primary school. As I will show, the degree to which their subsequent life chances and especially health were disrupted by the rustication experience depends greatly on their ages when the Cultural Revolution was initiated and played out.

This paper asks *whether* and *how* the large-scale social dislocation of rustication left a lasting imprint on midlife health of those who were sent to rural areas during their formative years. There are multiple possibilities. First, being sent down to rural areas was not random (Bonnin and Horko, 2013; Qian and Hodson, 2011; Xie et al., 2008; Zhou and Hou, 1999). As elaborated below, the process is deeply patterned and the composition of the rusticates changed over the course of the Cultural Revolution, due to shifting state policies. The pre-rustication characteristics, affecting the likelihood of being sent down, could also shape their later health. Second, “the journeys’ taken by these young people . . . would make a significant difference in their lives” (Elder, 2003, 65). Except for a few qualitative studies, however, regions of destination and what actually happened during the journey of rustication have not been examined systematically. One contribution of this paper, therefore, is to investigate whether different living conditions in rural areas mattered for later health. Third, the rustication experience might permeate into midlife health through its influences on other life chance outcomes when the youth returned to their home cities. The days spent in rural areas likely postponed and hurt their entire social lives later on (Chen, 1999; Hung and Chiu, 2003; Qian and Hodson, 2011; Zhou and Hou, 1999), but it could also force youth to become more adaptive in order to acquire the skills necessary to their survival (Chen and Cheng, 1999). Taken as a whole, by linking health with individual characteristics prior to being sent down, their experiences in rural areas, and their life chances following the return home, this paper evaluates these alternative explanations and highlights the role of nonrandom selection in studies of early-life conditions and subsequent health.

## 4.2 Turning Point or Selection? A Cohort and Life Course Framing

I draw on two strands of literature to theorize the experience of rustication. First, adolescent and early adulthood years spent in rural areas can be viewed as a “*turning point*,” an event or a transition that potentially leads to substantial change in the direction of one’s life (Elder et al., 2003). A turning point can have direct or indirect implications for subsequent life chances. Exposure to a nutritionally-scarce environment *in utero*, for example, has a directly scarring effect for later health (Barker, 1998); a turning point could also extend its long arm through triggering a series of life events such as a rough early life leading to other disadvantages (Hayward and Gorman, 2004; O’Rand and Hamil-Luker, 2005).

Second, any subsequent differences in health between the rusticated and non-rusticated youth may reflect a process of *selection*. There is emerging research revealing a dynamic selection process underneath the observed relationship between early life adversity and later health (Haas, 2006; Luo and Waite, 2005). In most situations, those “third variables” work to strengthen such a link. For example, children born into poor families are more likely to suffer hunger and less likely to have better health in adult life, thereby confounding the relationship between childhood hunger and adult health. Occasionally, however, selection works the other way, such as what happened during the early stage of the Cultural Revolution when children from more advantaged families bore the brunt of rustication.

These two points of view have profound implications for this research. The great majority of existing literature on rustication treats it as a turning point that has fundamentally changed the course of the rusticates’ lives, for better or for worse. Hung and Chiu (2003, 230), for example, commented that “The Cultural Revolution’s impact on individuals’ subsequent life chances has to be understood in terms of its chain effects.” Qian and Hodson (2011, 209) observed “The consequences of structural shocks [rustication] . . . are realized through their impact on a series of life transitions and the vulnerabilities they amplify or the strivings they engender.” From a positive angle, Chen and Cheng (1999, 39) argued that “the sent-down youth may be more adaptive, as their unusual experiences probably improved their social skills and increased their political



flexibility.” By contrast, although it is well-known that decisions around who was sent to rural areas were not random (Bonnin and Horko, 2013; Qian and Hodson, 2011; Xie et al., 2008; Zhou and Hou, 1999), rarely has selection been given due attention when examining subsequent life chances of rusticated youth (for an exception, see Xie et al., 2008, as discussed below). One aim of this paper, therefore, is to distinguish the relative merit of turning point and selection theories in the relationship between rustication and midlife health.

The respective implications of turning point and selection approaches, I further argue, should be moderated by cohort membership. Indeed, one limitation of prior studies on rustication is that they typically treat the Cultural Revolution cohort as a whole. And yet those in its leading and trailing edges were subject to different types of selection criteria given shifting rustication policies. They also encountered differential structural opportunities in the form of educational and occupational options when they returned cities. Members of the *leading-edge CR cohort* were born around 1947-52 and ages 14-19 at the outset of the Cultural Revolution. Had the Cultural Revolution not occurred, this cohort would have graduated from middle or high school in the first three years of the Cultural Revolution, 1966-68, the most chaotic stage when all levels of schooling were closed. When rustication policy was finalized, this cohort was the first and most heavily affected group. Members of the *trailing-edge CR cohort* were born around 1953-57 and ages 9-13 at the outset of the Cultural Revolution. They were in primary school when the Cultural Revolution began. Compared with their counterparts in the leading edge of the CR cohort, members of the trailing edge were exposed to a less strictly implemented rustication policy, usually sent to locations nearer their place of origin and not remaining for more than five years (Hung and Chiu, 2003). Below I examine selection and turning-point explanations through a cohort lens, elaborating on how the dislocations of rustication may have different health implications for members of the leading and trailing edges of the CR cohort because of what occurred before, during, and after a rustication experience.

#### 4.2.1 Selection: Shifting Rustication Policy

The practice of sending people to rural areas existed even prior to the Cultural Revolution as a way to resolve employment problems in the cities (Bernstein, 1977). But it

was maintained at a very low scale; not until the Cultural Revolution was rustication formalized as a policy.<sup>2</sup> This policy, which governed who was sent to and who was able to return from rural areas, changed greatly during the Cultural Revolution decade. Some scholars show that neither the formal nor informal power of parents was able to protect children from being sent to rural areas (Deng and Treiman, 1997; Qian and Hodson, 2011), but this only applies to the early period (Hung and Chiu, 2003; Zhou and Hou, 1999). From 1967 to 1971, when implementation of the rustication policy was stringent, children from cadre or intellectual families were at least as likely to be sent to the countryside as working-class children (Zhou and Hou, 1999). But selective mechanisms emerged later as the political tides subsided. From 1972 to 1978, high-rank cadres were in a much better position to either prevent their children from being sent (for example, by enlisting them in the army or locating them a job in urban areas, see Bonnin and Horko, 2013, 89) or bring their children back to the cities earlier (Zhou and Hou, 1999). Therefore, although selection based on family background is negligible for members of the leading-edge CR cohort, for members of the trailing-edge CR cohort, children from cadre families are more likely to avoid being sent to rural areas or to return to cities early.

*Hypothesis 1: The composition of rusticates in terms of family background differs by cohort. Whereas family background does not predict rustication status for members of the leading edge of the CR cohort, for members of trailing edge, children from cadre families have lower odds of being sent.*

Based on the selection view, the sent-down experience should not be predictive of midlife health for members of leading-edge CR cohort, given that rustication is almost compulsory regardless of family background for this cohort. By contrast, among members of trailing-edge CR cohort, those who were sent to rural areas—especially those who lived there for more than five years (i.e., late returners)—are expected to have poorer health than those who managed to stay in cities. Further, once selection based on family background is controlled for, rustication should have no bearing on midlife

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<sup>2</sup> Multiple factors contributed to the rustication policy. The prospect of assigning jobs for each individual became increasingly bleak in urban areas; the cessation of regular college admission throughout the Cultural Revolution decade amassed a great number of children who finished high school and yet had nowhere to go. Moreover, believing that academic institutions were instilling bourgeois ideas, Mao proposed “the intellectual youth must go to the country to be educated by living in rural poverty” (People’s Daily 1968).

health for either cohort.

