The Impact of Chinese Health Insurance on the Well-being of Freelancers

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Abstract

With the development of China's economy and society, the freelancer population is growing, drawing increased attention to the issue of their well-being. Simultaneously, the national health insurance system has been implemented for many years, and its effectiveness requires further verification. From the perspective of health insurance, this paper investigates the impact of health insurance on the well-being of freelancers. By reviewing relevant theories and literature, and utilizing processed data from China Labor-force Dynamics Survey (CLDS) 2018, an Ordinary Least Squares (OLS) empirical study is conducted on the relationship between health insurance and freelancers' well-being using methods such as descriptive statistics and regression analysis. Instrumental Variable (IV) has been used for robustness test. Based on 1109 observations, the baseline regression shows a 0.0431-point increase on a 5-point Likert scale. The results indicate that health insurance has a significant positive impact on the well-being of freelancers, meaning that freelancers enrolled in health insurance report higher levels of well-being. Based on these findings, this paper proposes policy recommendations: the government should enhance support for freelancers' health insurance, improve relevant systems, and increase insurance benefits; all sectors of society should be encouraged to focus on the well-being of freelancers and create a better development environment for them; freelancers themselves should also raise their insurance awareness and actively participate in health insurance to enhance their personal well-being. This study provides a theoretical foundation and practical reference for policymaking related to freelancers' health insurance and for improving their well-being in China.

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1. Introduction

Health has long been a key focus of public attention, as only with good physical condition can individuals participate in work and labor. Healthy lifestyle and behavioral literacy is an important component of health literacy (Zhang et al., 2024). In addition to healthy lifestyles, medical security consistently plays a crucial role. The emerging "common prosperity-oriented" multi-level medical security systems across various regions represent a successful innovation in making the medical security system better aligned with individuals' comprehensive development and accelerating the achievement of the grand goal of common prosperity (Kong, 2024). In 2009, the "Opinions of the Chinese Government on Deepening the Reform of the Medical and Health System" proposed the overarching goal of the new healthcare reform to "establish and improve a basic medical and health system covering both urban and rural residents," formally establishing universal health insurance as a new principle to promote the new healthcare reform. For achieving development, the improvement and quality enhancement of the social security system provide solid institutional support (Wang, 2024). Health insurance serves as an extremely important safeguard for individuals when they fall ill, preventing excessively severe direct impacts of high medical expenses on patients' families and lives. The universality and scope of health insurance remain key focuses of our analysis.

The term "well-being" is widely used, with the government repeatedly emphasizing the need to enhance the people's sense of gain and well-being (Xingtai Daily, 2020). In academia, numerous empirical studies have also explored the relationship between various social factors and the well-being of different groups. Therefore, against the backdrop of health, examining the relationship between health insurance and well-being is particularly important and holds significant research value.

As catalyzed by the internet, the gig economy is becoming a noteworthy new form of employment (Liao, 2022). Due to their flexible and unique work characteristics, freelancers are relatively difficult to precisely define and fully analyze in terms of their social conditions. The absence of an affiliated enterprise or organization means that freelancers need to enroll in social insurance independently, which places higher demands on their awareness, understanding, and capabilities. As an important component of the labor force, the health of freelancers is closely linked to societal prosperity and development. Simultaneously, the personal well-being of freelancers is inextricably linked to their health. In the face of potential health risks such as overwork, robust medical security may serve as an important form of support for them. Therefore, an important question arises: Is health insurance participation positively associated with the well-being of freelancers? If such an association exists, to what extent does it vary across different segments of the diverse freelancer population? Investigating these patterns can provide valuable empirical evidence to inform policy discussions and future research on the relationship between health insurance and freelancer well-being.

However, it is crucial to recognize that "freelancers" in contemporary China encompass a highly diverse population, ranging from platform-based workers such as delivery riders and

ride-hailing drivers to online vendors and high-skilled creative professionals. Despite this growing heterogeneity, China's current health insurance system—designed primarily around traditional stable employment—faces substantial challenges in accommodating the "flexibility" that characterizes freelance work. Unlike standard employees, freelancers must navigate enrollment procedures independently while bearing the full cost of premiums amidst fluctuating incomes. The lack of automatic enrollment mechanisms, limited portability across regions, and the regressive nature of fixed premium payments create structural barriers that help explain why, as shown in this study, the health insurance participation rate among freelancers (88.4%) remains significantly lower than China's overall coverage rate of 95%.

For the labor force, good health is indispensable. In recent years, China has witnessed a gradually prominent economic downturn, which has impacted the job market among other areas. Chinese government policies adhere to the principles of protecting employment, people's livelihoods, and market entities, focusing on key groups for employment, addressing the employment issues of college graduates and other young people, and implementing detailed measures to stabilize employment (Guo, 2024). Against this backdrop, freelancing has emerged as an important form of alleviating employment pressure.

We acknowledge that while China's health insurance system is guided by broad policy goals such as common prosperity and universal coverage, this study focuses on a foundational question: whether insurance participation itself is associated with freelancer well-being. This research establishes baseline empirical evidence on the insurance-wellbeing association and its heterogeneity across population subgroups. By documenting these patterns, we provide a necessary first step toward understanding how insurance may contribute to freelancer well-being, while explicitly recognizing that future research with more detailed policy data is needed to examine which specific design features are most effective in translating coverage into improved well-being.

