Research Proposal: The Impact of Health Shocks on Career Track, Social Class Mobility, and Next Generation's Development in China

Research Problem Statement

The sudden deterioration of an individual's health status, also referred to as a health shock, not only impacts the quality of life of the individual, but may also have profound effects on the family and its socio-economic status. In a rapidly changing society like China, despite rapid economic growth and continuous improvements in the social security system over the past few decades, the issue of falling into poverty due to illness remains severe. Disease not only brings about exorbitant medical expenses, but may also lead to the loss of job opportunities for patients or their family members, a reduction in family labor force, thereby severely affecting the family's economic situation. The core theme this research aims to explore is the indirect consequences and mechanisms of health shocks in China, primarily addressing the following questions:

Firstly, how significant are the indirect losses that health shocks can inflict on individuals and families in the context of Chinese society? Secondly, through what specific mechanisms do health shocks lead to the possible negative outcomes, and are there differences in the impact mechanisms for different groups when facing health shocks? Thirdly, to what extent does the social security system alleviate the negative impact of health shocks on families, and how much burden do health shocks impose on the social security system?

The responses to the three aforementioned questions will constitute the insight to core issues of my research: What impact do health shocks have on the career trajectories of individuals from different groups, as well as on the opportunities for social mobility of the families? What effects do they have on the education and development of the next generation within these families? And to what extent can social security mechanisms effectively mitigate these potential negative impacts?

Literature Review

The study of health shocks and their consequences has garnered extensive attention in the fields of economics and public health, with a comprehensive body of literature available for reference.

In developed countries, health shocks have been extensively examined and researched. Early literature, such as the work by Courtney C. Coile (2004), investigated the impact of health shocks on the labor supply of middle-aged Americans and their spouses. It found that heart disease and cancer significantly reduced the labor supply of the patients themselves, but did not observe a rise in the labor supply of the spouses, namely the "added worker effect." Meanwhile, a comparative study of health shocks in Denmark and the United States by Nabanita Datta Gupta et al. (2014) did not find significant differences in individual work behavior between the two distinct healthcare regimes. Over the past five years, numerous scholars have used the event study methodology to vividly illustrate the short-term and long-term effects of health shocks on individuals and their families. Prominent among these is the research by Itzik Fadlon et al., who utilized Danish Administrative Records data to study the impact of health shocks on family members' health behaviors (2019) and labor supply (2021). Thanks to the extensive data and the long panel time span, they were able to use the timing of shocks to construct counterfactuals for affected households using households that experience the same shock but a few years in the future. Their findings revealed that individual health shocks led family members—from spouses and children to siblings and even colleagues—to increase their health investments and improve their health behaviors. Moreover, fatal health shocks led to an increase in spousal labor supply, whereas non-fatal health shocks had no significant impact on spousal labor supply. Similarly, using event study methodology with U.S. data, Dobkin et al. (2018) uncovered the economic consequences of hospitalization, finding that hospitalization reduced the income of non-elderly adults with health insurance, increased their medical expenditures, and heightened their bankruptcy probability. Compared to those with health insurance, individuals without health insurance faced a much higher probability of bankruptcy following a hospitalization shock. Beyond examining the impacts on the individuals themselves and their spouses, other studies have focused on the effects of unexpected hospitalization of elderly parents on the labor market performance of their children

(Rellstab et al., 2020), using a combination of CEM and DID methods and finding no significant impact across whole samples and subsamples.

This research theme has also been extensively discussed in developing countries, particularly in Southeast Asian nations. Early literature using Vietnamese data found that health shocks caused greater income loss and medical expenditures for urban households, but increased non-labor income, partially offsetting the negative impacts (Adam Wagstaff, 2007). Evidence from three provinces in Laos (Adam Wagstaff et al., 2010) indicated that health-related shocks were widespread and had profound impacts, especially among the poor, with families primarily coping through strategies such as reducing savings, borrowing, and selling assets, which could have long-term implications for family welfare. A study on Bangladesh (Asadul Islam et al., 2012) using large panel data found that selling livestock was the main strategy employed by poor households to cope with medical expenditures resulting from health shocks, while microcredit could help households avoid selling livestock and thereby prevent long-term economic losses. A literature review on health shocks in low- and middle-income countries (Khurshid Alam et al., 2014) found that empirical literatures since 2000 consistently show that households use a variety of sources such as income, savings, loans, mortgage, asset selling, and livestock selling to cover the high out-of-pocket medical expenses resulting from health shocks. Additionally, health shocks lead to a significant reduction in household labor supply, and low-income families are unable to fully smooth out income losses caused by moderate and severe health shocks.

