

Article

Unlocking Opportunities for Migrant Workers in China: Analyzing the Impact of Health Insurance on Hukou Switching Intentions

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Abstract: The Chinese urban–rural binary health insurance structure has contributed to a significant urban–rural segmentation and regional fragmentation, which will affect labor mobilization and urbanization. The purpose of this research is to study whether and how urban–rural binary health insurance impacts the intentions of migrant workers to switch between rural and urban hukou. Pooled data were drawn from China Migrants Dynamic Survey, collected by the National Health Commission of China. The study applied the instrument variable model due to the existence of the endogeneity; and the IVprobit model to conduct the empirical analysis. Our findings are as follows: (1) the urban–rural binary health insurance affects migrant workers’ intentions to switch to urban hukou significantly. (2) The negative impact of originally rural health insurance on migrant workers’ intention of switching to urban hukou is relatively large for low-education-level migrant workers. (3) Compared with new generation of migrant workers, old migrant workers have higher health insurance dependency levels. Finally, our research suggested several policy implications, such as accelerating the establishment of a unified urban–rural health insurance system, increasing the urban health insurance participation rate of migrant workers in their working cities, and including migrant workers in the scope of equal access to urban public services, etc. All the policy suggestions are essential in order to accelerate the citizenization of migrant workers, improve the quality of urbanization, and promote the construction of a unified national labor market.

Keywords: urban–rural binary health insurance; migrant workers; intention of switching to urban hukou



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1. Introduction

China is the second largest economic system in the world. However, the level of urbanization is still low, along with significant pseudo-urbanization and semi-urbanization phenomena. According to the 7th national census results, 63.89% of residents are living in urban areas, and only 45.40% hold urban hukou, which indicated almost 20% in difference [1]. Hukou, as known as household registration, is a system used in China to register and classify its citizens based on their place of residence. Chinese citizens are divided into urban hukou and rural hukou. Hukou is highly related to individual employment, social welfare, and housing opportunities in China. Generally, citizens with urban hukou could receive more potential benefits in employment, social welfare, and housing opportunities, compared with citizens holding a rural hukou [2,3]. The main reason, resulting from the inconsistency of real urbanization and nominal urbanization, is that many migrant workers who are living and working at urban cities did not switch to urban hukou. The

central government required local governments to actively encourage and lead migrant workers to switch from rural to urban hukou [4]. Compared with the local rural residents, migrant workers are a high quality population due to their income earning ability and high urban life adaption level, performing high-intensity and high-risk work. Maintaining appropriate medical insurance would diversify the risk and maintain the health status of migrant workers. In terms of the urban hukou supply side, the government has already allowed and encouraged migrant workers to switch from rural hukou to urban hukou. From the demand side of urban hukou, there are potential motivations for migrant workers to switch from rural hukou to urban hukou. Therefore, this research is vital for each level of government to promote the citizenization of migrant workers and improve the quality of urbanization.

The Chinese health insurance system is based on the binary hukou regulation [5]. In 1998, the primary health insurance for urban employees was established, covering all formal employees with urban hukou. The new rural cooperative health insurance was founded in 2003 to provide coverage for rural registered residents. To cover the medical services for urban residents who have urban hukou but are not employed by urban public sectors, the government also established the health insurance for urban residents in 2006. The new rural cooperative health insurance and health insurance for urban residents have a wide range of similarities, such as individual premiums, government reimbursement, medical service coverage, etc. Therefore, in 2016, these two health insurances were combined into dual health insurance for urban and rural residents. However, there is still quite a large gap on the coverage and benefits between the health insurance for urban employees and the dual health insurance for urban and rural residents [6]. It is a long-term goal for Chinese government to merge the two health insurances (health insurance for urban employees and the dual health insurance for urban and rural residents) mentioned above and integrate a nation-wide primary health insurance system [7].

There are many researchers studying the effects of social insurance on the mobility of labor forces in developed countries. Some scholars proposed and proved that the mobility of labor force was affected by social insurance through job lock and job push [8–11]. In the US, employment-contingent health insurance has lower premiums, and job candidates would prefer jobs with employer-sponsored health insurance benefits [12,13]. However, the employer-sponsored health insurance in the US is not transferrable [14–16]. On one hand, this has the effect of job lock, i.e., employees may have to continue their job, which they might prefer to leave, due to the risk of losing health insurance, lowering the labor force mobility [17–19]. On another hand, it has the effect of job push, i.e., because the premium of self-sponsored health insurance is relatively high, people tend to leave jobs without employer-sponsored health insurance and seek employers who provide health insurance benefits [20–22].