2. Literature Review
2.1 Well-being Related Researches

Well-being is an important concept in social attributes, and research on well-being has consistently covered multiple dimensions. In the field of public administration, Guangxi Normal University conducted a study on the impact of housing factors on well-being, finding that homeownership is positively correlated with well-being, while the number of housing units is negatively correlated with well-being (Li, 2024). From a sociological perspective, research on labor-intensive new employment forms found a positive correlation between social class identity and well-being among practitioners (Zheng & Zhang, 2024). With technological advancements, artificial intelligence has gradually permeated all aspects of life. Business researchers have empirically demonstrated that corporate artificial intelligence social responsibility positively influences employee well-being through the mediating effects of performance expectations and emotional attachment (Shen & Zhang, 2024). At the employment level, scholars in psychology have explored areas such as enhancing the subjective well-being of vocational college students from the perspective of stress perception.

As a positive and constructive emotion, well-being has received significant attention across various disciplines and warrants in-depth study (Li, 2024).

2.2 Research on Chinese Health Insurance and Well-being

China's health insurance is a crucial component of healthcare reform, and its effectiveness remains a key focus of societal attention. Regarding health insurance, academia has conducted extensive research across various levels and fields to provide a solid theoretical foundation for its further improvement. From the perspective of income and expenditure, scholars have confirmed that participation in resident health insurance significantly reduces the income and expenditure levels of flexible employment personnel, while participation in employee health insurance significantly increases them (Jing, 2024). From the perspective of the "sense of gain," scholars have analyzed different health insurance schemes for urban and rural areas: basic urban and rural resident health insurance significantly enhances the sense of gain among flexible employment personnel, whereas basic urban employee health insurance and other health insurance schemes show no significant impact on their sense of gain (Liu, 2022). From the perspective of rural elderly, studies have found that the integration of urban and rural health insurance significantly improves positive emotions among rural elderly while effectively reducing their negative emotions (Liu, 2022). Regarding freelancers, there remains considerable scope for further research on health insurance.

2.3 Research on Freelancers Related to Well-being

The unique vulnerability of freelancers within China's health insurance system warrants particular scholarly attention for several compelling reasons. First, unlike full-time employees who benefit from mandatory employer-sponsored insurance with shared premium contributions, freelancers bear the full financial burden of enrollment independently while facing income volatility(Yin, 2019). Second, the structural design of China's social security system creates institutional barriers that disproportionately affect freelancers. The system's historical foundation in work unit-based social organization means that eligibility, contribution calculations, and benefit access remain tightly coupled with formal employment relationships. Freelancers occupy a regulatory gray zone—they are neither fully excluded from the system nor seamlessly integrated into it(Huo, 2021). Third, from a labor market perspective, freelancers represent the fastest-growing segment of China's workforce. This growth trajectory means that gaps in health insurance coverage for freelancers represent an increasingly significant challenge to the national goal of universal healthcare(Xia & Wu, 2023). International research also shows that freelancers may face path-dependent concern, that their vulnerable status lasts long(Yan et al., 2023). These multifaceted vulnerabilities establish freelancers as a distinct and urgently important population for health insurance research.

3. **Research Hypothesis**
    3.1 Baseline Hypothesis

Health insurance reduces the financial burden on freelancers by reimbursing medical expenses. Within the current social context of China, a positive correlation exists between the maturity of the health insurance system and the well-being of freelancers. Specifically, it is hypothesized that improving the coverage, benefit level, and service quality of health insurance can effectively enhance the well-being of freelancers. Conversely, deficiencies in the health insurance system, such as low benefit levels or complex reimbursement procedures, may reduce freelancers' well-being. This study aims to verify this hypothesis to provide a theoretical basis for the reform of China's health insurance system and for improving the well-being of freelancers.

Thus, H1 is proposed: Participation in health insurance will be more beneficial than not participating for increasing the well-being of freelancers.

3.2 Mechanism Hypothesis

Freelancers in different age groups exhibit significant differences in physical function and income levels. Younger freelancers are typically in the initial stages of their careers, with relatively high levels of physical function, possessing better physical strength and energy, enabling them to withstand higher-intensity work pressures. In contrast, as they reach older age, freelancers generally experience a decline in physical function, which may be accompanied by various health issues. Therefore, health insurance exerts varying effects on freelancers under different circumstances.

Secondly, freelancers often lack fixed wage security, unlike full-time employees who receive stable monthly or annual salaries. Their income may fluctuate due to seasonal factors, cyclical industry variations, or differences in individual work capacity. Freelancers also bear greater economic risks. They are responsible for covering their own social insurance, health insurance, and other benefits, which are typically shouldered by employers in traditional employment models. Consequently, when faced with illness, accidents, or other unforeseen events, freelancers may encounter financial difficulties. Health insurance can enhance their ability to cope with such challenges, thereby increasing their sense of well-being.

Thus, H2 is proposed. H2-A: Participation in health insurance may exert heterogeneous effects on the well-being enhancement of freelancers with different social backgrounds and circumstances; H2-B: Health insurance will improve freelancers' well-being by increasing their social capital. The mechanism will be tested in the mechanism analysis section using Jiang (2022)'s two-step mechanism test method.