*Hypothesis 2 (selection): Preexisting differences among rustication groups (in terms of family background) explain the relationship between rustication experience and midlife health, as well as any cohort variation thereof.*

#### 4.2.2 Turning Point (Direct): During Rustication

Alternatively, rustication could serve as a turning point that directly shaped the rusticated youth when they lived in rural areas. Life in rural China was much harder than in urban areas: housing was inferior by urban standards, basic sanitation measures were lacking, and employment was largely limited to labor intensive agricultural work. There are many anecdotal accounts that speak to the hardships the rusticated youth had to endure in remote mountains or villages (Bonnin and Horko, 2013, 250-254; Deng, 2005). In a 1978 health survey conducted in Yunnan, for example, a great majority of rusticates were found to have anemia, and almost all surveyed youth suffered from stomach diseases, rheumatoid arthritis, and malnutrition (Deng, 2005, 139).

Cohort might be an important contingency factor, however. Members of leading-edge CR cohort, given the strict rustication policy then implemented, were more likely to be sent to remote hinterlands, where hygiene facilities were typically worse, compared with the environments for members of the trailing-edge CR cohort who were more likely to go to towns closer to their home cities (Hung and Chiu, 2003).

*Hypothesis 3: Members of leading-edge CR cohort were more likely to be sent to rural areas with inadequate hygiene facilities, compared with those of trailing-edge CR cohort.*

A natural corollary from the direct turning-point framing is that, any negative association between rustication and midlife health should be more pronounced for members of the leading-edge CR cohort than for members of the trailing-edge CR cohort. Further, given that hard living conditions may cumulate, those who stayed in rural areas for a longer period of time (late returners) from the leading-edge CR cohort should have poorest health later in life.

*Hypothesis 4 (direct turning point): Different rustication experiences (in terms of destination locations and living conditions) explain the relationship between rustication experience and midlife health, as well as any cohort variation thereof.*

### 4.2.3 Turning Point (Indirect): Following Rustication

Another way turning points can alter human lives is through changing the timing and direction of a series of important life events. The rustication experience may have shaped health at midlife indirectly, by setting in motion a chain of events in individuals' lives, including disrupted education, delayed social role transitions, and dismal structural opportunities of locating jobs upon returning. I consider several life chances outcomes: marriage, educational attainment, occupation, and income.

Before returning to their home cities, many rusticated youth refrained from marriage for fear of having to remain in the countryside forever (Chen, 1999; Qian and Hodson, 2011; Zhou and Hou, 1999). In terms of educational attainment, the rusticated youth were actually more likely to subsequently (following their return) attain a college education, compared with urban youth who stayed in cities (Zhou and Hou, 1999; also see Chapter 2). Such differences in education, however, do not mean that rustication experience in itself promoted education. Rather, other social processes could be at work, including the rusticated youth's higher educational levels prior to being sent down (Qian and Hodson, 2011; Xie et al., 2008). With respect to occupation, years spent in rural areas did not contribute to accumulated job skills or enterprise-specific seniority (Qian and Hodson, 2011), which may have lowered the chances of career promotion for the rusticated youth. Lin (2013), for example, found that those who were rusticated, especially late returners (who returned at least 5 years later), are more likely to follow a "working class, downward" trajectory. A few others, however, show no difference between the rusticates and the non-rusticates in high-status occupational attainment at either their first jobs (Meng and Gregory, 2002; Zhou and Hou, 1999) or their midcareer (Xie et al., 2008).

The extent to which the send-down experience affects subsequent life events could depend on cohort membership. In particular, late returners of the trailing-edge CR cohort, who did not return until the final years of the rustication policy, should be most adversely affected. In terms of education, college entrance examinations resumed in 1977, open to all age-eligible youths and favoring academic merits over family background. An early return would therefore facilitate exam success by having more preparation time. Those who did not return until the late 1970s, even when they got a permission to take the exam, were often too busy doing manual work in the fields to make

adequate preparations for passing the exam (Bonnin and Horko, 2013, 136). Further, their late return might harm their prospects of locating a good job upon returning to cities. To some extent, this is a reflection of the fact that the labor market could not absorb the 8 million rusticated youths who returned within the short period of time following the demise of the rustication policy. Unlike the other 8 million—mostly from leading-edge CR cohort—who returned before 1977, these trailing-edge late returners may have faced a much bleaker labor market, which could have affected their time spent in unemployment as well as the nature of first job they eventually obtained.

*Hypothesis 5: Late returners, especially those from trailing-edge CR cohort, are less likely to have married and more likely to have lower levels of education and less desirable jobs (first and current).*

Based on the indirect turning-point view, late returners from the trailing edge should have the poorest health later in life, because their life chances upon returning were subject to the heaviest disruption.

*Hypothesis 6 (indirect turning point): Different life circumstances (marriage, education, occupation) after returning to the cities explain the relationship between rustication experience and midlife health.*

## 4.3 Data, Measures, and Method

### 4.3.1 Data and Analytic Sample

I draw on data collected from the *1994 State and Life Chances in Urban China Survey*, covering 20 cities in 6 provinces in mainland China (Zhou and Moen, 2002). This survey is particularly suitable for my research questions given its life course orientation and the collection of detailed life history events, including rustication experience, education, and occupation. The Life Chances survey adopted a multistage sampling procedure to create a sample consisting of 20 cities that represent a variety of geographic locations and types of urban economies.

Given the cohort focus, my analytic sample consists of members of the Cultural Revolution cohort who turned age 19 during the Cultural Revolution (1966-1976). I further divide it into *Leading-Edge CR-Cohort* (born 1947-52) and *Trailing-Edge CR-Cohort* (born 1953-57), based on their life stages when the Cultural Revolution began

and when the subsequent rustication policy was launched. The final sample size is 2064. Table 4.1 provides descriptive statistics for the overall sample by cohort membership and rustication status.

[Table 4.1 about here]

### 4.3.2 Measures

#### Outcomes

*Self-reported health.* Respondents were asked to rate their health status on a scale from 1 to 10 with 1 being very unhealthy and 10 being very healthy. Self-reported health has been shown to be a valid measure of health and a reliable predictor of subsequent survival (Idler and Angel, 1990; Idler and Benyamini, 1997).

#### Focal Predictors

*Cohort* distinguishes between leading-edge CR cohort (born 1947-52) and trailing-edge CR cohort (born 1953-57). The year 1947 corresponds to the birth year of students who were in their last year of high school at the outbreak of the Cultural Revolution and 1957 to the birth year of those who graduated from high school at the end of the revolution.

*Rustication status* takes into account occurrence and duration of the rustication experience. Respondents are categorized into three groups: (1) stayers (i.e., those who did not go to the countryside), (2) early returners (i.e., those sent down who returned home within 5 years), and (3) late returners (i.e., those sent to rural areas who returned home at least 5 years later). The five-year cutoff has been used in the previous literature as a meaningful cutting point for the rustication experience (see Lin, 2013; Qian and Hodson, 2011; Xie et al., 2008; Zhou and Hou, 1999); it is also methodologically reasonable to ensure early and late returners of approximately equal size.

#### Explanatory Variables

*Family background* is a label directly defined by the state and was a critical basis for political discrimination in the Mao era (1949-76). Before the abolition in 1979 of official family class labels, individuals were routinely required to report this label on

applications for educational enrollment, jobs, and promotions. I reduce the original 12 categories into three groups: (1) Cadre, (2) Working Class, and (3) Intellectual. I do not use parental education because it cannot capture individuals whose parents are cadres, but parental education yields similar patterns as the intellectual category (results available upon request).

*Destination areas* is dummy coded, differentiating those who were sent to rural areas and those who were sent to towns. *Running water* and *hygiene facilities* assess whether respondents had access to these facilities when rusticated.