The reform of the Chinese household registration system has lowered the standard for rural residents to switch to urban hukou. The beneficiaries of the reform are still high-income and high-quality urban populations [23,24]. The binary hukou system is one of the leading reasons for the inequality of citizens' economic and political status [25]. Due to the tight connection between the residents' benefits and their hukou category, the majority of migrant workers were not able to receive the same benefits as the local population and households do [26,27]. Along with the rapid improvement of the Chinese urbanization process, migrant workers' hukou switching intentions have attracted the attentions of various researchers. The advantage of rural hukou was the affiliated land interest [28]. The urban hukou was directly connected with high-quality public service and social welfare [29]. Rural migrants are significantly more deterred by hukou restrictions relative to urban residents [28,29]. Several scholars believed the main factor affecting migrant workers' intentions of switching their rural hukou was the trade-offs of the social welfare and land interest affiliated with urban and rural hukou [30,31].

The health insurance system is highly related to the household registration system. Due to the policy barrier and lack of urban social security-related information, migrant

workers have a relatively low urban health insurance enrollment rate [32–34]. Lacking health insurance has already negatively affected migrant workers' job searching and quality of life [33], such as their resistance to illness shocks and difficulties of local integration, which may decrease their incentive to stay in urban areas and motivate them to migrate further [2,35]. Some studies find that enrolling in urban health insurance would improve migrant workers' access to medical service, health status, subjective well-being, and social integration, to increase their urban hukou switching intentions [36–38]. Enrolling in rural health insurance may negatively impact migrant workers' urban hukou switching intentions [39]. There is area discrimination on the reimbursement percentage of rural health insurance [40]. The policy holders receive substantially different reimbursement rate based on their networks [40,41]. Comparing with the offsite (out-of-network) policy holders, the onsite (in-network) policy holders would receive higher reimbursement rate and simpler formalities for the medical services performed at their registered location [40–42]. Therefore, it is important to study whether migrant workers are willing to switch their hukou, and especially how the urban–rural binary health insurance system affects their switching intentions.

According to the current literature, there are several issues still left to be solved. Firstly, many manuscripts focused on how urban or rural health insurance alone affects migrant workers' hukou switching intentions. Few researchers studied the influence from both urban and rural health insurance together. Secondly, many studies did not solve the endogeneity in the empirical model and could not illustrate the causation between health insurance enrollment and migrant workers' hukou switching intentions. Thirdly, many studies only analyzed one or a few cities as their sample regions. Without a nationalized research sample, the research conclusion lacks academic rationale. Our study applied national field micro survey data and aimed to explore the impact mentioned above to make marginal contributions.

Our research objective is exploring the impact on migrant workers' urban hukou switching intentions from rural–urban health insurance system. The initial hypothesis is that the impact mentioned above will be statistically significant, resulting from the hindering effects of local health insurance for rural residents and the promoting effects of local health insurance for urban employees. The remainder of the manuscript is as below: part two explains the theoretical foundation and empirical model we have used for our analysis; part three demonstrates the data sources, descriptive statistics, and the empirical research results; and part four contains the conclusion and policy implication.

2. Methodology and Empirical Model

2.1. Theoretical Foundation

The theoretical foundation of this research is push–pull theory [43–45]. The main objective of labor force mobility is to improve individual economic and social status. According to the theory, there are usually two forces that affect labor force mobility. First, the push force from moved-out areas; second, the pull force from move-in areas. The moved-out areas have fewer job opportunities, lower income, exhausted nature resources for agricultural production, poor public services, low social security benefits, etc. All the points mentioned above would push the labor force out. Meanwhile, the move-in areas have more job opportunities, higher income levels, advanced modern manufacturing industry, high quality public utilities, and high-level social security, etc., which attract and pull more labor force in. For migrant workers, whether they keep their original rural hukou or switch it to local urban hukou depends on whether their total effectiveness will be improved or not. Therefore, whether migrant workers are willing to switch their rural to urban hukou depends on the comparison between the expected benefits of gaining an urban hukou and the expected cost of giving up their rural hukou.