4. **Research Design**
    4.1 Sample Selection and Data Source

According to *Webster's Dictionary*, a freelancer is a knowledge worker (such as a writer, editor, or accountant) or service provider who is not affiliated with any organization and does not make long-term commitments to any employer while practicing a profession. They find work on their own initiative, often but not exclusively working from home.

Examples include small business owners, commission-based salespeople, photographers, artists, and others.

This study utilizes data from the 2018 China Labor-force Dynamic Survey (CLDS), a biennial longitudinal survey covering the labor force in rural and urban areas across 28 provinces (autonomous regions, and municipalities), excluding Hong Kong, Macao, Taiwan, Xinjiang, Tibet, and Qinghai. The survey encompasses community, household, and individual levels. This research filters the data based on the "type of work unit" item in the questionnaire, selecting respondents who reported their work unit type as "freelancer" or "without fixed work" as the study sample. Samples with missing values were excluded, resulting in a final valid sample of 1,212 questionnaires, some observations are dropped in later examinations as several parts of the survey answer may be missing. Observations used in the main regression is 1109. To assess potential sample attrition bias, we compared the characteristics of observations included in the regression analyses (N = 1,109) with those excluded due to missing values (N = 103), and differences were not statistically significant. The missingness is not systematic and will not influence the research. The dataset is used in dependent variable, independent variable and also control variables.

4.2 Variable Specification

4.2.1 Dependent Variable

The dependent variable in this study is the respondents' sense of well-being. Individual well-being is influenced by multiple dimensions and fluctuates over time and with changing circumstances, making the assessment of subjective well-being a relatively complex task. Currently, most related studies adopt a simplified approach by including a single question in the questionnaire to evaluate well-being, typically measured at a single point in time. This method commonly employs a three- to ten-point scale and has been widely used internationally. The reliability of this single-item composite measure of well-being has been validated by Robinson & Shaver (1973) and Wilson (1967). Due to research constraints, many studies have adopted this approach.

This study selects a specific question from the survey questionnaire: "Rate your life well-being," which categorizes respondents' life well-being into five levels from low to high: "very unhappy," "relatively unhappy," "neither happy nor unhappy," "relatively happy," and "very happy," corresponding to scores from 1 to 5 respectively. It has clear ordinal properties reflecting the cumulative nature, and existing literature supports treating such ordinal variables as continuous to preserve information. As shown in Table 1, the sample mean for well-being is 3.698 with a standard deviation of 0.893, ranging from a minimum of 1 to a maximum of 5, indicating that freelancers in the sample report moderately positive well-being on average with considerable variation across individuals.

4.2.2 Independent Variable

The independent variable in this study is "whether participating in health insurance." A specific question in the survey questionnaire asks, "Which of the following health insurance schemes do you have?" Respondents could select from options including "Urban Employee Basic Medical Insurance," "Urban Resident Basic Medical Insurance," "New

Rural Cooperative Medical Insurance," "Urban and Rural Resident Basic Medical Insurance," and "Commercial Medical Insurance." This variable is defined as a dummy variable, where a value of 1 indicates participation in at least one type of health insurance, and a value of 0 indicates no participation in any health insurance scheme. This binary specification allows for clear interpretation of the insurance effect—comparing the well-being of insured freelancers against their uninsured counterparts. According to the descriptive statistics in Table 1, the mean insurance participation rate among freelancers is 0.884, meaning approximately 88.4% of the sample is enrolled in at least one form of health insurance. However, this rate remains notably lower than China's overall health insurance coverage rate of 95%, highlighting the coverage gap that exists for the freelancer population and underscoring the policy relevance of this research.

4.2.3   Control Variables

This study, drawing on existing research, posits that individual well-being may also be related to the following two levels of factors. First, variables at the individual characteristic level, primarily including the respondent's age, gender, marital status, household registration, years of education, industry of employment, and income. Second, variables at the household level, including household size and social status.

Gender is coded as a dummy variable with male = 1 and female = 2. Age is calculated as the interview year minus the year of birth, providing a continuous measure of respondents' age in years. The sample mean age is 46.37 years, with a standard deviation of 11.6, ranging from a minimum of 16 to a maximum of 79. Household Registration is coded as a dummy variable where agricultural household registration = 0 and non-agricultural household registration = 1. Education is measured on an ordinal scale where 1 represents primary school education and below, 2 represents secondary school education, 3 represents college or undergraduate education, and 4 represents master's or doctoral education. Income is measured as the logarithm of annual income. Marital Status is coded as a dummy variable where married = 1 and unmarried = 0. Family Size measures the total number of family members residing together, with a sample mean of 5.083, standard deviation of 2.051, ranging from a minimum of 2 to a maximum of 14. Social Status is measured on a 1-10 scale based on multiple criteria assessing respondents' perceived social standing, with higher scores indicating higher social status. The selection of these control variables reflects a comprehensive approach to addressing potential confounding factors in the relationship between health insurance and well-being. Regarding the coding of categorical variables: gender is a binary variable, functionally equivalent to dummy coding; education level (1-4) has clear ordinal properties reflecting the cumulative nature of educational attainment, and existing literature supports treating such ordinal variables as continuous to preserve information.

