The Rusted "Iron Rice Bowl": Intergenerational Effects of Chinese SOE Reform on Educational Inequality

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Reform of the Chinese state-owned enterprise (SOE) sector in the mid 1990s caused massive layoffs (xiagang) of around 34 million employees which marked the end of "iron rice bowl" guarantee of job security for the remaining workers, and the adverse impact of this shock on their children are mostly neglected in the existing literature. The research project aims to fill this research gap by investigating the intergenerational effects of parents' experience of unemployment triggered by the large-scale SOE reform on their children's educational attainment. This study employs the research method of natural experiment which assesses outcomes and impact of certain policy interventions to conduct the cohort difference-in-differences (DID) analysis. Drawing data from the China Health and Retirement Longitudinal Survey (CHARLS) in 2014 and 2020, this study examines the effects of parents' exposure to economic insecurity caused by SOE mass layoffs on their children's educational attainment. The findings of this study reveal the long-term intergenerational impact of the historical urban labor market reform in the last century on unequal educational resource allocation which hinders social mobility and perpetuates social inequalities in China nowadays. Our study suggests that not only people who experienced the time of great economic and employment uncertainty had their life disrupted but their children's socioeconomic statuses are indirectly affected. Since China's SOE reform is still unfinished, this study has significant policy implications to consider the impact of macroeconomic policy implementations on the unforeseen social equity issues at the micro level for the next generation.

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INTRODUCTION

Government-initiated economic reforms and planning with purposeful actions towards economic development and efficiency always create unexpected negative externalities, and sometimes citizens as victims have to pay for the high costs. Beyond the aggregate

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measures of economic indicators at the national or regional level, how people as individuals were are affected can be observed through how their life courses are disrupted. Education as one of the most important channels for human capital accumulation and individual upward social mobility is frequently discussed. Individual's educational attainment can not only be affected by factors of his or her immediate surroundings but crucial historical events, and economic reform is one scenario.

Conventional wisdom from a distinguished literature shows that, citizens in developed societies who experience economic reform had their individual benefits and welfare significantly compromised (Jacobson et al. 1993; Wong and Lee 2001; Jappelli 1990; Durlauf 2002), and these disadvantages not only directly affect their life but can be transmitted to their children (Ruiz-Valenzuela 2020; Rege et al. 2011; Bratberg et al. 2008; Dahl and Lochner 2012; Coelli 2011; Oreopoulos et al. 2008; Hilger 2016). A particular strand of literature examines the negative impact of economic reform and restructuring on children's education, providing cross-national empirical evidence from western developed countries. However, little research focuses on the impact of economic restructuring on certain groups' educational inequalities in the context of developing countries, and even less attention is paid to the mechanism of intergenerational transmission of certain these external shocks from people who were directly affected to their descendants.

To fill the research gap, this study contextualizes on the Chinese economic reform in the last century to test the intergenerational mechanism mentioned above. China provides an ideal quasi-experiment for the long-term effects of economic reform on the next generation's educational inequality. Since economic reform and opening up in 1978, China had replaced the socialist planned economy with market economy, which brought short-term and long-term social changes at both macro and micro levels and significantly changed urban life. Employment security was not guaranteed anymore due to state-owned enterprise restructuring and purposeful job displacements which caused massive layoff in 1990s. The economic reform came along with the end of the Cultural Revolution, which marked the start of educational system transformation. Since the return of gao kao (college education entry examination in China) in 1977, public education was increasingly privatized, raising the costs of education for families to afford. Along with the increasing competitiveness of high education, the country was undergoing disruptive economic reform which involved economic restructuring, transforming Chinese economy

from industry to service-oriented. It lifted the role of education in one's professional competitiveness and success. Numerous families were in the doubled adversities brought by job loss together with unaffordable educational costs for children, which is rarely discussed in the existing studies. This study attempts to estimate the causal effects of SOE layoff on next generation's education, using evidence from China.

Employing a Difference-in-Difference strategy, this study draws on the China Health and Retirement Longitudinal Study to conduct the statistical analysis, examining the intergenerational effects of parents' layoff experience. Our findings reveal the uncomfortable truth that, not only people who were directly affected by the SOE reform caused mass layoff but their children are victims of such large-scale economic restructuring. These children faced serious problems with unequal educational resource allocations, which substantively limit their social mobility upward and negatively influenced their socioeconomic status. We start with the assumption that, the large-scale involuntary unemployment brought by the SOE mass layoff drives the high-level economic insecurity, since people who were guaranteed with "iron rice bowl", which represents employment security and income stability, lost their jobs and they could not immediately find another one in a short period of time. As a result, they have less educational resources, including money, time, and networks, available to their children, which led to the intergenerational educational inequality problems in the long run. The idea of "iron rice bowl" characterized by employment security became rusted, and we attempt to understand the process, looking back at the history through observing what is happening nowadays in China.

This study contributes to the literature in two ways. Firstly, it is the first attempt to provide direct quasi-experiment evidence of a developing country's economic reform with its long-term impact on the next generation's educational attainment, complementing the existing studies with new empirical evidence in different national contexts. Secondly, this study analyzes the causal mechanism between job loss and kids' educational attainment driven by economic insecurity, of which the intensity can be estimated by certain cohorts' exposure to this shock. Our findings should be applicable to other emerging economies, especially authoritarian regimes that face the problem of economic reforms and restructuring which involve potential costs at not only macro but micro levels for individuals to pay. Given that central government initiated economic reform is always inevitable, the side effects,

especially those on vulnerable groups, need to be paid much more attention.