Under the current policy environment, the expected benefits of gaining an urban hukou include: (1) receiving the social security benefits of urban residents, such as low-income subsidies, urban area social insurance and welfare, low-cost housing subsidized

by government, etc.; (2) benefiting from the high-quality urban public services, such as urban public education, urban college-entrance exam, urban public health and culture services, etc.; (3) enjoying some other benefits local government provides to local residents, such as auto-purchasing discount program, etc. Meanwhile, giving up a rural hukou also means giving up all the benefits along with it. When migrant workers decide to give up their rural hukou, they would first have to give up all the farmland contracting rights and the residential land usage rights. Historically, the central government allocated to each rural hukou holder a certain area of farmland to ensure their basic food security and satisfy their basic accommodation needs. Secondly, migrant workers need to give up all the social security and rights associated with rural hukou holder, including medical insurance, social pension, rural low-income subsidies, and additional medical supports, etc. Thirdly, migrant workers also must waive their property dividends of the rural collective economy organization. The market economy boosted the development of rural collective economy organizations recently. Some rural villages are well-developed and earned notable dividends for each village resident, which are only distributed to the village residents with rural hukou.

2.2. Empirical Analysis

The migrant workers' urban hukou switching intentions depend on the comparison between the expected benefits and the expected costs mentioned above. According to push-pull theory, one of the major forces pushing rural populations out of the moved-out areas is the local rural health insurance; and the urban health insurance at move-in areas becomes one of the major factors pulling migrant workers in. If migrant workers decide switch to urban hukou, they will lose all benefits related to their original rural hukou automatically. Whether migrant workers switch to urban hukou is a rational choice, depending on the comprehensive effects from both push and pull forces. Because migrant workers' intentions of switching is a binary discrete variable, the research chooses to use probit empirical model to study this switching intention. The function of the probit model is shown as Formula (1).

$$Transfer^* = F(X, \beta) = X'\beta \quad (1)$$

The $Transfer^*$ represents migrant workers' switching intentions of urban hukou, which is an unobservable hidden variable. However, we were able to obtain migrant workers' actual choices in the survey. The surveyed migrant workers who expressed their positive willingness about urban hukou transfer would be assigned as 1, otherwise it is 0. Therefore, Formula (1) can be rewritten into Formula (2).

$$Prob(Transfer = 1|X) = \int_{-\infty}^{X'\beta} \phi(t)dt = \Phi(X'\beta) \quad (2)$$

The $\phi(\cdot)$ in Formula (2) is standard normal distributed. The expectation of each surveyed migrant worker's urban hukou transfer intentions is Formula (3).

$$E[Transfer|X] = 0[1 - F(X'\beta)] + 1[F(X'\beta)] = F(X'\beta + \epsilon) \quad (3)$$

The X' is the explanatory variable, containing the factors affecting migrant workers' urban hukou transfer intentions, such as demographic, employment, and mobility characteristics. The main variables are the local rural health insurance and the local urban health insurance of surveyed migrant workers. The demographic characteristics vector includes gender, age, education level, marital status, ethnic, intergeneration, and household size. To verify the non-linear influence on the urban hukou transfer intention by age, we also added the square of age as a control variable. The employment characteristics vector contains industry, profession, nature of employment units, employment contracting, and monthly income. The mobility characteristics vector contains migrated working years, mobility regions, and mobility cities. To test the different impact from various years, we also treated year (dummy variable) as control variable. In addition, we included region (dummy vari-

able) to control the different impacts from the regional economic and social status. β is the solve-for parameter vector, and ε is the random error. To eliminate the non-normality of the data, we used logarithm of all income/salary-related variables. Maximum likelihood estimation method is applied in the regression model.

However, in the actual estimation, some unobservable factors, such as personal preferences and abilities, may affect migrant workers' switching and their urban or rural health insurance enrollment decision. Therefore, the urban hukou transfer intention and health insurance participation may have an endogeneity issue, resulting in biased estimation. To solve the endogeneity problem, we used "the health insurance participation rate at the surveyed sample point level" as an instrument variable of individual health insurance enrollment. The insurance enrollment rate at each sample point is closely related with the individual insurance enrollment behavior, but relatively independent from the individual hukou registration decision. Thus, the sample point insurance enrollment rate is an appropriate instrument variable. If the Wald test results show there is no endogeneity issue between urban hukou transfer intention and urban–rural health insurance, we will apply the general probit model. If the Wald test demonstrates the endogeneity, we will use the IVprobit model. IVprobit, as known as instrumental variables probit, is a statistical model used to estimate the relationship between a binary response variable and a set of explanatory variables. IVprobit uses instrumental variables to address endogeneity, which can correct for it and provide consistent estimates of the coefficients. All the empirical analysis conducted above were completed using STATA 15, including the initial descriptive statistics, IVprobit analysis, heterogeneous test, and the further robustness check, which was performed using logit regression and 2SLS analysis.