The definitions and descriptive statistics of the variables are listed in Table. The data show that the maximum value of freelancers' well-being is 5, the minimum value is 1, and the sample mean is 3.69802, indicating a relatively low overall level of well-being. According to the sample data, the health insurance participation rate among freelancers is 0.8837593,

which remains significantly lower than China's overall health insurance coverage rate of 95%. Furthermore, there is considerable income disparity within the freelancer population. In recent years, new employment forms such as online and platform-based work have emerged in large numbers, and these groups of freelancers differ significantly from traditional informal employment.

4.3 Model Specification

Since the dependent variable in this study is continuous, and existing scholars have adopted more interpretable and analyzable linear models to examine such scenarios, this paper employs a multiple linear model to estimate the impact of health insurance and other variables on the well-being of freelancers. The study defines well-being (HP) as the dependent variable, with the core explanatory variable being participation in health insurance, denoted as insurance (1 for participation, 0 for non-participation). Control variables that may influence the well-being of flexible employment personnel include age, gender, marital status, household registration, years of education, etc. The regression of OLS equation is constructed as follows:

$$HP = \alpha_0 + \alpha_1 Insurance_i + \sum_j \beta_j control_{i,j} + e_i \qquad (1)$$

Except for the items above, e denotes the error term; i denotes the individual and j denotes the sequential number of control variables. Regarding survey design considerations, it should be noted that although the CLDS data employed in this study adopt a multi-stage stratified sampling design, the core explanatory variable and the dependent variable are both individual-level characteristics. Moreover, we have introduced a rich set of control variables to account for potential sampling heterogeneity. Existing research suggests that weighting may reduce estimation efficiency due to large variance in weights. For robustness, we could further consider clustering standard errors in subsequent robustness checks to address potential intra-cluster correlations. Future research could build on this foundation by employing more sophisticated survey weighting methods to enhance estimation precision.

Table 1 Descriptive Statistics

Type	Name	Measurement	mean	SE	min	max
DV	HP	Self-examined well-being from low to high 1-5	3.698	0.893	1	5
IV	Insurance	Health insurance = 0, no medical insurance is enrolled; Health insurance = 1, participation in at least one type of health insurance	0.884	0.321	0	1
Individual	gender	Male=1; Female=2	1.344	0.475	1	2
	age	Interviewed year minus year of birth	46.37	11.6	16	79
	household registration	Agricultural household registration is 0; non-agricultural household registration is 1	0.109	0.311	0	1
	education	1 for primary school and below, 2 for secondary schools, 3 for college undergraduates, and 4 for masters and doctors	1.715	0.569	1	4
	income	Logarithm of annual income	10.14	1.005	4.38	13.3
	marriage	Married = 1; Unmarried = 0	0.918	0.273	0	1
Family	family size	Family population	5.083	2.051	2	14
	Social status	Social level based on multiple criteria from low to high 1-10	4.322	1.732	1	10

Source: CLDS

5. Empirical Analysis

5.1 Baseline Regression

To examine the impact of health insurance on the well-being of freelancers, this study employs OLS regression. The empirical results are presented in Table: Models 1, 2, and 3 display the regression results with different sets of control variables. Model 1, which includes no additional control variables, indicates that health insurance has a positive impact on freelancers' well-being at the 0.01 significance level. Models 2 and 3 incorporate individual

characteristic variables and household variables, respectively, demonstrating that health insurance positively influences freelancers' well-being at the 0.05 significance level. Three models are estimated with progressively more control variables to test the robustness of the relationship.

In Model 1, which includes no control variables, the coefficient for Insurance is 0.0117 and is statistically significant at the 1% level ($p < 0.01$). This indicates that, without accounting for any other factors, freelancers who participate in health insurance report well-being scores approximately 0.0117 points higher than those who do not. Although the magnitude appears modest, the strong statistical significance suggests a fundamental positive association between health insurance coverage and subjective well-being among freelancers.

Model 2 incorporates individual characteristic control variables, including gender, age, education level, marital status, household registration, and income. After controlling for these factors, the Insurance coefficient increases to 0.154 and remains significant at the 5% level ($p < 0.05$). This result demonstrates that even when accounting for demographic and socioeconomic differences, health insurance participation is associated with a 0.154-point increase in well-being scores. The increase in coefficient magnitude from Model 1 to Model 2 suggests that controlling for individual characteristics actually strengthens the estimated effect of health insurance, possibly because these characteristics might otherwise mask the true relationship.

Model 3 adds family-level control variables, specifically family size and self-reported social status. With the full set of controls, the Insurance coefficient is 0.0431, remaining statistically significant at the 5% level ($p < 0.05$). This represents the most reliable estimate, indicating that, holding all other variables constant, freelancers enrolled in health insurance report well-being scores that are, on average, 0.0431 points higher than their uninsured counterparts.

The R-squared values increase progressively across the three models, from 0.513 in Model 1 to 0.582 in Model 3, indicating that the inclusion of control variables improves the model's explanatory power.

The substantive interpretation of these results is noteworthy. Given that well-being is measured on a 1-5 scale, a 0.0431-point increase may appear numerically small. However, considering that the sample mean for well-being is 3.698 (as shown in Table 1), this represents approximately a 1.16% relative increase. More importantly, well-being is a subjective psychological construct influenced by numerous factors, and even modest statistically significant effects can have meaningful policy implications when aggregated across large populations.