Thanks to the increasing availability of large-scale survey data in China in recent years, literature from China has also comprehensively assessed the impact of health shocks on families. Unlike in Southeast Asian developing countries, rural Chinese families are able to smooth consumption even without health insurance. However, compared to households with health insurance, health shocks could rise the probability of entering the labor market for uninsured families' children (Kai Liu, 2016). Health shocks also cause an barrier to upward mobility in the value of family financial assets (Yaxuan Liu et al., 2022), and increase proactive health prevention behaviors (Peng Zhang et al., 2022). The most comprehensive study used CFPS and CHARLS data for a multi-period DID analysis (Yajie Wang et al., 2023), finding that unexpected health shocks significantly increased families' out-of-pocket medical expenses, lowered per capita income and assets, and increased the probability of depression in both the individuals themselves

and their spouses over a five-year period. Moreover, the study calculated that health shocks caused by cardiovascular diseases resulted in an average loss of 34,966 CNY per household in direct and indirect costs over five years, as well as 6,066 CNY in medical reimbursements and social welfare transfers.

In summary, existing literature has elucidated the consequences of health shocks, including direct outcomes such as increased medical expenditures, and indirect outcomes such as reduced individual labor supply, and in some cases, increased spousal labor supply. Due to these outcomes, low-income families in low- and middle-income countries may cope with health shocks through strategies such as reducing savings, borrowing, and selling assets, but this could have long-term implications for family welfare. Additionally, beyond economic consequences, health shocks could also increase the probability of depression in individuals and their spouses, improve health behaviors among family members, and reduce educational opportunities for children.

In terms of empirical methods, research on health shocks has evolved from early multivariate linear regressions to extensive use of DID and event study methodologies, enhancing the credibility of causal inferences while illustrating both the short-term and long-term consequences of health shocks.

Significance of Research

The notable characteristic of China’s labor supply is its extreme diversity, encompassing a wide range of occupations, including both agricultural and non-agricultural self-employment and wage employment. Wage employment itself is further categorized into several different types. A gap in the existing literature is the lack of analysis on the impact of health shocks on individuals and their families across different types of employment, as well as whether health shocks may lead to unemployment after the medical treatment period, preventing individuals from returning to their original job type and level. Additionally, it is unclear whether health shocks may interrupt individuals' career progression and result in long-term employment discrimination. Therefore, this study aims to utilize diverse representative micro-databases to examine the specific impact mechanisms of health shocks on different groups, taking into account the type and severity of the health shocks.

Furthermore, based on the analysis above, we can conduct research on the effects of health shocks from the perspective of social mobility. While existing studies have thoroughly analyzed continuous income and wealth variables, this study seeks to investigate how health shocks influence the probability of social mobility for families from different social strata: For families from lower social strata (i.e., impoverished or subsistence level), to what extent do health shocks hinder their potential for upward mobility? For families from middle and upper social strata (i.e., well-off and affluent level), what is the likelihood that health shocks could cause them to fall from their original social stratum? In addition, although existing literature has found that for families without medical insurance, health shocks can increase the probability of children working, it has not delved into a detailed analysis of the long-term educational and developmental status of children in families affected by health shocks. Therefore, this study will further analyze the negative effects of health shocks on the educational development of adolescent children, both when the children themselves and when their parents are affected, in order to examine the impact of health shocks on intergenerational mobility.