The research paper proceeds as follows. Section 2 discusses the main theoretical framework and historical background of this study, followed by our main hypotheses. Section 3 specifies the resign design with the identification strategy DiD which is employed by this study for empirical analysis. Empirical results are presented in Section 4, and Section 5 concludes this study with our main findings and extended discussions.

THEORY AND BACKGROUND

Our research builds on a growing literature which examines the impact of family income change associated with parental working status, on children's human capital based on the family investment in education. In this section, we elaborate the theoretical basis, which is related on human capital accumulation, introduce China's mass layoffs caused by SOE reform, and formulate several testable hypotheses.

Theoretical Framework

According to the existing research, we start with the premise that parent's human capital depreciation caused by layoff impact their children's human capital accumulation. Changes in family's circumstance influence the sources of human capital that children acquired.

The concept of human capital can be traced back to the 18th century. In An inquiry into the Nature and Causes of the Wealth of Nations, Adam Smith suggested that improving human capital through education contributed to the collective wealth of society. It refers to the stock of skills and productive knowledge embodied in people (Rosen 1972), and can depreciate through unemployment if workers' skills and social networks are unused (Dinerstein et al. 2020).

Given the historical background of the mass layoff, there are numerous hypotheses regarding the negative impact of economic insecurity on family circumstance, including earning losses (Jacobson et al. 1993), family credit constrained (Jappelli 1990), parental marital tensions (Charles and Stephens 2004) and negative community-based social capital (Durlauf 2002). The changed family circumstance,

which related to the overall capacity to meet the immediate and future needs for children's education, will further affect their children's human capital accumulation. This mechanism of parental layoff affecting the well-being of children who are incorporated into the changed household, reflects the intergenerational effect of unemployment on human capital accumulation extending across two or even three generations. Given that education is one of the crucial ways of enhancing human capital and is closely depended on family circumstance, our empirical research on the intergenerational accumulation of human capital will concentrate on the assessment of children's educational attainment associated with family's sense of economic insecurity.

Economic Insecurity

Convincing evidence suggests that job loss negatively affects further earnings for family, and increase the sense of economic insecurity. As the key indicator of family economic security, parental employment affects the family income resource.

According to the United Nations Development Programme's 1994 Human Development Report, the notion of human security has been defined over seven areas, including economic, food and health etc. Among them, the document states that economic security requires an ensured basic income for individuals, generally from productive and remunerative employment from a publicly funded safety net. In Rohde and Tang (2018)'s overview on the theoretical approaches for economic insecurity, they conclude that the empirical studies on "economic insecurity" identification and measurement have tended to be vaguely ad hoc. Haurin (1991) observed that income volatility is commonly been taken as one of the sources of economic insecurity. In line with Jacobson et al. (1993), those high-tenure workers experience substantial and persistent earnings losses when they leave their jobs, especially when workers are displaced in regions that have depressed rates of employment growth. From the perspective of mental unease, the operational definition of economic insecurity is essentially reduced to "the anxiety resulting from exposure to economic risks" by Osberg (2018), affecting individuals' life courses.

Children's Educational Attainment

Scholars from different areas noted that children's education is widely regarded as a central way of human capital accumulation, which associated with family resources. To study the intergenerational

effect of policy on economic restructuring, further research noticed this issue and deliver numerous research on whether and how economic restructuring affects the education for next generation.

The short-term impact is mainly reflected in children's school performance. Numerous studies indicate the positive correlation between parental income and children's cognitive performance, which is considered as the improvement of children's learning ability supporting the enrollment in higher education. For instance, Valenzuela's study investigates the impact of parental job loss on children's school performance. Fixed effect shows that father's job loss entails a negative and significant decrease in children's average grades of 13% (Ruiz-Valenzuela 2020). Using data from Norway, Rege et al. (2011) and Bratberg et al. (2008) suggest that parental job loss has a negative effect on children's school performance (GPA, children's graduation-year point average). Based on data from the US National Longitudinal Surveys (NLSY), Dahl and Lochner (2012) founded that a $1,000 increase in parental income is associated with an average increase of 2.1% in their children's math test scores and 3.6% in reading test scores.

For the long-term impact, a large proportion of empirical researches looks at the economic effects of investment in education on employment and earnings. Bratberg et al. (2008) utilize the employer-employee data from Norway to analyze the impact of worker displacement during 1986-1987 on their children's earning in 1999-2001. Job losses lead to large permanent reduction in family income. However, there is no significant effects on earning of the next generation. Coelli (2011) proposes that parental job loss from layoffs and business failures that occur when youth complete high school are found to be negatively related with enrollment at university and community college. Using longitudinal data on Canadian youth and their parents, estimates find that parental job losses correspond with significant reductions in the probability of university enrollment (10%). Oreopoulos et al. (2008) use the Canadian panel of administrative data tracking over 39,000 father-pairs from during from 1978 to 1999. They find that people whose fathers have lost jobs caused by firm closures in their youth, tend to have annual earnings about 9% lower than others whose fathers did not experience an employment shock. However, Hilger (2016) shows that layoffs significantly decrease family income but only slightly reduce college enrollment and early career earnings.