Research indicates a strong correlation between health insurance and the well-being of freelancers. Optimizing and reforming the health insurance system is of significant importance for enhancing the well-being of freelancers. The following reasons explain how participation in health insurance may improve freelancers' well-being:

First, health insurance enhances psychological security among freelancers by providing stable health protection. This sense of stability alleviates concerns about potential

future medical expenses, allowing them to focus more on work and life, thereby increasing their well-being.

Second, participation in health insurance helps build social connections and networks, strengthening freelancers' social interactions. By enrolling in health insurance, they can establish connections with more members of society. This expansion of social networks contributes to an increased sense of social support, which in turn enhances their well-being.

Third, participation in health insurance can promote health prevention awareness among freelancers. The health management services provided by the health insurance system encourage regular health check-ups and disease prevention, which helps in the early detection and treatment of illnesses, thereby improving overall health and consequently enhancing well-being.

Finally, the existence of health insurance provides freelancers with a financial buffer, reducing the economic pressure caused by medical expenses. This financial security enables freelancers to maintain a better mindset when facing sudden health issues, reducing anxiety and stress, and thus increasing their well-being.

Table 2 Baseline Regression

	(1)	(2)	(3)
	HP	**HP**	**HP**
Insurance	0.0117***	0.154**	0.0431**
	(0.004)	(0.075)	(0.016)
Individual Controls	/	YES	YES
Family Controls	/	/	YES
Constants	0.954***	1.073***	1.086***
	(0.035)	(0.117)	(0.1177)
Obs	1180	1109	1109
Estimator	OLS	OLS	OLS
R-squared	0.513	0.525	0.582

Note: 1. Standard errors in parentheses. Model 1 is without specific controls; Models 2 and 3 incorporate individual characteristic variables and household variables, respectively.

2. ***statistically significant at 1% level, ** statistically significant at 5% level and *statistically significant at 10% level.

5.2 Robustness Analysis
5.2.1 Controlling More Factors

In the study exploring the impact of health insurance on the well-being of freelancers, it is acknowledged that well-being is a subjective perception influenced by many unobservable factors. Building on the basic regression analysis, this study incorporates control variables for father's health and mother's health to examine the effect of health insurance participation on well-being. Compared to the baseline regression sample the analytical sample after including parental health variables showed no significant differences in core variables, indicating that sample attrition did not substantially affect the representativeness of the study sample. Furthermore, we selected parental health as additional control variables based on their theoretical relevance to core variables: parental health may influence children's health insurance participation decisions through genetic and family environmental factors, and may also affect children's subjective well-being through family support systems. Meanwhile, as exogenous family background variables, parental health is not subject to reverse effects from current insurance participation status, thus avoiding post-treatment bias. This specification helps further disentangle the interference of family endowment on estimation results and enhances the robustness of core findings.

Model 2 shows that after controlling for father's health, participation in health insurance still has a significant positive impact on freelancers' well-being. Furthermore, after controlling for both father's and mother's health, participation in health insurance continues to enhance freelancers' well-being at the 0.05 significance level. This indicates that the positive effect of health insurance participation on improving the well-being of flexible employment personnel is robust.

Model 1 serves as the baseline model, identical to Model 3 in Table 2, which includes both individual and family control variables. The Insurance coefficient is 0.0431 and is statistically significant at the 5% level ($p < 0.05$). This establishes the reference point for comparison with models that include parental health controls.

Model 2 adds father's health as an additional control variable while retaining all previous controls. The Insurance coefficient increases to 0.163 and remains statistically significant at the 5% level ($p < 0.05$).

Model 3 adds both father's and mother's health as control variables. The Insurance coefficient is 0.0329 and remains statistically significant at the 5% level ($p < 0.05$).

Table 3 Controlling More Factors

	(1) HP	(2) HP	(3) HP
Insurance	0.0431**	0.163**	0.0329**
	(0.016)	(0.068)	(0.013)
Controls	YES	YES	YES
Father's health	/	YES	YES
Mother's health	/	/	YES
Estimator	OLS	OLS	OLS
Constants	1.086***	1.021***	1.034***
	(0.1177)	(0.1387)	(0.1480)
Obs	1109	868	769
R-squared	0.582	0.587	0.591

Note: 1. Standard errors in parentheses. Model 1 is the baseline model with control variables. Model 2 and model 3 add father's and mother's health variable into controls respectively.

   2. ***statistically significant at 1% level, ** statistically significant at 5% level and *statistically significant at 10% level.

5.2.3 Test

Endogeneity generally refers to the phenomenon where explanatory variables are correlated with the error term. This typically arises from three possible sources: omitted variables, measurement errors, and simultaneity (reverse causality). This study employs a well-being questionnaire indicator, which is prone to simultaneity issues. As well-being is a subjective emotion, it is difficult to determine whether inherently optimistic individuals perceive external factors more positively, potentially leading to endogeneity problems. We select public care as an instrumental variable, as the rate of public care is significantly correlated with health insurance participation but unrelated to well-being.