*Marital status* distinguishes married and non-married respondents. *Educational attainment* measures respondents' education as of during the survey: middle school or less, high school, and associate college or more. *Cadres* and *professionals*, both dummy variables, capture respondents who were cadres or professionals when surveyed—two high-status occupations in China; they are compared against *ordinary workers*. *Income* is respondents' total income in 1993; I take the nature log to avoid right-skewness. *Work unit* assesses the type of organizations respondents worked as of the survey, consisting of party/government, public institutes, state-owned enterprises, collective-owned enterprises, private enterprises, at school, and unemployed. I experimented with sequence analysis to capture respondents' whole history of in and out of different types of work units. These patterned sequences, nevertheless, do not seem to vary between cohorts or explain any health differences by rustication status (not shown; available upon request).

### Covariates

In most analyses I control for *age*, *age squared*, *gender* (women = 1), and *province of residence*. *Educational level before rustication* is constructed based on educational history and the year when respondent was sent to rural areas. For respondents who stayed in cities, I first calculate the average age when their peers born in the same year were sent to rural areas, and use that age as an anchor to obtain educational levels for stayers.

### 4.3.3 Analytic Strategy

I begin by presenting health differences across groups constructed by rustication status/duration and cohort membership. Next, I show differences between these groups in

characteristics reflecting their before-, during-, and after-rustication experiences, based on OLS, dichotomous logit or multinomial logit models. Lastly, I determine the most likely explanation for the observed health differences across groups. Selection is assessed through propensity-score matching; differential rustication experiences are evaluated by restricting the sample to the rusticated youth to determine which aspect of rustication appears to have harmed subsequent health the most; and I add potential mediators (life chances variables when the rusticates returned home) to see whether after-rustication experiences are the key.

## 4.4 Results

### 4.4.1 Health Differences by Rustication and Cohort Groups

As presented in Table 4.1, self-reported health does not vary across rustication groups for members of the leading-edge CR cohort. For members of the trailing-edge CR cohort, however, self-reported health is quite low among those who remained in rural areas for longer than 5 years (6.7 vs. 7.48 among stayers and 7.2 among early returners,  $p < .001$ ).

This cohort variation remains when covariates are included. Table 4.2 shows estimates from ordinal logit models predicting self-reported health, first for the overall sample (Model 1) and then separately by cohort (Models 2-3). There is no difference in self-reported health between stayers, early returners, and late returners when both cohorts are combined. For members of the trailing-edge CR cohort, however, a health disadvantage compared with stayers is observed among those who spent more than 5 years working in rural areas ( $-.441$ ,  $p < .05$ ). A post-estimation Wald test further suggests the health gap between late returners and stayers is significantly different between leading- and trailing-edge CR cohort ( $p < .01$ ). How to account for these differences? Below I examine how these three rustication groups differ from each other in terms of their before-, during-, and after-rustication characteristics, separated by cohort.

[Table 4.2 about here]



#### 4.4.2 Before Rustication: Family Background

The three rustication groups differ from each other even prior to being sent to rural areas. Table 4.3 presents estimates from multinomial logit models predicting the odds of being early returners and late returners, respectively, compared with the odds of never being sent to rural areas. As shown in Model 1, compared with members of the leading-edge CR cohort, those in the trailing edge are more likely to stay in rural areas for fewer than 5 years (.366,  $p < .05$ ). Reflecting the dominant ideology during the Cultural Revolution, compared with working class children, those born into intellectual families are significantly more apt to be sent to rural areas and stay there either within 5 years (.559,  $p < .01$ ) or longer than 5 years (.398,  $p < .05$ ), as opposed to staying in cities.

Importantly, cohort membership moderates the role of family background. As evidenced by the main effect of “cadre family background” in Model 2, children of cadres from the leading-edge cohort were hit heavily, being much more likely to be sent to rural areas than their peers from working-class families (1.160,  $p < .01$ ). However, as cadres gradually resumed power following the initial years of the Cultural Revolution, their children were no longer in a disadvantaged position, as is seen among the trailing-edge CR cohort (1.160 - 1.231 = -.071, not significant). Taken as a whole, Hypothesis 1 is supported; family background composition by rustication groups differs between the two cohorts.

[Table 4.3 about here]

#### 4.4.3 During Rustication: Destination Areas and Running Water

Early and late returners seem to differ from each other in terms of the locations they were sent down to, as well as the living conditions of their rustication destination, as revealed from Model 1 through Model 3 in Table 4.4. In general, compared with early returners, late returners were more likely to be sent to rural areas as opposed to towns (1.289,  $p < .001$ ), and they tended to have lived in places with no hygiene facilities (-1.062,  $p < .05$ ). No differences are found for other predictors; neither is there any cohort variation. In sum, therefore, late returners suffered poorer sent-down living conditions as compared with their early-returning peers irrespective of cohort membership, even

as they also remained in rural areas for a longer period of time.

[Table 4.4 about here]

#### 4.4.4 After Rustication: Marital Status, Education, Occupation, and Work Unit

In terms of subsequent life chances upon returning to cities, no difference in marital status is observed by rustication status (Model 1 in Table 4.5). There is an apparent difference, however, in educational attainment between those who were sent to rural areas and those who were not. As shown in Model 2, compared with stayers, the rusticates are much more likely to return to school in their later life stages (.465,  $p < .05$ , for early returners, and .395,  $p < .05$ , for late returners). As for their educational attainment as of the survey in 1994, early returners are more likely than stayers to have a college degree as opposed to a primary school degree (.580,  $p < .05$ , Model 3). Late returners, however, do not differ from their peers who stayed in cities in terms of educational attainment.

[Table 4.5 about here]

The three rustication groups have comparable odds of being cadres or professionals when surveyed in 1994 (Models 4-5); they also earn similar amounts of money (Model 6). The types of organizations respondents worked in when surveyed in 1994 do not differ by rustication status, except that early returners are less likely to be in school and more likely to have a paid job (Model 7). Taken as a whole, with the exception of education, there are few differences across the three rustication groups in terms of their achievements later in life; neither does cohort membership moderate these relationships. Hypothesis 5 is therefore not supported.

#### 4.4.5 Putting it All Together

First, given that few subsequent life chances are found to differ between the three rustication groups (Table 4.5), it is not surprising that adding marital status, education, income, occupation, and work unit does little to explain away the health disadvantage for late returners of the trailing-edge CR cohort (Table 4.6). The coefficients barely change regardless of which variables are added or in what order. Therefore, the different

life circumstances following rustication do not seem to be the driving force of health disparities across rustication groups.

[Table 4.6 about here]

Next, I examine whether what happened during rustication mattered for subsequent health by restricting the sample to rusticates. For members of the trailing-edge CR cohort, absence of running water when rusticated does not predict early returners' health (main effect .647, not significant, Model 4), but no running water is associated with poorer health among late returners (.647 - 1.861 = -1.214,  $p < .001$ , Model 4). This pattern is not observed for members of the leading-edge CR cohort (Model 3). A lack of running water, therefore, seems to account partly for the health disadvantage of late returners from the trailing edge.

[Table 4.7 about here]

Last, I apply propensity score technique to address issues related to selection. The propensity score is generated from a regression on age, gender, family background, education prior to being sent to rural areas, and province dummies. After matching, the health disadvantage of late returners from the trailing-edge CR cohort disappears (-.771,  $p < .001$  before matching; -.404, not significant after matching; Table 4.8). Disadvantages associated with these individuals that put them in the “treatment” group in the first place—that is, that sent them down to rural areas and prevented them from returning home early—therefore, appear to be the main reason why they suffered the worst health when surveyed in 1994.

[Table 4.8 about here]

## 4.5 Discussion

Almost half a century have passed since the rustication movement of the Cultural Revolution, but not a single study has examined its long-term consequences for midlife health. Relying on a survey that collected detailed life histories of rustication, education, and occupation, this paper reveals several important findings. First, the extent to which rustication predicts subsequent health is contingent on a combination of duration spent in rural areas and cohort membership. For the leading-edge CR cohort, midlife health is independent of rustication status. But a different pattern is observed for those

in the trailing edge, with those who spent more than 5 years in rural areas suffering much poorer health compared with stayers. Second, echoing previous literature, I show considerable selectivity regarding who was sent to rural areas and who was able to return home within a short amount of time. But I also extend existing studies by demonstrating another aspect that differentiates early and late returners: late returners are more likely to be sent to rural areas (as opposed to towns) where basic hygiene facilities were lacking. However, with the exception of educational attainment, life chances following their returning home—marital status, income, occupation, and work unit—show little variation. Third, using propensity score matching, I show that the poor health suffered by late returners from the trailing-edge CR cohort is due to the disadvantages that both uprooted them and prevented them from returning to home cities early. In addition, a lack of running water where they were rusticated seems to have exacerbated their pre-rustication disadvantages.