As these researches on parent's layoff and children's educational attainment argue, on the one hand,

being laid off interrupt the fixed income of these urban workers, which limits their children access to better educational resource. On the other hand, those laid-off parents may have more free time to invest more time in their children's education, which would improve children's school performance. Based on the controversial issue, the long-term intergenerational effects on children's educational attainment also require further research. In addition, since most of existing studies rely on data from Western developed countries, there is a lack of extensive empirical research on this issue in developing countries. To further explore the micro-level of top-bottom economic reform in developing countries, Chinese SOE reform provides an ideal case study with rich empirical evidence to investigate the short-term and long-term effects of economic restructuring on human capital accumulation at the individual level.

Historical Background: Chinese SOE Reform and Mass Layoff in 1990s

Our research exploits China's state-owned enterprises (SOE) reform in the mid-1990 as a quasi-experiment, to study the instability of individual human capital accumulation during economic reforms in developing countries. The reform of SOE has been a core element of China's market-oriented reform process over the past 40 years. The economic literature on SOE reform typically emphasizes the impact of these restructuring on the production efficiency of SOEs, including aspects such as enterprise performance (Dong and Xu 2008), tax alterations (Cai et al. 2005), and changes in product prices (En et al. 2006). Sociological literature tends to focus more on the effects of SOE reform on laid-off workers, including decreased family income (Fan and Woo 1996), heightened mental stress (Rege et al. 2011), and increased preventive savings within families (He et al. 2018). In addition to the experiences of laid-off workers themselves, more studies have examined the long-term and intergenerational impact on their children, including the effect of changes in family characteristics on children's health care, years of education, rate of school dropouts and highest academic qualifications, etc. Certainly, the discussion on impact of China's SOE reform extends beyond economic and sociology. In alignment with our research questions, this study will concentrate on the issue of employee layoffs, which is blamed to the central job allocation in the pre reform era. Most urban jobs were distributed through government plans (Ge 2016). Local government assigned job quotas to schools and specify the number of new workers required. In the permanent employment system, organization for production as "Danwei"

not only guarantee workers stable income, but also provide members with necessities of life. These self-sufficient economic community supply most of the social services its members required throughout their lives, from birth to death, such as schools, housing, health care, etc. (Lee 2000). However, such close employee dependence on SOEs was severed by reforms. The centralized job assignment system in planned era was progressively replaced by the contract system, and the SOE reform was officially initiated in 1994. Nan and Zhen (2010) promote that China's SOE reform process consists of three main stages, including expanding operational autonomy for enterprises, establishing a modern enterprise system related to market, and reforming state-owned asset management. To adapt to marketization and industrial adjustments, SOEs have proposed the strategy of "reducing staff and increasing efficiency" to improving the productivity. In 1995, the new term "xia gang" (layoff) was invoked in the China Labour Statistical Yearbook. The policy started with the "grasp the large and let go of the small (Zhua Da Fang Xiao)", which means making small SOEs shut down or privatized while keeping and reforming the large SOEs. The risk of bankruptcy liquidation and reorganization have led to layoffs in small-sized enterprises. In 1997, the application of new labor law has intensified layoffs to large SOEs during the reform process. According to the data from CEIC, from 1995 to 2004, the workforce of SOEs declined by almost 44 million of employees. Especially since 1998, there has been a marked decline in the number of employees in SOEs (Kong et al. 2019). In addition, the mass laid-off workers often failed to find new position in other enterprises promptly, which led to the long-term family income reductions. Using data from the China Urban Labour Survey at the year-end 2001, Giles et al. (2006) quantify the magnitude of worker benefit shocks during the period of economic restructuring from 1996 to 2001. Only 34.8% of workers who experienced unemployment during SOE reform were able to get re-employed within 12 months. As for unemployment compensations, which survive lay-off workers through the period of hardship, there are three forms of subsidy, including public subsides, pensions for early forced retirees, and lumpsum severance payments. However, these compensations have had a limited impact on mitigating the shock (Giles et al. 2006). The annualized unemployment subsidy and the pension income are only 30% of the national average disposable income for urban workers in 2001. Therefore, the monthly salary loss due to unemployment, based on the available data and the inferences about correlations, provides accurate measure of absolute income decline occurred to one family. The

significant income drops increase household economic insecurity during the SOE mass layoff shock. In traditional Chinese culture, there is a saying as "all trades and occupations are inferior and only studying is superior". Investment in children's education is generally an essential part of family spending, which is associated with household economic status. After the cultural revolution, the resumption of college entrance examinations increased the enrollment and the college tuition wavier benefits students from all walks of life. During the socialist market reform, educational development has been affected by powerful market forces. It is argued that the transfer of state responsibility for educational provision to families and individuals, the higher education fee-charging, and the introduction of internal competition among educational institutions, clearly indicates that China's education system has been experiencing a process of marketization (Mok 2000). During this period, higher education reform primarily focused on three aspects, including the increase in enrollment, college tuition inflation, and job-hunting by self-determination (Ying 2016). Among them, the fee-charging has directly increased the sensitivity of family income to education, making the economic insecurity a significant factor in educational inequality (Qiming and Jian 2014). Therefore, we assumed the pressure on tuition fees has negatively affect the educational attainment for children whose family incomes have dropped sharply due to the mass layoff. Embracing the market economy has inevitably challenged the traditional practice of socialism in China's public sector including education. As a crucial means of human capital accumulation, it represents a long-term family investment from primary to higher education. Since China's SOE reform is still unfinished, this study has significant policy implications to consider the impact of macroeconomic policy implementations on the unforeseen social equity issues at the micro level for the next generation.