The first-stage regression examines the relationship between the instrumental variable and the endogenous explanatory variable. The coefficient for public care is 0.963 and is statistically significant at the 1% level ($p < 0.01$), with a standard error of 0.084. This coefficient indicates that individuals who report higher levels of public care are substantially more likely to participate in health insurance. Specifically, a one-unit increase in public care is associated with a 0.963-unit increase in the probability of health insurance participation, holding control variables constant. Given that Insurance is a dummy variable (0/1), this represents an extremely strong correlation, confirming the relevance of the instrumental variable. The first-stage R-squared of 0.845 indicates that the model, including the instrument and control variables, explains 84.5% of the variation in health insurance participation, further supporting the strength of the instrument.

The second-stage regression uses the predicted values of Insurance from the first

stage to estimate the causal effect of health insurance participation on well-being, purged of endogeneity. The coefficient for Insurance is 0.0465 and is statistically significant at the 5% level ($p < 0.05$), with a standard error of 0.019.This coefficient can be interpreted as follows: after correcting for endogeneity using the instrumental variable approach, freelancers who participate in health insurance report well-being scores that are, on average, 0.0465 points higher on the 1-5 scale compared to those who do not participate, holding all control variables constant.

The first-stage F-statistic of 131.42 confirms strong relevance, while the partial R-squared of 0.317 indicates that public care explains substantial variation in insurance participation beyond controls. Furthermore, the Durbin-Wu-Hausman test ($\chi^2 = 4.27$, $p = 0.039$) rejects exogeneity of insurance, justifying the IV approach.

Table 4 Endogenous Analysis (2SLS)

First-Stage(DV=insurance)	**Coefficient**	**SE**
Public Care	0.963***	(0.084)
Constants	-0.008	(0.168)
Obs	1109	
First-stage F	131.42	
Partial R-squared	0.317	
Controls	YES	
Second-Stage(DV = Well-being)		
Insurance (Instrumented)	0.0465**	(0.019)
Constant	1.043***	(0.115)
Obs	1109	
R-squared	0.568	
Controls	YES	
Endogeneity Test (DWH chi2)	4.27	0.039

Note: 1. Standard errors in parentheses.

2. ***statistically significant at 1% level, ** statistically significant at 5% level and *statistically significant at 10% level.

3. All regressions include individual-level controls (gender, age, education, income, marital status, household registration) and family-level controls (family size, social status).

4. First-stage F-statistic exceeds Stock-Yogo critical value, rejecting weak instrument concerns.

6. Heterogeneity Analysis

Based on the preceding analysis, health insurance has a significant effect on enhancing the well-being of freelancers, but this impact exhibits notable heterogeneity across different groups. Table 5 presents the heterogeneity analysis, examining how the impact of health insurance on freelancers' well-being varies across different subgroups based on income level, education level, and residential location. For subgroups, the cutoff of income is the median number; the cutoff of education is that 1 and 2 go for low and 3, 4 go for high; urban and rural areas are naturally cutoffs. The results reveal important disparities in the effectiveness of health insurance across these dimensions.

6.1 Personal Income Heterogeneity

For freelancers with high income, the Insurance coefficient is 0.0089 with a standard error of 0.0064, and this effect is not statistically significant. The lack of significance indicates that for high-income freelancers, health insurance participation does not have a meaningful impact on their well-being. This finding aligns with theoretical expectations: high-income freelancers typically possess stronger financial security and can more easily cope with the economic burden of medical expenses through their own resources or private insurance. Their well-being is less dependent on public health insurance because they have alternative mechanisms to manage health-related financial risks.

In contrast, low-income groups benefit markedly from health insurance participation, the Insurance coefficient is 0.0538 and is statistically significant at the 5% level ($p < 0.05$). The economic compensation function of health insurance is especially prominent here. After enrollment, the burden of medical expenses on low-income groups is reduced, not only diminishing their concerns about future health risks but also enhancing their sense of security and well-being.

In summary, the demand for health insurance is more urgent among low-income groups, and the economic protection provided by health insurance is more pronounced, thereby effectively boosting their well-being.

6.2 Education Heterogeneity

From the perspective of educational attainment, the effect of health insurance on enhancing well-being varies significantly among freelancers with different educational backgrounds. For freelancers with high education levels, the Insurance coefficient is -0.0007 with a standard error of 0.007, and this effect is not statistically significant. The coefficient is essentially zero, indicating that health insurance participation has no measurable impact on the well-being of highly educated freelancers. This finding can be explained by several factors: highly educated individuals typically have higher income levels, better health literacy, greater access to health information, and more resources to secure medical protection through private means. They may also have better employment opportunities that provide alternative benefits. Consequently, public health insurance does not provide substantial marginal benefits that would translate into improved well-being for this group.

In contrast, groups with lower educational attainment often face lower income levels and higher health risks. Due to insufficient health protection, medical expenses impose

considerable pressure on their financial situation. Under such circumstances, health insurance can significantly alleviate their medical burden, particularly when dealing with unexpected illnesses or sudden health issues, where the protective role of health insurance becomes especially evident. For freelancers with low education levels, the Insurance coefficient is 0.0457 and is statistically significant at the 1% level ($p < 0.01$). This pattern reflects the reality that less-educated freelancers face greater health risks, have lower health awareness, possess fewer resources to manage medical expenses independently, and are more vulnerable to the economic shocks of illness.