Institutional Background

Employment Types in China

The types of employment in China today can be broadly categorized into two main groups: self-employment and wage employment. Self-employment is further divided into agricultural self-employment and non-agricultural self-employment. The former includes individuals engaged in family farming, while the latter encompasses individual business owners or entrepreneurs engaged in non-agricultural production and business activities. Self-employed individuals typically participate in social insurance programs designed for residents, but they also have the option to apply for employee-type social insurance programs, covering the cost that would typically be borne by an employer. The income range for the self-employed is extremely wide; however, the majority of this group, represented primarily by farmers and small urban business owners, still falls within the low-income bracket.

Wage employment can be divided into three categories: public service and administrative positions, formal contract workers, and labor dispatch workers. Public service and administrative

positions refer to employees in public institutions such as schools, hospitals, research institutes, cultural organizations, as well as various levels of government agencies and their affiliated institutions. These individuals generally enjoy stable employment, fixed salaries, social insurance, and other benefits, and their positions are colloquially referred to as “iron rice bowls”. Formal contract workers refer to employees who have signed formal labor contracts directly with enterprises or employers and are fully protected by labor rights and benefits. They typically enjoy a comprehensive range of labor protections and benefits stipulated by national laws, including but not limited to social insurance, housing provident funds, and paid leave. Labor dispatch workers, commonly known as temporary workers, sign labor contracts with labor dispatch companies, becoming employees of these companies while actually working at the client units of the dispatch companies. This arrangement creates a “triangular” relationship among the labor dispatch company, the employing unit, and the worker. Compared to formal contract workers, labor dispatch workers generally have less job stability, and employing units can more easily adjust or terminate their employment. Although legally labor dispatch workers are supposed to receive the same treatment as regular employees of the employing unit, in practice they often face issues of unfair wages and benefits. Non-payment of social insurance by labor dispatch companies is a widespread problem. Additionally, labor dispatch workers typically lack opportunities for promotion and career development.

Medical Treatment Period and Pre-employment Medical Examinations

In accordance with the principles of the "Labor Law," the Ministry of Labor of the People’s Republic of China has stipulated a medical treatment period for enterprise employees who are sick or injured outside of work. This period typically ranges from three to twenty-four months, increasing with the length of service at the current company. During the medical treatment period, the enterprise may not dismiss the employee, and must provide sick leave pay of no less than 80% of the minimum wage standard. However, if the employee is still unable to return to their job position after the medical treatment period has expired, the enterprise may terminate the labor contract in accordance with relevant regulations and provide the necessary compensation. Therefore, individuals who suffer from serious illnesses such as cancer, which require prolonged

treatment and recuperation, face a significant risk of dismissal.

At the same time, individuals who have experienced health setbacks are more likely to fail pre-employment medical examinations, and enterprises have the right to refuse employment to those who do not meet the health requirements for the position based on the results of these examinations. This can severely hinder the job-seeking process for individuals who have experienced health setbacks and are left with chronic illnesses.

The Medical Insurance System in China

The prevalent medical insurance system in China can be primarily categorized into four types: the Urban Employee Medical Insurance implemented in 1998, the New Rural Cooperative Medical Scheme launched in 2003, the Urban Resident Medical Insurance initiated in 2007, and the Basic Medical Insurance for Urban and Rural Residents introduced in 2016.

The Urban Employee Medical Insurance premiums are jointly contributed by employers and employees, with corresponding subsidies provided by the government. The reimbursement rate varies across different years and regions. However, generally, for inpatient expenses above the deductible and up to the maximum payment limit (which has been around 150,000 RMB in recent years), the reimbursement rate of the Urban Employee Medical Insurance ranges from 80% to 95%. The New Rural Cooperative Medical Scheme, Urban Resident Medical Insurance, and Basic Medical Insurance for Urban and Rural Residents offer essentially the same benefits, and are all funded by the residents themselves with governmental subsidies. Compared to the employee-based medical insurance, the reimbursement rates of the resident-based medical insurances are significantly lower, particularly in tertiary hospitals (about equivalent to municipal level and above), where the reimbursement rate is only around 50%.