Hypotheses

We predict that, people who suffered from SOE reform caused layoff experienced the external shock, and this shock not only affected them but also indirectly affected their next generations on their educational equality.

Hypothesis 1: Children of people who experienced mass layoff caused by SOE reform in China, on the margin, are affected by educational inequality. Our prediction hinges on the assumption that,

economic insecurity is one mechanism driving this relationship. People who were previously employed by state-owned enterprises are forced to leave, and they did not have income and had to search for jobs in a highly competitive environment where unemployment rate was rising. Employment uncertainty led to economic insecurity, which caused less educational resources (including but not limited to money, time, and social networks) available to their children, compared with those people who survived the external shock and were still employed by SOEs at that time of economic reform. The disparities of educational resources explain the educational inequalities of their children.

Hypothesis 2: The marginal effects of SOE layoff on intergenerational educational inequalities depend on the levels of economic insecurity at that time. The more economically insecure the unemployed people became, the more unequal their children experience in their education attainment.

The proposed causal mechanism of economic insecurity that links SOE layoff with children's educational inequality functions heterogeneously, depending on the length of period of economic insecurity's overlapping time with that of children's schooling years. We can infer that if children reached the age of 18 or above when his or her parent got laid off, we predict that his or her educational attainment is less not even not affected by the economic insecurity shock occurred to the family. However, those children whose future educational years significantly overlap with the economic insecurity period have less educational resources available to them, and their educational attainments were inversely affected.

Hypothesis 3: The heterogeneous effects of economic insecurity shock brought by SOE layoff depend on its overlap with children's schooling years. The longer period of the overlap is, the more children's educational attainments were affected.

RESEARCH DESIGN

In this section, we elaborate the selected data source and identification strategy, and we provide empirical evidence to evaluate the key identification assumptions which are required for the causal inference of this study.

Data Source

This study draws on data from the China Health and Retirement Longitudinal Study (CHARLS), which is administered the Institute of Social Survey at Peking University. CHARLS is a nationally representative survey that covers 28 provinces in China. Using the probabilities proportional to size (PPS) sampling method, CHARLS investigates 450 residential committees/villages in China with 12,400 households involved. Since this study primarily targets the health and retirement problems of the aging population in China, participants who aged above 45 were involved. Information of the survey respondents' demographic characteristics, household information, health status, health care situations, and other socio-economic conditions was collected. Well-trained interviewers collected and process all the data through face-to-face computer-aided personal interviews (CAPIs), and the longitudinal study is conducted every two years. Not only information of the survey respondent was comprehensively collected, situations of his or her family member were asked. The maintained dataset provides invaluable information for this study of Chinese SOE reform's transgenerational impact which is reflected by not only people who experienced the historic economic shock but also by their next generation. In addition, the special wave of the life history survey was conducted by CHARLS in 2014, collecting information on the detailed employment history of all the survey respondents. It traces back to each individual's employment history at the state-owned firms in the last century with the starting point, and it also records the reasons for leaving the firms. A list of unemployment reasons includes leaving the firm due to the SOE mass layoff from which the collected data is crucial for the empirical identification strategy of this study on the intergenerational impact of the economic reform shock. Over 70% of people who attend the regular waves of CHARLS survey participated into the life history study in 2014, which provides sufficient useful observations for our statistical analysis. The most recently published regular wave of CHARLS study that is available to the public was conducted in 2020. We match data of 2020 with the 2014 life history survey by the respondents' individual and household identification numbers, re-organizing the cross-sectional data for this study. Because the two surveys used the same sampling design and partially same questionnaire implemented by the same research institute at Peking University, we treat the matched dataset as repeated cross-sectional data. Our sample exclude individuals who were younger than the working age (younger than 18-year-old)

during the state-owned enterprise reform caused massive layoff, since they were not affected by this wave of large-scale involuntary unemployment. In addition, we keep observations in the urban areas and drop rural ones to avoid the potential confounding effects on the treatment effects of SOE reform caused mass layoff which occurs across cities in China. It leaves us 1,247 observations in total for the later statistical analysis.

Variables

Independent Variable: SOE Reform Caused Laid-off (Treated and Control)

Our main independent variable is SOE Reform-caused mass layoff happened in the 1990s in China which affected numerous workers and led to their involuntary unemployment. This variable can be measured at both macro and micro levels. At the macro level, SOE reform caused layoff can be measured by the unemployment rates across cities or provinces, calculated by laid-off population divided by the base size of population. At the micro level, it is according to the employment history of an individual who was employed by a state-owned enterprise and experienced layoff during the period of economic restructuring as the external shock. Since the empirical evidence of this study draws on the China Health and Retirement Longitudinal Study, which is a nationally representative survey project collecting survey data at the individual level, the measurement of the independent variable in this study is also at the micro level. We adopt the questions on the survey respondents' employment history in details from the CHARLS data collection.