Two temporal dimensions figure predominantly in this research: historical timing and duration of time, as evidenced by the finding that the group afflicted with poor health are late returners (duration of time) from the trailing-edge CR cohort (historical timing). Of the two dimensions, duration has received due attention in previous literature; almost all prior studies distinguished early and late returners (Lin, 2013; Qian and Hodson, 2011; Xie et al., 2008; Zhou and Hou, 1999). This is reasonable, given that any disadvantages associated with living in rural areas possibly cumulate over time.

What has been ignored in prior literature, however, is that the Cultural Revolution cohort is not a homogeneous unit. Although heterogeneity stemming from characteristics such as family background has been studied, less attention has been given to young people's differential ages when the Cultural Revolution was initiated and played out. In the case of rustication, historical timing is expected to matter because it captures (1) shifting state policies governing who was sent to rural areas, who was able to return to cities early, as well as their locations of destination, and (2) differential opportunity structures in getting higher education and obtaining a job after returning to cities. My findings largely support the first but not the second channel. The composition of stayers, early returners, and late returners—in terms of family background—differs greatly between leading- and trailing-edge members of the CR cohort, given shifting rustication policies. Distinguishing cohort membership is therefore essential to capture groups

located differently in the social hierarchy, even as they belong to the same rustication group. There are no cohort variations, by contrast, in terms of how rustication is associated with subsequent educational or occupational attainment. This may have to do with the general lack of opportunities throughout the Cultural Revolution decade. Those who came of age during that decade, therefore, were deprived of many opportunities, whether they were sent down or not, or whether they returned home early or not.

Another contribution of this paper is to show the relative validity of selection and turning-point theoretical arguments in the shaping of midlife health for the rusticated youth. With few exceptions (Xie et al., 2008), previous literature typically frames rustication as a “turning point” (Chen, 1999; Hung and Chiu, 2003; Qian and Hodson, 2011; Zhou and Hou, 1999) that fundamentally changed life trajectories of those sent to rural areas in their formative years. What I show, however, is that it is not so much what occurred following these rusticated youth’s home return as what placed some into the “late returners” group in the first place that mattered for their health. In other words, even without the rustication experience, late returners from the trailing-edge CR cohort may have had poor health in midlife.

This finding has several components that need to be unpacked. First, what exactly led to the poorer health of the late returners from the trailing-edge CR cohort? In other words, what are the hidden “third variables” in the selection thesis? As shown, due to the shifting rustication policies, these individuals tend to have been disadvantaged even prior to being sent to rural areas. For example, they are most likely to come from working-class families, the least likely to have parents who were cadres, and the great majority had not gone to high school before going to the countryside (89%, Table 4.1). Further, members of this group are the most likely to be sent to rural areas without basic hygiene facilities (Table 4.4), signaling their disadvantaged position that placed them at a high risk of being sent to places with unfavorable conditions. Long duration of time spent in such harsh living conditions thus further magnified existing disadvantages these children suffered before being sent down to the countryside. Therefore, despite the state portrayal of the rustication policy as a way to eliminate the “three great differences” between mental and manual labor, between workers and peasants, and between rural and urban areas, it actually served to reinforce these differences. Social hierarchies of

advantages/disadvantages, if anything, seem to be reproduced with the facilitation of the rustication policy.

Second, regardless of cohort membership, the rustication experience does not seem to matter much for important life chances such as marital status, occupation, income, and work units in midlife. Regardless of rustication status, children who came of age during that decade had few opportunities to thrive in their formative years. Many children who did not go to the countryside stayed at home unemployed. Therefore, the rusticates may not have lost as much as expected. Third, confirming prior studies (Zhou and Hou, 1999; Qian and Hodson, 2011), the sent-down experience does appear to be a turning-point in some other aspects; the rusticated youth are more apt to return to school, and they have attained higher educational levels as of the survey in 1994 (for early returners). These factors, nevertheless, do not predict midlife health. Taken together, therefore, the turning-point perspective fails to offer a satisfactory explanation for midlife health because the rustication experience either did not lead to subsequent differences in life chances (in the case of marital status, occupation, income, and work units), or if it did, those life chances differences are not important predictors for health (in the case of educational attainment).

This study has several limitations. First, the survey used in this analysis was conducted in 1994 when members of the Cultural Revolution cohort were in their 40s. A different pattern possibly emerges as they move into even later life stages. For example, the late 1990s witnessed a large-scale economic restructuring that resulted in millions of workers being laid-off. Based on the 2003 Chinese General Social Survey (CGSS), Qian and Hodson (2011) showed that those who were sent to rural areas were more likely to retire early. To what extent this unfavorable life event translated into health among the rusticates, as well as possible cohort variations, is a question that future studies could examine. It is possible that late returners from the trailing-edge CR cohort are most adversely affected by such an event, leading to their even worse health. Nevertheless, the 2003 CGSS did not collect health-related measures to permit an investigation of this issue. Second, given data limitations, measures related to the rustication experience (location, running water, hygiene facilities) are crude and are missing for a few respondents. Nevertheless, this is the only survey that allows us to have a quantitative perspective regarding “the journey.” I also compared socio-demographic characteristics

between those who provided measures on rustication experiences and those who did not, finding these two groups are quite comparable (results available upon request). Third, self-reported health is a widely used and well-recognized health measure that is highly predictive of subsequent mortality, but more objective health measures such as morbidity or mortality are better positioned to address any bias related to self reports. Fourth, left truncation is an issue this study cannot address. This concerns mortality selection; no conclusions can be drawn for those who died before the survey data were collected. Likewise, what happened to the sent-down youth who did not get a chance to return home is unknown.

Despite these limitations, this study is the first to evaluate any long-term health consequences of the rustication policy among those who came of age during China's Cultural Revolution decade. It points to the importance of understanding human lives within the contexts of specific historical moments: life chances were socially stratified during political turmoil, but the particular pattern could vary depending on when individuals were affected by the historical event. It also illustrates how disadvantaged family background operated together with harsh living conditions in rural areas and long duration of time to produce an especially bleak health profile among those who spent a long period of their youth in rural areas. As these people moved into even later life stages, it is vital to examine their living standards and design policies accordingly to compensate for their early-life adversity due to the state intervention.