3. Empirical Results and Discussion

3.1. Data and Descriptive Statistics

The research data came from the National Migrants Dynamic Survey, conducted by the National Health Commission of China. The survey data have covered the 31 provinces (except Hong Kong, Macau, and Taiwan), and applied probability proportional to size (PPS) sampling methods. The migrant residents selected by the survey satisfied the following conditions: (1) they have lived in the targeted urban area longer than one month; (2) they do not have local urban hukou; (3) their age were between 15 and 59 years old.

The national yearly survey started from 2010 and ended in 2018. The survey objects were resampled every year. Consequently, the sample was not tracked by the survey data due to the yearly different sample objects. The variables in the annual questionnaire were not the same. The key explanatory variable in this research is whether the respondent would be willing to switching their rural hukou to urban hukou, which was addressed in the questionnaires in 2011, 2016, and 2017. Therefore, we used the sample from these three years. There are 92,532 observations in the 2011 data, 117,765 observations in the 2016 data, and 112,711 observations in the 2017 data, totaling 323,008 observations.

In the research sample, the percentage of migrant workers who were willing to switch their rural hukou to urban hukou was only 32.92%, which is much lower than the percentage of migrant workers who were not willing to. The percentage of migrant workers who enrolled into the local rural health insurance was 72.55%, and the percentage who enrolled into the local urban health insurance was only 18.90%. Local rural health insurance was the main health insurance migrant workers preferred, which was unfavorable to the labor protection and human resource cumulation of migrant workers. The male migrant workers represented 58.30%, higher than the female proportion, which was consistent with the Chinese "more men than women" population characteristic. Of those observed, 17% had below elementary level education and 53.58% had middle school level education, i.e., the education level of migrant workers were relatively low. Generationally speaking, the new generation migrant workers, i.e., those who were born after 1980, represented 52.93%, relatively equal to the percentage of old generation migrant workers. The household size among migrant workers ranged from 1 to 10 with an average of 2.91, which was slightly

higher than 2.62, the average size from the 7th national census (National Bureau of Statistics, 2021) and consistent with the general observation that the rural household size was greater than the urban household size. The sample was allocated into three different regions, east (44.29%), central (21.87%), and west (33.84%). Please refer to Table 1 for the descriptive statistics of the rest of the variables.

Table 1. Variables definition and descriptive statistics.