In the questionnaire of the life history survey project conducted by CHARLS in 2014, a set of questions asks the survey respondents about their employment chronological history in details. The study records the ownership of firms where the survey respondents had been employed previously. Employment at state-owned enterprises or not is a dummy variable. The answers to this question as "state-owned firms" are coded as 1, otherwise it is 0. For the treatment of SOE mass layoff shock that happened during the 1990s in China, we draw on data collected by CHARLS 2014 which asks the survey respondents about the reasons for stop doing the job that recorded by the question on the ownership of firms mentioned above. The reasons include "1 business closed", "2 the position was gone", "3 I was laid off", "4 I was fired", "5 land was taken", "6 I went to school", "7 I went abroad",

"8 I stopped working for health reasons", "9 I stopped working for family reasons", and other 7 types of reasons for stop doing this specific job. Each labeled values of the answers are recoded to have the dummy variable of individual's layoff. The interaction composed by the SOE employment dummy and the mass layoff dummy creates the new dummy variable of SOE-reform-caused layoff with values of 1 or 0. To be noticed, the first three reasons for leaving the state-owned firms are all included. In the context of SOE mass layoff, some individual workers experienced layoff while others had their firms closed or positions gone without formal layoff notifications.

The independent variable is measured by SOE employment itself and the interactive term of SOE employment and layoff. The survey respondents who were employed at the SOEs but did not experience the mass layoff become the control group (SOE=1 and layoff=0), and those who were employed at the SOEs and laid off by their firms during the economic restructuring is our treatment group of this study (SOE=1 and layoff=1). In that sense, we divide SOE employers into two groups; one is of people who did not get laid off, and the other group of people received the treatment of involuntary unemployment during the economic reform as the external shock. It is consistent with the DiD strategy assumption that, in the absence of the mass layoff program intervention, should the differences of outcome variables among cohorts remain constant.

Key Outcome Variable: Educational Inequality

The key outcome variable of this study is the educational inequality of children whose parents experience the SOE reform caused mass layoff in the 1990s in China. Education as a key determinant of socioeconomic status and human capital accumulation promotes social mobility, and educational inequalities can be observed through disparities among different groups. Educational inequality as a concept is multi-dimensional, and we select the most straightforward proxy measurement of this variable, which is the educational attainment measured by children's schooling years.

The 5th wave of the China Health and Retirement Longitudinal Study completed in 2020 asks each survey respondent's children's highest educational attainment. The answers to this question are in ten categories, which are "1 no formal education (illiterate)", "2 did not finish primary school", "3 elementary school", "4 middle school", "5 high school", "6 vocational school", "7 two-/three-year college/associate degree", "8 four-year college/bachelor's degree", "9 master's degree", and "10

doctoral degree/Ph.D.". The answers to this question provide comprehensive information on the survey respondents' children's school years and attained degrees. The ten types of answers are recoded and labeled with values of their numerical years of educational attainment accordingly, which create a continuous dependent variable for this study. Since the next generation of people who had experienced the large-scale SOE reform and mass layoff are subject to the one-child policy in China, we only draw on data collected from an individual survey respondent' eldest kid for the accurate comparison purpose, and we control the number of children belonged to this family for rigorousness. In addition, we do not consider the child's current schooling status in this study. The reason is that we assume children of people who experienced SOE reform caused layoff should have finished their highest level of education by 2024. Even if some children might currently enroll in schools, we stipulate that they are less affected by their parent's unemployment and they are not included as samples in our study. The ultimate years of schooling of children whose parents were exposed to mass layoff shock operationalize the educational attainment as the dependent variable of this study.

Control Variables

WWe control several variables based on the survey respondents' demographic characteristics, which are identified as determinants of intergenerational transmissions of educational attainment. The demographics include the laid-off (or not) parent's gender, the parent's educational attainment, the child's gender, the number of children in this family, and total income of the household when the 5th wave of CHARLS survey was conducted. To be noticed, regarding the parent's educational attainment, the CHARLS questionnaire is designed to ask their attained degrees which is categorical instead of the continuous schooling years. We make this variable categorical to maintain the accuracy of the measurement. We introduce an additional variable, which is the survey respondent's economic insecurity when he or she was laid off during the economic restructuring caused unemployment. It is for the causal mechanism test that we will elaborate in the next section of identification strategy. The age of the child to which cohort he or she belongs are also included for the examination of the heterogeneous effects derived from the causal mechanism. Appendix Table 1 presents these variables' measures and summary statistics. We include two-way fixed effects estimators, which are unit fixed effects of each community and province-cohort fixed effects of children of the survey respondents, in

the model to control for time-invariant unit-specific effects across time.

Identification Strategy

Leveraging the benefits of repeated cross-sectional data drawn on the Chinese Health and Retirement Longitudinal dataset, we are able to capture dynamics of the transgenerational changes and avoid most of the response biases of survey data. We can estimate how SOE-reform-caused mass layoff occurred in the 1990s in China led to intergenerational educational inequality happening nowadays by employing a cohort DiD strategy. Differences from two sources are identified. The first difference is in the explanatory variable: to which extent children of people who experienced the SOE reform face the problem of educational inequality. The second difference is to which extent the intergenerational educational inequality is due to SOE reform caused layoff (involuntary unemployment), evaluated by child's cohort of which schooling years overlaps with national economic restructuring. The DiD design helps us infer the causally differential effects of SOE mass layoff on intergenerational educational inequalities, revealing the long-term and transgenerational inter-group disparities in educational resource allocations.

The assumption of this identification strategy is that, in the absence of the SOE mass layoff, there wouldn't be any differences in average educational attainments among SOE employers' kids, and the differences in average educational attainments among people across cohorts of this study should be constant. One possible violation of this common-trends assumption is that, the children of cohorts that experienced more intensified mass layoff during the economic reform were systematically different from those had less regarding the educational resource allocations, since children of different age groups are also subject to other systematic factors in terms of educational environment changes. Children of the cohort of which the schooling years overlap with the SOE mass layoff may also face the problem with increasingly competitive education and difficulty of entering colleges. In this sense, although we find an association between SOE mass layoff and certain children belonged to varied cohorts' educational inequalities, the results possibly suffer from the reverse causality or the omitted variable bias problems.