Table 4.1: Descriptive Statistics for the Chinese Cultural Revolution (CR) Cohort, 1994 State and Life Chances in Urban China Survey

	Leading-Edge CR Cohort (born 1947-52)						Trailing-Edge CR Cohort (born 1953-57)							
	Stayers (N = 700)		Early Returners (< 5 years, N = 84)		Late Returners (>= 5 years, N = 175)		Stayers (N = 851)		Early Returners (< 5 years, N = 154)		Late Returners (>= 5 years, N = 100)			
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD		
Self-Reported Health	7.05	1.97	7.24	1.75	7.12	1.85	7.48	1.81	7.2	1.86	6.7	1.69	***	
Age	44.4	1.71	44.4	1.61	43.94	1.47	39.01	1.43	38.46	1.31	39.84	1.29	***	
Women	48%	0.5	48%	0.5	53%	0.5	50%	0.5	46%	0.5	53%	0.5		
Family Background														
Cadre	6%	0.24	15%	0.36	11%	0.31	**	11%	0.32	10%	0.31	6%	0.24	
Working Class	76%	0.43	57%	0.5	68%	0.47	***	76%	0.43	72%	0.45	74%	0.44	
Intellectual	18%	0.39	27%	0.45	21%	0.41		13%	0.34	18%	0.38	20%	0.4	
Educational Attainment prior to Rustication														
Primary School or Less	66%	0.48	50%	0.5	43%	0.5	***	51%	0.5	37%	0.48	29%	0.46	***
Middle School	13%	0.34	27%	0.45	45%	0.5	***	24%	0.43	25%	0.44	60%	0.49	***
High School	21%	0.41	23%	0.42	12%	0.33	*	25%	0.43	37%	0.48	11%	0.31	***
Associate College or Higher	0	0.07	0	0	0	0		0	0.05	0.01	0.08	0	0	
Rustication Locations														
Cities	--	--	10%	0.3	6%	0.24		--	--	11%	0.31	8%	0.27	
Towns	--	--	7%	0.26	5%	0.22		--	--	11%	0.31	3%	0.18	
Rural Areas	--	--	83%	0.38	89%	0.32		--	--	79%	0.41	89%	0.32	
Access to Running Water when Sent Down	--	--	15%	0.37	14%	0.34		--	--	32%	0.47	20%	0.4	
Access to Hygiene Facilities when Sent Down	--	--	10%	0.3	7%	0.26		--	--	22%	0.42	4%	0.21	**
Escape Routes														
Attending School	--	--	14%	0.35	6%	0.24	***	--	--	9%	0.29	12%	0.33	***
Joining the Army	--	--	7%	0.26	2%	0.13	***	--	--	6%	0.25	2%	0.14	***
Married when Surveyed	98%	0.14	98%	0.15	95%	0.21		97%	0.16	99%	0.08	97%	0.17	
Ever Returned to School	14%	0.34	30%	0.46	20%	0.4	***	14%	0.34	18%	0.38	23%	0.42	*
Administrative Cadre when Surveyed	21%	0.41	25%	0.44	15%	0.36		15%	0.36	19%	0.4	19%	0.39	
Professional when Surveyed	27%	0.44	39%	0.49	20%	0.4	**	22%	0.41	26%	0.44	24%	0.43	
Educational Attainment when Surveyed														
Primary School or Less	29%	0.46	11%	0.31	14%	0.34	***	15%	0.36	8%	0.27	11%	0.31	*
Middle School	37%	0.48	39%	0.49	57%	0.5	***	43%	0.5	36%	0.48	58%	0.5	**
High School	22%	0.42	29%	0.45	18%	0.39		32%	0.47	44%	0.5	19%	0.39	***
Associate College or Higher	11%	0.32	21%	0.41	11%	0.32	*	9%	0.28	12%	0.33	12%	0.33	
Income when Surveyed	6080	14639	10259	38998	5548	3672		5555	5672	5767	4117	6260	6403	
Work Unit when Surveyed														
Party/Government Organizations	12%	0.32	16%	0.37	10%	0.3		11%	0.31	13%	0.34	8%	0.27	
Public Institutes	9%	0.28	17%	0.38	11%	0.31	*	10%	0.29	11%	0.31	16%	0.37	
State-Owned Enterprises	50%	0.5	50%	0.5	55%	0.5		49%	0.5	56%	0.5	47%	0.5	
Collective Enterprises	16%	0.36	9%	0.28	14%	0.34		18%	0.38	14%	0.35	15%	0.36	
Private Organizations	7%	0.26	6%	0.24	6%	0.25		8%	0.27	5%	0.21	8%	0.27	
At School	1%	0.09	0%	0	0%	0		0%	0.07	0%	0	1%	0.1	
Not Employed	6%	0.23	2%	0.16	5%	0.21		5%	0.21	1%	0.12	4%	0.2	

Note: Stars indicate significance levels derived from ANOVA testing whether variables differ across rustication groups within each of the two cohorts. \*\*\* p<0.001, \*\* p<0.01, \* p<0.05

Source: 1994 State and Life Chances in Urban China Survey.



Table 4.2: Estimates from Ordinal Logit Models Predicting Self-Reported Health, 1994 State and Life Chances in Urban China Survey

VARIABLES	Model 1	Model 2	Model 3
	Overall	Leading-Edge CR Cohort	Trailing-Edge CR Cohort
Rustication Group (Ref. = Stayers)			
Early Returners	-0.048 (0.127)	0.168 (0.206)	-0.188 (0.164)
Late Returners	-0.115 (0.130)	0.139 (0.166)	-0.441* (0.201)
Women	-0.429*** (0.067)	-0.522*** (0.107)	-0.353*** (0.097)
Age	0.136 (0.442)	-0.459 (2.090)	-0.267 (2.614)
Age Squared	-0.002 (0.005)	0.004 (0.024)	0.003 (0.033)
Family Background (Ref. = Working Class)			
Cadre	-0.113 (0.156)	-0.197 (0.234)	-0.122 (0.206)
Intellectual	0.025 (0.111)	-0.032 (0.144)	0.054 (0.172)
Trailing-Edge CR Cohort	0.007 (0.161)		
Educational Attainment prior to Rustication (Ref. = Primary School or Less)			
Middle School	-0.277** (0.104)	-0.287 (0.164)	-0.256 (0.138)
High School	-0.148 (0.105)	-0.229 (0.159)	-0.073 (0.140)
Associate College or Higher	-0.381 (0.565)	-1.314 (1.217)	0.262 (0.368)
Observations	2,064	959	1,105

*Notes:* 1. Stayers did not go to the countryside. Early returners were sent down and returned home within 5 years. Late Returners were sent to rural areas and returned home at least 5 years later.

2. Province dummies are included in models but omitted here for simplicity.

3. Robust standard errors in parentheses.

\*\*\*  $p < 0.001$ , \*\*  $p < 0.01$ , \*  $p < 0.05$

*Source:* 1994 State and Life Chances in Urban China Survey.

Table 4.3: Multinomial Logit Models Predicting Rustication Status (Ref. = Stayers),  
1994 State and Life Chances in Urban China Survey

VARIABLES	Model 1 (Ref. = Stayers)		Model 2 (Ref. = Stayers)	
	Early Returners	Late Returners	Early Returners	Late Returners
Women	-0.116 (0.130)	0.174 (0.123)	-0.117 (0.130)	0.181 (0.123)
Family Background (Ref. = Working Class)				
Cadre	0.359 (0.253)	0.144 (0.262)	1.160** (0.391)	0.573 (0.341)
Intellectual	0.559** (0.184)	0.398* (0.183)	0.841** (0.284)	0.363 (0.231)
Trailing-Edge CR Cohort	0.366* (0.160)	-0.997*** (0.154)	0.609** (0.195)	-0.937*** (0.174)
Educational Attainment prior to Rustication (Ref. = Primary School or Less)				
Middle School	0.632*** (0.189)	1.487*** (0.168)	0.622** (0.191)	1.470*** (0.168)
High School	0.557** (0.181)	-0.238 (0.228)	0.556** (0.181)	-0.228 (0.228)
Associate College or Higher	0.413 (1.079)	-12.431*** (0.597)	0.470 (1.088)	-13.598*** (0.606)
Family Background * Cohort (Ref. = Working Class * Leading Edge CR Cohort)				
Cadre * Trailing Edge CR Cohort			-1.231* (0.495)	-1.004 (0.565)
Intellectual * Trailing Edge CR Cohort			-0.461 (0.369)	0.122 (0.367)
Constant	-2.227*** (0.260)	-1.873*** (0.242)	-2.400*** (0.263)	-1.907*** (0.247)
Observations	2,077	2,077	2,077	2,077

Notes: 1. Stayers did not go to the countryside. Early returners were sent down and returned home within 5 years. Late Returners were sent to rural areas and returned home at least 5 years later.

2. Province dummies are included in models but omitted here for simplicity.

3. Robust standard errors in parentheses.

\*\*\* p<0.001, \*\* p<0.01, \* p<0.05

Source: 1994 State and Life Chances in Urban China Survey.