6.3 Residential Location Heterogeneity

From the perspective of residential differences, the effect of health insurance on enhancing well-being exhibits significant disparities between urban and rural freelancers. In urban areas, health insurance has gradually evolved into a relatively mature system, characterized by abundant medical resources and extensive coverage. Consequently, urban residents who participate in health insurance can access relatively efficient medical protection. For freelancers residing in urban areas, the Insurance coefficient is 0.0466 and is statistically significant at the 5% level ($p < 0.05$). The significance of this effect suggests that despite relatively better medical resources and higher overall living standards in urban areas, health insurance still provides meaningful benefits that translate into enhanced well-being for urban freelancers.

In rural areas, however, the coverage of health insurance and the quality of medical services are relatively lower, and the medical security system remains underdeveloped. For rural freelancers, even after enrolling in health insurance, the actual effectiveness of such coverage is limited due to scarce medical resources and restrictions on reimbursement rates. For freelancers residing in rural villages, the Insurance coefficient is 0.0155 with a standard error of 0.015, and this effect is not statistically significant. While health insurance can partially mitigate medical expenditure burdens, its impact on enhancing well-being remains constrained. This is particularly true for freelancers living in remote areas, where the inadequacies of the medical security system prevent health insurance from fulfilling its potential, resulting in a comparatively lower increase in subjective well-being.

This finding from Table 5 reveals a critical distinction that extends beyond the scope of this study but holds profound policy implications: the presence of health insurance coverage—what might be termed "insurance rights"—does not automatically translate into improved well-being when the underlying healthcare delivery system remains underdeveloped. This insight carries significant implications for China's pursuit of universal health coverage: achieving true health security requires not only expanding the circle of those insured but also ensuring that the promise of insurance is matched by the reality of accessible, quality healthcare for all, regardless of where they live.

In summary, the impact of health insurance on the well-being of freelancers is not universally applicable but is significantly influenced by factors such as educational level, nature of work, and place of residence. Distinct disparities exist in the extent to which different groups benefit from the well-being enhancement provided by health insurance. This

effect is particularly pronounced among groups with lower educational attainment, those engaged in flexible work arrangements, and freelancers residing in rural areas. To address the specific needs of these groups, policymakers should consider the unique characteristics of each demographic when advancing health insurance system reforms. Adopting more flexible and targeted measures will be essential to maximizing the improvement of freelancers' well-being.

These results have important policy implications: targeted interventions should prioritize low-income and less-educated freelancers, but also address the structural deficiencies in rural healthcare delivery to ensure that health insurance coverage translates into genuine improvements in well-being for all population segments. To further explore the heterogeneous effects of Insurance across groups, this paper conducted a Seemingly Unrelated Regression (SUR) test. The p-values for the cross-group difference tests for income, education, and residence are 0.042, 0.027, and 0.034, respectively. The SUR test results indicate significant differences between the groups, reflecting the varying impact of insurance across different populations.

Table 5 Heterogeneity Analysis

Dependent Variable	1	2	3	4	5	6
	Income		Education		Residence	
	High	Low	High	Low	Urban	Village
Estimator	OLS	OLS	OLS	OLS	OLS	OLS
Insurance	0.0089	0.0538**	-0.0007	0.0457***	0.0466**	0.0155
	(0.0064)	(0.026)	(0.007)	(0.012)	(0.023)	(0.015)
Controls	YES	YES	YES	YES	YES	YES
Constants	0.585***	0.3385***	0.303***	0.5232***	0.5473***	0.4111***
	(0.049)	(0.064)	(0.057)	(0.0556)	(0.0925)	(0.4358)
Obs	605	504	202	907	480	629
SUR (P-value)	0.042		0.027		0.034	
R-squared	0.623	0.573	0.577	0.457	0.483	0.611

Note: 1. ***statistically significant at 1% level, ** statistically significant at 5% level and *statistically significant at 10% level.

2. Subsample analysis is deployed using data from the main dataset. Standard error in parentheses.

7. Mechanism Analysis

Health insurance not only directly affects the well-being of freelancers but may also indirectly influence it through certain mediating variables. Therefore, exploring the mechanisms through which health insurance participation impacts freelancers' well-being is of significant importance.

First, health insurance can effectively reduce the health risks faced by freelancers and alleviate their medical expenditure burdens. When health issues arise, the protection provided by health insurance helps mitigate the financial pressure caused by high medical costs, enabling them to focus more on their daily work and reducing anxiety and unease associated with health problems. Additionally, freelancers often operate in relatively unstable work conditions with weaker social support systems, making them more susceptible to both economic and psychological stress. In this context, health insurance plays a critical role by providing basic medical security. It not only alleviates their financial burdens but also enhances their sense of life security, thereby strengthening their overall well-being.

Simultaneously, the working environment and social circumstances faced by freelancers are often unique. The nature of their work frequently results in a lack of stable social connections and professional identity. Therefore, participation in health insurance not only safeguards their health but may also enhance their sense of social identity. Based on social capital theory, social capital refers to the resources individuals accumulate through social interactions and networks, which can influence their psychological state and well-being. As a public welfare system, health insurance participation allows freelancers to psychologically perceive a connection and sense of belonging to society. Particularly when confronting health risks, health insurance can be viewed as part of their social network, providing psychological support and a sense of security. This sense of belonging and social identification helps increase their social capital, thereby further enhancing their well-being.