We cannot directly test this counterfactual common trend assumption in real life; however, given that we have more than one pre-treatment period for which data is available from the CHARLS dataset,

we can detect the pre-existing differences in the trends of the outcome variable. To rule out the possible reverse causality or omitted variable bias problems, the correlation between pre-treatment level of educational attainment, that is, before the start of the economic restructuring, and SOE reform caused mass layoff should be examined in this study. The further explanation is that, there are variations in overlap of children's schooling years with their parent's layoff. Those children's parents got laid off; however, if their schooling years did not overlap with this external shock intervention, we consider that their educational attainment was not affected by his or her parent's unemployment. To conduct this placebo test, we include the survey respondents who got laid off, and at the year of his or her employment, his or her child had reached the age of 18 and above. We fake that these people are in the treatment group, while other SOE employers are the control group. If the DiD identification strategy is credible, the DiD estimator should be zero as we fake this treatment which did not have the intervening effects at all. The DiD estimator is applied to the pre-treatment data. The coefficient of the interaction term (SOE*layoff) is very small and indistinguishable from zero. Based on the result of this placebo test, we feel safe to say that the causal interpretation of our study in the next section is plausible.

EMPIRICAL RESULTS

In this section, we present our main empirical results, which are complemented by further robustness check. We then provide additional empirical evidence to show that how the economic insecurity mechanism links SOE layoff with intergenerational educational inequalities, and how the inequalities are dependent on the variations in the levels of economic insecurity due to the involuntary unemployment in 1990s in China.

Baseline Equation Estimates

Fitting the following baseline equation, we use ordinary least squares (OLS) and input the compiled repeated cross-sectional data collected by the China Health and Retirement Longitudinal Study in 2014 and 2020.

$$Y\_Edu_{i,p,c} = \beta_0 + \beta_1 SOE + \beta_2 SOE * layoff + \beta_3 X_{i,p,c} + \lambda_c + \mu_{c,p} + \epsilon_{i,p,c}$$

Where $Y\_Edu_{i,p,c}$ is province p's respondent i's child's educational attainment (by schooling years log) who belongs to cohort c, SOE represents if the survey respondent was employed by a state-owned enterprise for his or her first job, $layoff$ represents if this SOE employee was laid off during the economic reform in China in 1990s, and $X_{i,p,c}$ is a vector of individual-level demographic controls, including the survey respondent's gender, the age group to which the survey respondent belongs, his or her educational attainment (categorical variable according to the survey question), his or her first child's gender, how many children does the survey respondent have, and total income of this household to which the survey respondent belongs. λ_c are community fixed effects, which absorb all time-invariant residential community level characteristics being relevant to children's education. Unobservable heterogeneous cohort trends may be correlated with the intensity of SOE mass layoff that is crucial for this cohort DiD identification strategy of our study. To deal with this concern, we incorporate the province-cohort fixed effects in our estimation. The parameter of interest in this study is the comparison and between β_1 and β_2, which estimates to which extent the SOE layoff affected the previous employers' children's educational attainment.

Table 1 presents our estimates. We firstly present the most parsimonious specification in column (1) which does not include the layoff variable but SOE employment history itself, estimating the effects of state-owned enterprise employment without the layoff treatment on children's educational attainment. In column (2), we add the interactive term between SOE employment and layoff treatment. Then we add community and province-cohort fixed effects in column (3). Lastly, we add demographic controls in column (4) to present the most comprehensive empirical analysis of the baseline equation estimation. Regardless of which specification we use, the coefficient on the interactive term between SOE employment and layoff treatment is lower than that on the SOE itself (0.17 compared with 0.14 in the last column). The statistical results are consistent with Hypothesis 1. In addition, our results are highly robust proven by a wide range of robustness check, including the placebo test ground on the pre-treatment period data. Based on the statistical results, we can infer that, SOE laid-off employees' children experienced educational inequality compared with those whose parents did not lay off.

TABLE 1. OLS estimates of the effects of SOE layoff on child's educational attainment

	Dependent Variable: Educational Attainment			
	(1)	(2)	(3)	(4)
	SOE only	SOE layoff	FE	Control
SOE	0.137***	0.148***	0.154***	0.175***
	(0.0261)	(0.0287)	(0.0358)	(0.0384)
SOE#layoff		0.126***	0.128***	0.138***
		(0.0327)	(0.0390)	(0.0410)
Parents' Education				0.020*
				(0.0120)
Household Income				1.44e-07
				(1.11e-07)
Child's Gender				-0.033
				(0.0203)
Parent's Gender				-0.014
				(0.0194)
No. of Children				-0.069***
				(0.0131)
Constant	2.326***	2.321***	2.329***	2.392***
	(0.0241)	(0.0263)	(0.0320)	(0.0588)
Community FE	N	N	Y	Y
Province Cohort FE	N	N	Y	Y
Observations	1,394	1,394	1,319	1,191
R-squared	0.020	0.020	0.308	0.336

t-statistics in parentheses

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Evidence on Economic Insecurity Mechanism

So far, we have established a negative relationship between SOE employers' layoff experience and their children's education measured by schooling years. Now we provide direct evidence on the proposed economic insecurity mechanism which explains this causal relationship between the macro-level external shock and micro-level individual loss in 1990s in China. Our theory predicts that, state-owned enterprise employers who directly experienced mass layoff got involuntarily unemployed, and this situation led to their economic insecurity. The economic insecurity that reduced resources available to their children, including but not limited to economic, time, and network support, caused the unequal

educational resource allocations for their children, who in turn had their educational attainment compromised compared with those children whose parents did not experience the mass layoff in this intergenerationally transmittable way.