Table 4.4: Estimates from Logit Models Predicting Rustication Experiences (restricted to respondents who were once sent to rural areas), 1994 State and Life Chances in Urban China Survey

VARIABLES	Model 1	Mode 2	Mode 3
	Destination Rural Areas (vs. Towns)	Access to Running Water	Access to Hygiene Facilities
Women	-0.020 (0.265)	0.381 (0.356)	-0.198 (0.450)
Late Returners (Ref. = Early Returners)	1.289*** (0.355)	-0.426 (0.394)	-1.062* (0.482)
Family Background (Ref. = Working Class)			
Cadre	0.082 (0.551)	-0.314 (0.691)	0.572 (0.776)
Intellectual	0.245 (0.351)	-0.230 (0.426)	0.536 (0.510)
Trailing-Edge CR Cohort	-0.212 (0.306)	0.479 (0.371)	0.359 (0.470)
Educational Attainment prior to Rustication (Ref. = Primary School or Less)			
Middle School	-0.218 (0.324)	-0.077 (0.407)	0.075 (0.542)
High School	0.360 (0.443)	0.538 (0.464)	0.327 (0.574)
Constant	2.326*** (0.567)	-1.923** (0.632)	-2.847** (0.887)
Observations	461	234	235

*Notes:* 1. This set of analysis is conducted among those who were once sent to rural areas. Early returners were sent down and returned home within 5 years. Late Returners were sent to rural areas and returned home at least 5 years later.  
2. Province dummies are included in models but omitted here for simplicity.  
3. Robust standard errors in parentheses.

\*\*\* p<0.001, \*\* p<0.01, \* p<0.05

*Source:* 1994 State and Life Chances in Urban China Survey.



Table 4.5 (cont.)

VARIABLES	Model 7					
	Current Work Unit (Ref. = State-Owned Enterprises)					
	Party/Government Organizations	Public Institutes	Collective Enterprises	Private Organizations	At School	Not Employed
Rustication Group (Ref. = Stayers)						
Early Returners	0.078 (0.227)	0.187 (0.251)	-0.334 (0.251)	-0.395 (0.344)	-14.200*** (0.475)	-1.083* (0.547)
Late Returners	-0.046 (0.260)	0.325 (0.261)	-0.078 (0.213)	-0.056 (0.288)	0.072 (1.123)	-0.160 (0.356)
Trailing-Edge CR Cohort	0.076 (0.327)	0.643* (0.327)	-0.034 (0.273)	-0.392 (0.345)	0.803 (1.356)	0.255 (0.428)
Family Background (Ref. = Working Class)						
Cadre	0.920*** (0.224)	0.930*** (0.255)	-0.515 (0.307)	-0.590 (0.462)	0.394 (1.228)	-0.805 (0.615)
Intellectual	-0.051 (0.220)	0.513* (0.207)	-0.208 (0.189)	-0.273 (0.269)	-0.658 (1.064)	-0.186 (0.330)
Educational Attainment prior to Rustication (Ref. = Primary School or Less)						
Middle School	-0.343 (0.219)	0.221 (0.235)	-0.246 (0.164)	-0.291 (0.237)	-14.319*** (0.573)	-0.623* (0.301)
High School	0.225 (0.183)	0.900*** (0.196)	-1.033*** (0.221)	-0.969*** (0.272)	-0.067 (0.637)	-1.238*** (0.375)
Associate College or Higher	0.256 (1.045)	0.723 (1.257)	-15.190*** (0.621)	0.841 (1.328)	-14.711*** (1.481)	-14.374*** (0.849)
Women	0.136 (0.141)	0.307* (0.141)	0.555*** (0.118)	-0.294 (0.175)	1.581* (0.787)	2.065*** (0.309)
Age	-0.898	1.157	-1.021	0.096	-0.187	0.530
Age Squared	0.011 (0.009)	-0.012 (0.011)	0.012 (0.008)	-0.003 (0.012)	0.004 (0.032)	-0.006 (0.013)
Constant	16.009 (16.579)	-29.489 (18.822)	20.734 (15.046)	-1.870 (20.137)	-19.455 (56.391)	-16.565 (23.099)
Observations	1,992	1,992	1,992	1,992	1,992	1,992

Notes: 1. Stayers did not go to the countryside. Early returners were sent down and returned home within 5 years. Late Returners were sent to rural areas and returned home at least 5 years later.

2. Province dummies are included in models but omitted here for simplicity.

3. Robust standard errors in parentheses.

\*\*\* p<0.001, \*\* p<0.01, \* p<0.05

Source: 1994 State and Life Chances in Urban China Survey.

Table 4.6: Estimates from Ordinal Logit Models Predicting Self-Reported Health with Potential Mediators, 1994 State and Life Chances in Urban China Survey

VARIABLES	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
	Leading-Edge CR Cohort	Trailing-Edge CR Cohort	Leading-Edge CR Cohort	Trailing-Edge CR Cohort	Leading-Edge CR Cohort	Trailing-Edge CR Cohort
Rustication Group (Ref. = Stayers)						
Early Returners	0.168 (0.206)	-0.208 (0.165)	0.135 (0.211)	-0.214 (0.165)	-0.023 (0.219)	-0.254 (0.172)
Late Returners	0.138 (0.166)	-0.450* (0.202)	0.132 (0.165)	-0.458* (0.199)	0.103 (0.176)	-0.484* (0.206)
Women	-0.523*** (0.107)	-0.367*** (0.097)	-0.526*** (0.108)	-0.383*** (0.098)	-0.430*** (0.117)	-0.377*** (0.104)
Age	-0.458 (2.090)	-0.053 (2.622)	-0.093 (2.147)	-0.057 (2.626)	0.252 (2.278)	-1.900 (2.716)
Age Squared	0.004 (0.024)	0.000 (0.034)	0.000 (0.024)	0.000 (0.034)	-0.004 (0.026)	0.024 (0.035)
Family Background (Ref. = Working Class)						
Cadre	-0.195 (0.235)	-0.120 (0.205)	-0.217 (0.242)	-0.066 (0.213)	-0.235 (0.245)	0.050 (0.217)
Intellectual	-0.033 (0.144)	0.084 (0.175)	-0.050 (0.145)	0.109 (0.176)	0.001 (0.152)	0.113 (0.183)
Educational Attainment prior to Rustication (Ref. = Primary School or Less)						
Middle School	-0.288 (0.165)	-0.269 (0.138)	-0.288 (0.168)	-0.276* (0.139)	-0.211 (0.173)	-0.250 (0.143)
High School	-0.229 (0.159)	-0.092 (0.141)	-0.394* (0.182)	-0.032 (0.179)	-0.373* (0.187)	-0.068 (0.188)
Associate College or Higher	-1.311 (1.216)	0.223 (0.367)	-1.341 (1.231)	0.361 (0.416)	-1.384 (1.076)	0.554 (0.435)
Currently Married	-0.073 (0.297)	0.970* (0.448)	-0.106 (0.295)	0.987* (0.453)	-0.054 (0.310)	0.858 (0.484)
Educational Attainment when Surveyed (Ref. = Primary School or Less)						
Middle School			0.331 (0.205)	-0.046 (0.194)	0.147 (0.231)	0.011 (0.207)
High School			0.155 (0.199)	-0.299 (0.197)	-0.114 (0.228)	-0.295 (0.221)
Associate College or Higher			0.053 (0.196)	-0.208 (0.207)	-0.200 (0.218)	-0.249 (0.242)
Logged Personal Income (when Surveyed)					0.057 (0.075)	0.022 (0.034)
First Job Administrative Cadre					0.038 (0.222)	0.130 (0.248)
Current Job Administrative Cadre					0.110 (0.165)	-0.083 (0.185)
Current Job Professional					0.187 (0.162)	0.210 (0.148)
Current Work Unit (Ref. = State-Owned Enterprises)						
Party/Government Organizations					0.323 (0.206)	-0.189 (0.189)
Public Institutes					0.294 (0.211)	-0.258 (0.193)
Collective Enterprises					-0.197 (0.208)	-0.030 (0.170)
Private Organizations					0.503* (0.247)	0.259 (0.254)
At School					-0.206 (1.195)	0.795 (0.574)
Not Employed					-0.768 (0.514)	-0.622 (0.490)
Observations	959	1,105	959	1,104	882	1,045

Notes: 1. Stayers did not go to the countryside. Early returners were sent down and returned home within 5 years. Late Returners were sent to rural areas and returned home at least 5 years later.