Data

First and foremost, the unit of analysis in our study is individuals and their families, necessitating a database that provides micro-level data related to households. Moreover, the focal variables of our research pertain to health-related factors as well as variables associated with labor market performance. Consequently, it is imperative that the database encompasses this

information. In addition, given that our study will employ event study methodology, multi-period panel data at the data level is a prerequisite. After a thorough screening process, the databases that satisfy these three criteria are primarily CFPS, CLDS, and CHARLS, all of which utilize stratified PPS sampling to ensure the representativeness of the sample while maintaining a high degree of estimation precision.

CFPS

The China Family Panel Studies (CFPS) is a comprehensive, large-scale, national, and longitudinal social survey, focusing on households, conducted biennially since 2010. It encompasses nearly 20,000 families across 31 provinces, autonomous regions, and municipalities of China, covering diverse aspects including economy, education, health, family structure, and social participation (Yu Xie et. al., 2017). To date, six rounds of panel data from 2010 to 2020 have been released. The CFPS database utilizes households as the unit of analysis, surveying main family members across various age groups.

The database consistently includes information on hospitalization and illness for all years, detailing related medical expenditures. Starting from 2012, it meticulously records whether the respondents suffer from specific diseases during the survey year, with a subdivision into 150 categories, providing extremely detailed information. This granularity enables us to analyze the heterogeneous impacts of different types and severities of health shocks on individuals and their families.

On the employment front, the CFPS work module categorically records the employment status of the respondents, including self-employment and employment in both agricultural and non-agricultural sectors, as well as family labor. Additionally, for each category of work, the survey inquires in detail about the number of working days and hours, wages, and insurance, among other critical information. This ensures that we can meticulously analyze the specific mechanisms through which health shocks impact labor market outcomes at the household level.

The household questionnaire thoroughly documents various income, expenditure, and asset items, allowing for a comprehensive assessment of the impact of health shocks, incorporating individual-level data. In the child module, the survey also encompasses rich information on

education, health, ideologies, values, and detailed records of children's illnesses, facilitating research on the impacts of parental health shocks and children's own health shocks on their education and development.

CLDS

The China Labor-force Dynamics Survey (CLDS) conducts biennial dynamic tracking surveys of households and individual labor force members in urban and rural areas, using villages/neighborhoods as the tracking scope. This initiative systematically monitors changes and mutual influences among social structures in villages/neighborhoods, families, and individual labor force members, establishing tracking databases at the levels of labor force, family, and community.

The content covers a wide range of research topics, including education, work, migration, health, social participation, economic activities, and grassroots organizations. The CLDS employs a rotation panel survey methodology, wherein each sample unit is tracked for four rounds (six years) before being replaced by a new sample unit for surveying. This approach not only retains the advantages of cross-sectional surveys but also benefits from longitudinal tracking, overcoming the drawbacks of both methods (Center for Social Survey, Sun Yat-sen University).

The CLDS primarily surveys the working-age population (15-64 years old) within families. Although its health module is relatively brief, capturing disease, hospitalization, and related expenditure information without detailing disease types, a significant advantage of this database lies in its comprehensive portrayal of the respondents' work over the past year and their entire work history. This includes details about every job held, such as its type, industry, wage, work intensity, and labor relations, and inquiries into the job-seeking situations of temporarily unemployed individuals.

CHARLS

The China Health and Retirement Longitudinal Study (CHARLS) tracks around 17,000 individuals over the age of 45 across 150 county-level units and 450 village-level units nationwide, collecting comprehensive data on income, social interactions, economic status, health, medical

care, and more. The sample covers urban and rural areas in 28 provinces across the country, ensuring good representativeness (Zhao et. al., 2013). The data reliably and richly depict the demographic, socio-economic, and medical characteristics of the subjects.

Although the CHARLS database focuses on a population aged 45 and above, it provides detailed records of their children, including their education, occupation, income levels, as well as intergenerational support and communication between parents and children. This allows for the analysis of the impact of severe health shocks on adolescent children and young adults, especially relevant for those aged 45-55, whose children might still be in education or have just entered the labor market and are thus still in their developmental stages. Furthermore, CHARLS offers extensive details in its health module, recording more than ten types of chronic diseases, as well as measuring mental health and cognitive function status.