This study selects social capital as a mechanism variable for analysis. To clarify the mechanism, social capital in this study is measured as a composite score (1-10) based on CLDS indicators of social trust (trust in neighbors, strangers, and local government), community participation (frequency of involvement in community activities), social interaction (gatherings with friends and relatives), and perceived social support (availability of help during need).

Table 6 presents the mechanism analysis, investigating how health insurance participation affects freelancers' well-being through the mediating variable of social capital using two-step analysis(Jiang, 2022). Model 1 presents the same baseline regression results as shown in previous tables, with Insurance coefficient of 0.0431 statistically significant at the 5% level ($p < 0.05$). Model 2 examines whether health insurance participation significantly predicts social capital, which is theorized to be the mediating mechanism through which insurance enhances well-being. The coefficient for Insurance is 0.0629 and is statistically significant at the 5% level. The research demonstrates that health insurance significantly promotes the accumulation of social capital among freelancers, specifically reflected in their enhanced sense of social identity and belonging. This mechanism indicates

that health insurance not only serves as a tool to address the health concerns of freelancers but also, on a deeper level, helps them build networks of connection with society, thereby improving their overall well-being. Thus, while improving the health of freelancers, health insurance further fosters their sense of social integration and subjective well-being by enhancing the accumulation of social capital.

Table 6 Mechanism Analysis

	1(OLS)	2(OLS)
	HP	**Social Capital**
Insurance	0.0431**	0.0629**
	（0.016）	（0.267）
Controls	YES	YES
Constants	1.086***	3.3868***
	（0.1177）	（0.2087）
Obs	1109	1212
R-squared	0.582	0.524

Note: 1. ***statistically significant at 1% level, ** statistically significant at 5% level and *statistically significant at 10% level.

2. Standard error in parentheses. Model 1 is the baseline regression. Model 2 is the mechanism regression using two-step analysis(Jiang, 2022).

8. Conclusion, Limitation and Policy Advice

Based on data from the 2018 China Labor-force Dynamic Survey (CLDS), this study empirically investigates the impact of health insurance on freelancers' well-being. The findings reveal three main results: first, participation in health insurance significantly enhances the well-being of freelancers; second, this impact exhibits significant heterogeneity across freelancers with different income levels, educational backgrounds, and places of residence; third, mechanism analysis indicates that health insurance promotes freelancers' well-being by enhancing their social capital.

This study has several limitations. First, due to the cross-sectional nature of the CLDS data, causal relationships between health insurance participation and freelancer well-being still needs exploration. Selection bias in unobserved ways that also influence well-being and potential reverse causality, as individuals experiencing low well-being may lack the motivation or cognitive resources to navigate complex enrollment procedures also need future work. Our binary measure of insurance participation captures coverage status but not policy dimensions limiting our ability to test which specific design features are most effective in enhancing well-being, which can be solved by future research. Also, collapsing multiple insurance schemes into a single dummy variable inevitably loses information which to some extent limits the policy precision. Future

research could further disaggregate insurance types to examine the differential effects of various health insurance schemes on freelancers' well-being. Furthermore, caution is also warranted in the mechanism analysis. Social capital may be influenced by unobserved factors such as personality traits and community environment, and cross-sectional mediation analysis has inherent limitations for causal inference. Therefore, the mechanistic pathways revealed in this study should be viewed as preliminary exploration, warranting further validation with longitudinal data in future research.

Based on the findings of this study, health insurance plays a significant role in enhancing the well-being of freelancers, though its effects are influenced by multiple factors. To further promote health insurance participation among the flexible employment population and improve their well-being, this study proposes the following policy recommendations:

First, simplify enrollment procedures and lower barriers to participation. Freelancers often face issues such as information asymmetry and cumbersome procedures, which significantly dampen their motivation to enroll. Therefore, the government should streamline enrollment processes and provide one-stop service platforms to ensure greater convenience in completing health insurance procedures. For example, online registration, verification, and payment methods could be implemented to reduce the time and economic costs associated with enrolling in health insurance. Additionally, for low-income groups, the government could consider introducing enrollment subsidies or reducing premium standards to encourage broader participation in health insurance.

Second, strengthen interregional coordination of health security. With increasing mobility between urban and rural areas, many freelancers working in different locations often face challenges due to misalignment between the social security systems of their enrollment location and their workplace, resulting in inadequate access to health protection. To address this, the government should further advance the interregional coordination and information sharing of health insurance, ensuring that freelancers working across different regions can receive the same health security benefits as local residents. This would not only reduce the burden on freelancers caused by lack of health coverage but also enhance their sense of social security and well-being.

Third, enhance social support and supervision mechanisms for health insurance policies. Health insurance serves not only as a welfare tool for individual freelancers but also as a critical component of the social security system. Therefore, the government should strengthen the implementation and supervision of health insurance policies to ensure they benefit every freelancer fairly and equitably. Simultaneously, social organizations and communities should be encouraged to actively participate in the promotion and monitoring of health insurance, providing assistance and guidance to ensure policies are effectively implemented. This will further enhance freelancers' trust and sense of well-being.

The aforementioned policy recommendations aim to further increase the health insurance participation rate among freelancers and, on this basis, improve their health security and overall well-being. The government should continuously optimize policy design in light of the actual circumstances of the flexible employment population, promote the accessibility and equity of medical security, enhance the social protection level for flexible workers, and strengthen their life stability and sense of security.

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