2. Province dummies are included in models but omitted here for simplicity. Constants (cutoff points) are omitted for simplicity.

3. Robust standard errors in parentheses.

\*\*\* p<0.001, \*\* p<0.01, \* p<0.05

Source: 1994 State and Life Chances in Urban China Survey.

Table 4.7: Estimates from Ordinal Logit Models Predicting Self-Reported Health (restricted to respondents who were once sent to rural areas), 1994 State and Life Chances in Urban China Survey

VARIABLES	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
	Leading-Edge CR Cohort	Trailing-Edge CR Cohort	Leading-Edge CR Cohort	Trailing-Edge CR Cohort	Leading-Edge CR Cohort	Trailing-Edge CR Cohort
Late Returners (Ref. = Early Returners)	-0.998 (0.682)	-2.061* (0.960)	0.109 (0.562)	-2.190*** (0.491)	0.111 (0.545)	-1.764*** (0.426)
Women	-0.609** (0.233)	-0.405 (0.240)	-0.696 (0.404)	-0.936* (0.416)	-0.698 (0.367)	-0.925* (0.416)
Age	3.646 (4.651)	-4.489 (6.515)	-6.809 (7.033)	1.195 (9.661)	-6.860 (7.086)	2.478 (8.903)
Age Squared	-0.041 (0.052)	0.056 (0.083)	0.079 (0.079)	-0.014 (0.124)	0.080 (0.079)	-0.031 (0.114)
Family Background (Ref. = Working Class)						
Cadre	-0.424 (0.372)	-0.596 (0.347)	-0.620 (0.670)	0.246 (0.495)	-0.620 (0.653)	0.268 (0.547)
Intellectual	0.036 (0.302)	0.300 (0.363)	-0.069 (0.430)	1.162* (0.535)	-0.049 (0.419)	1.064 (0.557)
Educational Attainment prior to Rustication (Ref. = Primary School or Less)						
Middle School	-0.364 (0.306)	0.126 (0.281)	0.121 (0.416)	1.026 (0.526)	0.157 (0.429)	0.901 (0.508)
High School	-0.535 (0.375)	-0.273 (0.403)	0.740 (0.620)	0.057 (0.637)	0.745 (0.602)	-0.014 (0.620)
Associate College or Higher		0.200 (0.652)				
Destination Rural Areas	-0.145 (0.687)	-0.938** (0.362)				
Destination Rural Areas * Late Returners	0.865 (0.734)	1.678 (0.979)				
Had Running Water			-0.169 (0.820)	-0.647 (0.643)		
Had Running Water * Late Returners			-0.156 (1.124)	1.861* (0.862)		
Had Hygiene Facilities					-0.293 (0.665)	-0.247 (0.717)
Had Hygiene Facilities * Late Returners					-0.178 (1.205)	0.966 (2.649)
Observations	233	229	120	114	121	114

Notes: 1. This set of analysis is conducted among those who were once sent to rural areas. Early returners were sent down and returned home within 5 years. Late Returners were sent to rural areas and returned home at least 5 years later.

2. Province dummies are included in models but omitted here for simplicity. Constants (cutoff points) are omitted for simplicity.

3. Robust standard errors in parentheses.

\*\*\*  $p < 0.001$ , \*\*  $p < 0.01$ , \*  $p < 0.05$

Source: 1994 State and Life Chances in Urban China Survey.

Table 4.8: "Effects" of Rustication before and after Propensity Score Matching, by Cohort, 1994 State and Life Chances in Urban China Survey

VARIABLES	Leading-Edge CR Cohort		Trailing-Edge CR Cohort	
	Early Return	Late Return	Early Return	Late Return
Before Matching	0.182 (0.225)	0.064 (0.165)	-0.282 (0.159)	-0.771*** (0.192)
After Matching	0.226 (0.311)	0.373 (0.259)	-0.235 (0.255)	-0.404 (0.301)
Constant	7.056*** (0.074)	7.056*** (0.074)	7.483*** (0.062)	7.471*** (0.065)
Observations	781	872	1,005	882
Balance Test p-value	1	0.967	0.985	0.989
R-squared	0.001	0.000	0.003	0.018

*Notes:* 1. Matching variables include age, gender, family background, education prior to rustication, and province dummies. Early return refers to being sent down and returning home within 5 years. Late Return refers to being sent to rural areas and returning home at least 5 years later.

2. Robust standard errors in parentheses.

\*\*\*  $p < 0.001$ , \*\*  $p < 0.01$ , \*  $p < 0.05$

*Source:* 1994 State and Life Chances in Urban China Survey.



## Chapter 5

# Conclusions

Return to the puzzle introduced in the opening chapter: Despite disrupted education and days of harsh living in rural areas, members of the Cultural Revolution cohort do not suffer worse health in their later lives (see Figure 1.2). Why is this the case? In this closing chapter, I first answer this intriguing question from three angles, drawing on findings from my analytic chapters. Next, I discuss the contribution of this dissertation, followed by limitations that future research could attend to. This chapter ends with a reflection on research directions as well as implications for health-related policies.

### 5.1 Back to the Puzzle

That members of the Cultural Revolution cohort lost a chance to receive higher education on time is well studied (e.g., Deng and Treiman, 1997; Pepper, 1991; Unger, 1982). But a “return to school” trend has been missed by previous literature on the China experience. As revealed in Chapter 2, life courses are not “set” early in life, but members of the Cultural Revolution cohort reverse early adversities by returning to college on a much larger scale compared to adjacent cohorts. Further, this important life-course turning point, returning to school, was more available to the adult children whose parents were more educated, the same adult children who were targeted mostly harshly during the Cultural Revolution. Consequently, the negative relationship as denoted by Arrow 1 in Figure 1.1 is less severe than what previous studies have suggested. Nevertheless, returning to school does not appear to matter for subsequent health, suggesting

the need for a more thorough examination of the relationship between education and health in China.

Given the particular institutional arrangement of China, as shown in Chapter 3, there is a two-career path—professional or administrative occupations—into the urban Chinese elite with college education a persistently vital prerequisite for a professional position even as party membership is always a prerequisite for top administrative posts (Dickson and Rublee, 2000; Walder, 1995; Walder et al., 2000). In terms of access to a range of flexible resources, those with both educational and political credentials (*the dual elite*) enjoy a noticeable advantage over those with only a college degree (*the education-only elite*) (Bian, 2002; Li and Walder, 2001; Walder et al., 2000). By comparing their health profiles using three cross-sectional data over a span of almost 20 years (1994-2010), I show that the dual elite—regardless of the order in which they received each credential (the incorporated dual elite, path of schooling then party membership, and the sponsored dual elite, path of party membership then schooling)—enjoy a health advantage over the education-only elite in all three surveys. In other words, a college degree in itself is not sufficient; only when coupled with party affiliation is it predictive of health in China. In Figure 1.1, therefore, Arrow 2 should be viewed contextually: the extent to which health benefits of education can be realized depends on particular institutional and political circumstances, as marked by a connection to the state apparatus in the case of China.