Variable	Definition	Mean	Std. Dev.
Transfer to Urban Hukou	1 for willing to, 0 for otherwise	0.3292	0.4699
Gender	1 for make, 0 for female	0.5830	0.4931
Age	Actual Age	35.6003	9.6083
Education Level			
Elementary and below	1 for elementary and below, 0 for otherwise	0.1770	0.3817
Middle School	1 for Middle School, 0 for otherwise	0.5358	0.4987
High School	1 for High School, 0 for otherwise	0.2028	0.4021
Associate Degree and above	1 for Associate degree and above, 0 for otherwise	0.0844	0.2780
Marital Status	1 for married, 0 for otherwise	0.8107	0.3918
Ethnicity	1 for majority (Han), 0 for otherwise	0.9184	0.2738
Intergeneration	1 for new generation (born after 1980), 0 for otherwise	0.5293	0.4991
Family Size	Number of households	2.9099	1.2266
Origin Rural Health Insurance	1 for enrolled into local rural health insurance, 0 for otherwise	0.7255	0.4463
Local Urban Health Insurance	1 for enrolled into local urban health insurance, 0 for otherwise	0.1890	0.3915
Mobility Length	Number of years migrant workers worked (year)	5.8495	5.5544
Mobility Region			
County to City	1 for moving from county to city, 0 for otherwise	0.1663	0.3724
City to Province	1 for moving from city to province, 0 for otherwise	0.3128	0.4636
Outside of Province	1 for moving out of province, 0 for otherwise	0.5209	0.4996
Destinated City			
Metro City	1 for moving toward metro city, 0 for otherwise	0.1204	0.3255
Capital City	1 for moving toward capital city, 0 for otherwise	0.2994	0.4580
Prefectural-level City and County-level City	1 for moving toward prefectural-level city and county-level city, 0 for otherwise	0.5802	0.4935
Contracting	1 for having official contract, 0 for otherwise	0.3038	0.4599
Monthly Income	The most recent monthly income (RMB)	3236	3149
Industry			
Mining or Manufacturing	1 for mining or manufacturing, 0 for otherwise	0.3087	0.4620
Business or Accommodation and catering industry	1 for business or accommodation and catering industry, 0 for otherwise	0.4928	0.4999
Transportation or Real Estate Industry	1 for transportation or real estate industry, 0 for otherwise	0.1037	0.3049
Others	1 for other industries, 0 for otherwise	0.0948	0.2929
Occupation			
Professional Skilled Worker	1 for professional skilled worker, 0 for otherwise	0.0631	0.2431
Administrative Staff	1 for administrative staff, 0 for otherwise	0.2106	0.4077
Service Industry	1 for service industry, 0 for otherwise	0.1365	0.3434
Renovation and Construction	1 for renovation and construction, 0 for otherwise	0.4740	0.4993
Others	1 for other occupations, 0 for otherwise	0.1158	0.3199
Employer types			
Small Business Owner	1 for small business owner, 0 for otherwise	0.4216	0.4938
State-owned or Collective Enterprise	1 for state-owned or collective enterprise, 0 for otherwise	0.0575	0.2329
Private-owned Enterprise	1 for private-owned enterprise, 0 for otherwise	0.2842	0.4510
Foreign Industry	1 for foreign industry, 0 for otherwise	0.0400	0.1959
Others	1 for other employer types, 0 for otherwise	0.1967	0.3975

Table 1. Cont.

Variable	Definition	Mean	Std. Dev.
Year			
2011	1 for data from 2011, 0 for otherwise	0.2865	0.4521
2016	1 for data from 2016, 0 for otherwise	0.3646	0.4813
2017	1 for data from 2017, 0 for otherwise	0.3489	0.4766
Region			
Western	1 for Western sample, 0 for otherwise	0.3384	0.4732
Middle	1 for Middle sample, 0 for otherwise	0.2187	0.4133
Eastern	1 for Eastern sample, 0 for otherwise	0.4429	0.4967

3.2. Empirical Results of Probit and IVprobit Models

Table 2 illustrates the empirical analysis results regarding how the health insurance impact migrant workers' urban hukou transfer intentions. Model (1) is the regression results of probit, and Model (2) is the analysis results of IVprobit. The endogeneity test results (Wald test) shows 710.81 and rejected the exogeneity hypothesis at 1% significant level, i.e., the model does have an endogeneity issue. Therefore, the IVprobit model is our main empirical analysis method, and we will focus on the IVprobit-reported results to avoid biased estimation. We reported the empirical results for both probit and IVprobit to illustrate the biased results caused by endogeneity without the IV correction. The absolute values of the coefficient estimator of the urban–rural binary health insurance variable, i.e., local rural health insurance and local urban health insurance, are greater in the IVprobit model than it in the probit model. Therefore, without the IV correction, the impact of the urban–rural binary health insurance on migrant workers' urban hukou switching intentions is underestimated substantially.

Table 2. Regression results of the impact from health insurance on migrant workers' urban hukou transfer intentions.

Variables	Model (1)		Model (2)	
	Probit		IVProbit	
	Coef.	Std. Err.	Coef.	Std. Err.
Gender	−0.0094 *	0.0050	−0.0051	0.0050
Age	0.0200 ***	0.0021	0.0182 ***	0.0021
Age ²	−0.0002 ***	0.0000	−0.0002 ***	0.0000
Education level (control group: elementary and below)				
Middle School	0.0127 *	0.0069	0.0098	0.0069
High School	0.1132 ***	0.0085	0.0937 ***	0.0085
Associate Degree and above	0.2498 ***	0.0113	0.1893 ***	0.0115
Marital Status	0.0011	0.0084	0.0051	0.0085
Ethnicity	−0.1472 ***	0.0088	−0.1477 ***	0.0088
Intergeneration	0.0915 ***	0.0090	0.0888 ***	0.0090
Family Size	0.0230 ***	0.0025	0.0228 ***	0.0025
Origin Rural Health Insurance	−0.1645 ***	0.0060	−0.3230 ***	0.0108
Local Urban Health Insurance	0.1252 ***	0.0074	0.2575 ***	0.0143
Mobility Length	0.0205 ***	0.0005	0.0182 ***	0.0005
Mobility Region (Control Group: County to City)				
City to Province	0.1566 ***	0.0074	0.1339 ***	0.0075
Outside of Province	0.0587 ***	0.0074	0.0404 ***	0.0074

Table 2. Cont.