To test Hypothesis 2 that parent's economic insecurity is one causal mechanism that links SOE layoff with intergenerational educational inequalities, we examine the effects of parent's layoff on their economic insecurity. Economic insecurity as a concept is of complexities and multi-dimensions, of which the measurement is not unified in the existing studies. According to Jacob Hacker and his colleagues, the economic security index is a micro-level index based on aggregate level economic insecurity in a country. The micro-level aspect of the index is that, net income declines that people experience, net of whatever level of income protection may be available to them and whatever else happened in their life. This measure estimates the substantial income fall which significantly affects a household's income level and brings unneglectable economic insecurity. Based on the underlying logic of this economic insecurity index, we adopt the monthly salary of the survey respondent when he or she was employed at the state-owned enterprises as a proxy to economic insecurity. Adding this variable to our baseline equation, we estimate the effects of the economic insecurity mechanism.

Table 2 presents the estimates on the effects of the proposed economic insecurity mechanism between SOE layoff and children's educational attainment. The coefficient of economic insecurity of SOE laid-off employees on their child's educational attainment is negative (-.001), and it is statistically significant with all demographic control variables and fixed effect included. The explanation is that, the higher level of salary the SOE employee earned when he or she was still employed, the more he or she lost when the mass layoff occurred. The larger scale of economic loss happened involuntarily to the household increased the level of economic insecurity, which limited available resources, including time, money, and network, to the children. It compromised treated children's educational opportunities, which is consistent with Hypothesis 2. Base on the interpreted statistical results, we can say that, economic insecurity is one driving mechanism which mediates the negative relationship between SOE layoff experience and their children's educational attainment.

TABLE 2. OLS estimates of the effects of economic insecurity on child's educaitonal attainment

Dependent Variable	Educational Attainment
Income	-0.001***
	(0.0453)
SOE#layoff	0.110***
	(0.0418)
Controls	Y
Community FE	Y
Province Cohort FE	Y
Observations	1,156
R-squared	0.337

t-statistics in parentheses

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

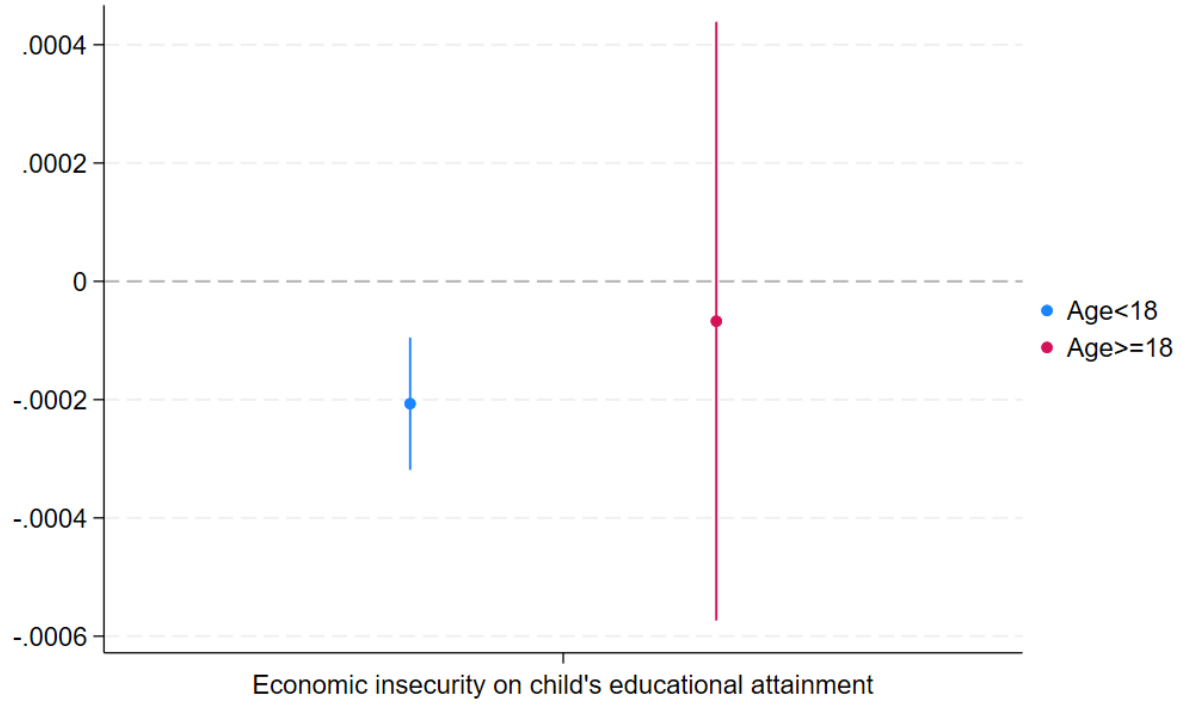
Heterogeneous Effects of Children's Cohort Exposure

One of the core insights of our theory is that, the effects of SOE layoff caused economic insecurity should be conditional on the child's schooling years' overlap with the period of economic insecurity as an external shock. This overlap estimates children's exposure to the substantial income decline faced by their laid off parent (s) which negatively influenced disposable income of the household. The larger the exposure was, the more economically insecure that the family faced, which predict the decrease in the children's educational attainments. To test the heterogeneous effects, we specify a measurement of the survey respondent's child's age when his or her parent got laid off by the previously employer SOE, and we calculate the difference between this time period and the age of 18. The measure of this difference represents the overlapping years between the occurring economic insecurity to the family and the child's remaining schooling years that she or he needed the financial and other kinds of support from the parents.