Lastly, Chapter 4 demonstrates that the rustication policy, despite disrupting the life courses of those sent to rural areas during their formative years, left no mark on the subsequent health of most of the rusticates. The only group adversely affected are members of the trailing-edge Cultural Revolution cohort (born 1953 to 1957) who stayed in rural areas for more than five years (“late returners”). This finding is largely a reflection of the shifting rustication policies as implemented during the Cultural Revolution. Whereas in the early period (1967-71), implementation of the rustication policy was stringent, social stratification again emerged as the political tides subsided. Among the leading-edge Cultural Revolution cohort, therefore, selection based on family background is negligible, thereby contributing to the lack of variation in health by rustication status. A different pattern is observed for the trailing-edge Cultural Revolution cohort;

as cadres gradually resumed their power in later stages of the Cultural Revolution, children pulled in to rural areas and staying there for a long time were more apt to come from disadvantaged families. Once these pre-rustication differences are taken into account through propensity score matching, the poorer health of late returners from the trailing edge is no longer significant. Therefore, it is primarily selection, in terms of who was sent to and who was able to return early from rural areas, that explains health differentials by cohort and rustication status. Arrow 4 in Figure 1.1, consequently, largely reflects a spurious correlation.

## 5.2 Contribution 1: Theorizing Institutional Arrangements in the Production and Perpetuation of the SES Gradient in Health

My findings cast doubts on the universal role of education in structuring health disparities. Particular institutional arrangements, as in the case of China, figure prominently in determining the educational gradient in health. Although Lutfey and Freese have in various places (Freese and Lutfey, 2011; Lutfey and Freese, 2005) highlighted the role of the dynamic actions of institutions in the production of health disparities, they mostly refer to the institution of the medicine, wherein, for example, diagnoses and treatments are made not entirely based on actual diseases but taking into account patients' specific socioeconomic status. The "institutional arrangements" used in my dissertation, in comparison, is more general, referring to the whole set of "who gets what" rules, which differs most sharply between market and socialist societies.

In industrialized market societies, the market plays a central role in allocating resources; education, as a signal of human capital and productivity, is consequently rewarded and associated with a wide range of flexible and desirable resources beneficial for health. This is the case for both "liberal" countries such as the United States (Adler et al., 1994; Elo and Preston, 1996; Kitagawa and Hauser, 1973; Link and Phelan, 1995; Meara et al., 2008; Mirowsky and Ross, 2003; Warren, 2009) and countries where the welfare state plays an active role in resource redistribution such as the Nordic nations (Olafsdottir, 2007).

However, the importance of education for getting ahead is not necessarily a fixed

feature of society. In China's particular macro-political environment, it is the state and the Communist Party—rather than the market—that distribute and allocate resources (Bian, 2002; Nee, 1989, 1996; Walder et al., 2000; Zhou, 2010; Zhou et al., 1996). State/party policies can even change the very meaning of “resources,” the most extreme case being the Cultural Revolution decade when parental education was considered a liability rather than an asset (Deng and Treiman, 1997; Unger, 1982; Zhou and Hou, 1999). Even with the ending of the Cultural Revolution and the burgeoning economic reform in urban China, education has yet to become the fundamental force shaping life chances it is in Western societies (Bian and Logan, 1996; Walder, 1996; Zhou, 2000). What turns out to play a more important role in structuring health disparities than education is party affiliation, an indicator of one's loyalty to and connection with the state/party apparatus.

These findings are not only relevant to the Chinese population, but shed light on why education is so persistently associated with health in general. Among the three dominant theoretical perspectives tested in Chapter 3: spurious correlation, human capital, and fundamental cause theory, my findings are most consistent with fundamental cause theory but also extend this theory by highlighting the importance of specifying concrete institutional contexts. The meaning of education and its health implications could well exhibit different patterns in societies with alternative institutional arrangements. Accordingly, there is no way to map education and wellbeing outcomes without locating individuals in socially and historically bounded life course contexts; recognizing variations by social contexts and historical timing is essential to understanding the social production of life chances outcomes, including health.

### 5.3 Contribution 2: Historical Timing and Human Agency

The role of social disruptions in shaping individual life chances, and how individuals resist these external forces to construct their own destinies, are enduring themes of life course research. One contribution of this dissertation is to give substance to the notion that individuals' agentic decisions are shaped by historical shifts in opportunity and motivation, as well as collective biography. Cohort membership is a good way to capture these variations.

When the Cultural Revolution closed the door for a whole cohort to attend college or when it sent millions of youth to do the manual labor in rural areas, it was not the end of the story. This can be seen in the contrast between the Cultural Revolution cohort and the cohorts immediately before and after it in decisions to return to school, with members of the Cultural Revolution cohort most likely to compensate for their limited early-life human capital by going back to school at a much later life stage. This cohort difference reflects their distinct early-life educational experiences, the shifting structural opportunities of adult education, and the rising importance of education in the Chinese job market since the 1980s. Likewise, when uprooted to the countryside, the rusticates exhibited considerable human agency in leaving, including by admission to college and joining the People's Liberation Army. Notably, however, the extent to which human agency can be successfully called upon is stratified, with those possessing more resources more likely to do so. For example, those born into intellectual families were more likely to return to school when their education was disrupted early in life; children of cadres were also in a much better position to use college or the army as a way to leave the countryside, pointing to the unevenness of catching up and fighting against adversity.

## 5.4 Limitations

Although this study has afforded me the opportunity to examine relationships between education, rustication, and health among three Chinese cohorts, there are important caveats for this research. First, due to data limitation, I am unable to examine changes in health. Trajectories of health may well differ from levels of health measured at a given time point. Second, health is a broad concept encompassing indicators such as mortality, morbidity, mental wellbeing, health behaviors, etc. What I have focused on is self-reported health, a reliable predictor of subsequent mortality. But other health measures are necessary to understand actual disease burden or subjective wellbeing patterns. Third, more detailed measures and better study designs are needed to understand concrete mechanisms in the social structuring of health inequalities. Why exactly, for example, do members of the education-only elite lag behind those of the dual elite in health? Answers to such questions will help conceive and devise interventions to fight

health disparities. Fourth, left truncation is an issue this study cannot address. This concerns mortality selection; no conclusions can be drawn for those who died before the survey data were collected. Likewise, what happened to the sent-down youth who did not get a chance to return home is unknown.

## 5.5 Implications for Future Research and Policies

One potentially fruitful area is to extend the scope of the current study, spatially and temporally. For example, what would the educational gradient in health look like for post-Communist countries as they transition from state socialist to market societies? Do alternative transition trajectories matter (Walder, 2003)? Comparative studies with detailed institutional analysis will offer insights on these important questions. Similarly, this study examines three Chinese cohorts who entered the labor market before the intensification of the economic reform in urban China (since 1992). As China has experienced great institutional restructuring over the past few decades, to what extent the patterns detected in this research are generalizable to even more recent Chinese cohorts is an empirical question awaiting for future analysis.

A second direction is to deepen our understanding regarding the educational gradient in health by examining the role of (biographical) timing of education. My study shows that the timing of education in individual biographies does not matter for subsequent health. This is in contrast with previous research showing that schooling timing matters (for the outcome of income, see Elman and O’Rand 2004; Light 1995; Monks 1997), drawing on evidence from advanced societies. Part of the reason for the conflicting findings is that many of the Chinese who returned to college are the sponsored dual elite, sent by the party to “credential up” party personnel. In other words, timing of education is confounded with advantaged social positions in the China case. A better design to disentangle these two will be beneficial, in light of the global trend that more and more people go back to school in the hopes of improve their life chances. Further, sponsored return-to-school also exists in Western countries, used by organizations to reward and train their valued employees. To what extent the associated health benefits are the same as observed in China would be another interesting topic to investigate.

Third, future studies are needed to gaining a broader and deeper understanding of

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the concrete mechanisms generating health inequalities by socioeconomic status. The question of “how” has been unfortunately neglected given the burgeoning interest in identifying “causal effects.” As argued before, effects occur in specific contexts and through specific mechanisms. To develop successful interventions, an understanding of generalizable mechanisms and contextual effects is essential.

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