Methodology

This study will adopt the empirical research methods mature in recent years, namely DID method and event study method.

DID Setting

The setting of this method is as follows:

$$y_{it} = \beta \cdot PostShock_{it} + \Gamma X_{it} + \eta_t z_i + \alpha_i + \lambda_t + \varepsilon_{it}$$

The left-hand side variable y_{it} represents the outcome variables. $PostShock_{it}$ is a binary variable, assigned a value of 1 if the individual is after the shock (this variable is always zero for the control group). Therefore, β is the main difference-in-differences coefficient we estimate. X_{it} represents individual-level covariates that change over time; α_i denotes individual fixed effects; and λ_t stands for year fixed effects. However, if some predetermined covariates are correlated with the likelihood of experiencing a shock and also correlate with the time trend of the dependent variable, this can lead to omitted variable bias. To address this potential bias, we introduce $\eta_t z_i$, which is the interaction term of predetermined individual characteristics and time. Based on the descriptive statistics and analysis, we believe that it's crucial to include core interaction terms between predetermined variables and time.

Event Study

In order to observe whether the prior trend is stable and to study the dynamic impact after the health shock, it is necessary to introduce the event study method:

$$y_{it} = \sum_{\substack{-T \\ \tau \neq -1}}^{T} \gamma_\tau \mathbf{1}(t - t^* = \tau) + \Gamma X_{it} + \eta_t z_i + \alpha_i + \lambda_t + \varepsilon_{it}$$

The setup remains consistent with the standard difference-in-differences model, except that the broad categorization of being "post-treatment" is replaced with a series of dummy variables. ***1(t-t*=τ)*** indicates that individual ***i*** is in the ***τth*** period after the shock at time ***t***, with ***τ*** taking a negative value to represent the period ***-τ*** before the shock. The benefits of this setup are twofold: First, it allows observation of pre-treatment trends and conducting tests on these trends. If pre-treatment trends are stable and their coefficients approach 0, it provides corroborative evidence and indirectly boosts the persuasiveness and confidence in the results' validity. Second, it provides insight into how post-treatment trends evolve, i.e., whether the effects of the shock persist or dissipate, or if families can recover quickly after a health shock.

Event studies with heterogeneous treatment effects

The latest advancements in theoretical econometrics literature indicate that if groups receiving treatment at different time points exhibit heterogeneous treatment effects, meaning they follow different treatment effect trajectories, the estimates derived from the event-study methodology might still be severely biased even if the parallel trends and no anticipation assumptions are satisfied (Goodman-Bacon, 2021; Sun and Abraham, 2021; Borusyak et al., 2023; Dube et al., 2023).

In this study, the identified treatment effects are likely to have temporal heterogeneity; for instance, the impact on the same individual experiencing a shock in 2014 might differ from experiencing it in 2016 due to the evolving macro environment and healthcare systems. Should such heterogeneity exist, it could lead to biased coefficients, necessitating the introduction of estimators robust to heterogeneous treatment effects. In subsequent research, we will compare these robust estimators proposed by Sun and Abraham, Borusyak, and Dube with the traditional event-study estimators to enhance the robustness of our conclusions.

Heterogeneity Analysis

We further need to explore whether there is heterogeneity in the effects of health shocks on individuals of different groups mentioned above. Therefore, the following model is developed:

$$y_{it} = \beta \cdot PostShock_{it} \cdot H_i + \Gamma X_{it} + \eta_t z_i + \theta_t H_i + \alpha_i + \lambda_t + \varepsilon_{it}$$

$$y_{it} = \sum_{\substack{-T \\ \tau \neq -1}}^{T} \gamma_\tau \mathbf{1}(t - t^* = \tau) \cdot H_i + \Gamma X_{it} + \eta_t z_i + \theta_t H_i + \alpha_i + \lambda_t + \varepsilon_{it}$$

The setup is largely consistent with the basic two-way DID and event study configuration above, except for the requirement to multiply the post-shock indicator variable with the group variable of interest, $\boldsymbol{H_i}$. Concurrently, this group variable is also multiplied with the time variable to avoid omitted variable bias.

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