Figure 1 shows that the estimates of the marginal effects of economic insecurity caused by SOE layoff on children's educational attainments are conditional on the heterogeneity of child cohorts' schooling years' exposure to the income decline shock. If the child was at the age of 18 or above at the

year when his or her parent got laid off, the effect of economic insecurity on his or her educational attainment is statistically insignificant, and the coefficient is indistinguishable from zero. In contrast, if the child was below the age of 18, which means his or her schooling years overlap with the economically insecure period of the family, the child's educational attainment is negatively affected by the level of economic insecurity (coefficient -.002). The statistical results on the heterogenous effects of economic insecurity's overlap with children's schooling years are consistent with Hypothesis 3, and it bolsters the causal interpretation of our analyses on SOE layoff economic insecurity intensity mechanism.

FIGURE 1. Heterogeneous effects of economic insecurity on children's educational attainment for different cohorts



CONCLUSIONS AND DISCUSSIONS

Findings

National economic reform is a scary state action which involves high-level uncertainty and unexpected costs from different sources. China's SOE reform in the mid-1990s provides an ideal case for researchers to investigate the effects of macro-level reform policies on individuals at the micro level. To

be noticed, some reforming policy and procedures not only have immediate impact but intergenerational implications. Grounded on this quasi-experiment of economic restructuring which significantly impacted state-owned enterprises' ownership and human capital, our study reveals that, SOE reform caused mass layoff not only affected those who survived the large-scale involuntary unemployment shock but indirectly sacrificed their children's educational resources and opportunities, compromising their educational equality intergenerationally in an unforeseen way. Individuals are paying the costs of economic restructuring not only with their own life course shocks but also with their descendants' future opportunities and social mobility.

The findings may also apply to countries of emerging economies which had suffered or would experience economic reforms in the future. The positive sides of successful economic reform involve economic efficiency, economic growth, and resource reallocations. However, the negative externalities cannot be underestimated. For instance, in our study, parents who experienced job displacement and income decline were victims, and so were their children who suffered from increasingly competitive education in the context of marketization. This study develops a theoretical framework and provides empirical evidence for policy decision makers, economists, and other stakeholders to understand the negative externalities of economic restructuring on next generation's social mobility, emphasizing that the economic growths brought by certain government-initiated programs were achieved at the cost of SOE employees' and even their next generation's welfare to a large extent.

Limitations and Future Directions

This study is subject to obvious limitations, which should direct our future extended research based on this topic. Firstly, the empirical evidence of this study does not differentiate families of which one parent got laid off, or both parents experienced layoff in the 1990s in China. We can infer that, families of which both parents got laid off at the same time faced more serious problems with involuntary unemployment-caused economic insecurity, and their children are much more affected by the intensified shocks to the family which are reflected by the severity of educational inequalities in the intergenerational manner. However, due to the limitation of the CHARLS survey questionnaire coverage, we do not have information regarding the situation of both parents got laid off, and we

can only consider the situation that one parent employed by a state-owned enterprise was forced to leave. The heterogeneous effects of SOE reform mass layoff on families of which one or two parents were affected by the shock are to be examined in our future studies. Secondly, this study does not consider the industries to which the SOE laid off people belong before they experienced the involuntary unemployment. Our empirical evidence drawn on the CHARLS dataset does not include the information regarding the specific industries of their first employment beyond the heterogeneity of types of their firms or institutions, including state-owned enterprises, foreign-controlled enterprises, public sectors, etc. The results might be subject to significant biases caused by the alternative mechanism of industry heterogeneity. Those people who suffered from the SOE layoff most economically may belong to certain industries, which were affected by the economic restructuring more than others did. We plan to incorporate this omitted variable in our further study by trying out empirical evidence from other sources, testing the validity of the statistical results in this study. This potential bias is related to the other important aspect of this study, which is how SOE reform mass layoff affected provinces differently. The variations in educational inequalities across regions can be explained by the heterogeneous effects of layoff rates and economic structure varied among provinces. One last identified limitation of this study, is the not so satisfactory measurement of educational inequality in this study. We use the laid-off parent's salary as the proxy to the substantial decline of income to the household without considering the government or SOE initiated compensation programs, the wealth stock of the family, etc. More reliable measurement of economic insecurity will be developed as we forward this ongoing study.

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APPENDIX

TABLE 1. Descriptive Statistics of Variables

Variable	Obs	Mean	Std. dev.
SOE	1,206	1	0
Layoff	1,206	.2545605	.4357946
Parent's Education	1,206	2.952736	.9564396
Household Income	1,109	88309.1	109047.5
Child's Gender	1,206	.5406302	.4985532
Parent's Gender	1,206	.5165837	.4999322
No. of Children	1,206	1.84743	1.039441
Income (SOE)	1,177	83.77124	210.1436
No. of Communities	215		
No. of Province Cohort	47		