Variables	Model (1)		Model (2)	
	Probit		IVProbit	
	Coef.	Std. Err.	Coef.	Std. Err.
Mobility Cities (Control Group: Metro City)				
Capital City	−0.4379 ***	0.0085	−0.4146 ***	0.0085
Prefectural-level and County-level City	−0.5616 ***	0.0076	−0.5479 ***	0.0076
Contracting	0.0029	0.0069	−0.0435 ***	0.0073
Monthly Income	0.0020	0.0019	0.0021	0.0018
Industry (Control Group: Mining or Manufacturing)				
Business or Accommodation & Catering Industry	0.1448 ***	0.0068	0.1399 ***	0.0068
Transportation or Real Estate Industry	0.1630 ***	0.0088	0.1519 ***	0.0088
Others	0.1322 ***	0.0156	0.1150 ***	0.0156
Occupation (Control Group: Professional Skilled Worker)				
Administrative Staff	−0.0547 ***	0.0118	−0.0450 ***	0.0117
Service Industry	0.0416 ***	0.0118	0.0521 ***	0.0118
Renovation and Construction	0.0041	0.0104	0.0190 *	0.0104
Others	0.0178	0.0153	0.0255 *	0.0153
Employer Type (Control Group: Small Business Owner)				
State-owned and Collective Enterprises	0.1459 ***	0.0117	0.0880 ***	0.0120
Private-owned Enterprises	0.0080	0.0075	−0.0120	0.0075
Foreign Companies	−0.0216	0.0144	−0.1036 ***	0.0150
Others	0.0864 ***	0.0082	0.0832 ***	0.0082
Year (Control Group: 2011)				
2016	−0.2764 ***	0.0067	−0.2536 ***	0.0067
2017	−0.1353 ***	0.0069	−0.1142 ***	0.0070
Region (Control Group: Western)				
Middle	−0.0192 ***	0.0069	−0.0140 **	0.0069
Eastern	0.2757 ***	0.0060	0.2667 ***	0.0060
_cons	−0.6408 ***	0.0464	−0.4852 ***	0.0469
Log likelihood	−193,146.8600		−343,131.9900	
Wald test	—		710.8100	
Prob > chi2	0.0000		0.0000	

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

In Table 2, the probit model estimation results show that the coefficient of local rural health insurance enrollment is −0.1645, which means the local rural health insurance negatively impact migrant workers' urban hukou transfer intentions. The coefficient of local urban health insurance enrollment is 0.1252, which mean the local urban health insurance has positive effects. With the IV correction (IVprobit results in Table 2), the economic impact of various health insurance policies on migrant workers' urban hukou transfer intentions has increased dramatically and significantly at a 1% significance level. The coefficient of local rural health insurance enrollment decreases to −0.3230, and the coefficient of local urban health insurance increases to 0.2575. Thus, after ruling out the endogeneity, the local rural health insurance still negatively impact migrant workers' urban hukou switching intentions, while the local urban health insurance positively affect the same intention. Table 3 reported the marginal impact from urban–rural binary health insurance. Based on the IVprobit model results, on average, enrolling in local rural health insurance decreases migrant workers' urban hukou switching intentions by 125.44%; enrolling in local urban health insurance will increase their intentions by 136.24%. Comprehensively speaking, urban–rural binary health insurance has positive effects on migrant workers' urban hukou transfer intentions, improving the intention by 10.81%. Apparently, the positive effectiveness of local urban health insurance on migrant workers' urban hukou switching intentions has been weakened substantially by the negative impact from local rural health insurance.

Table 3. Marginal effects from urban–rural binary health insurance on migrant workers’ urban hukou transfer intentions.

Variable	Probit	IVProbit
Origin Rural Health Insurance	−22.6740%	−125.4369%
Local Urban Health Insurance	66.2434%	136.2434%
Net Effects (Sum of the above two)	43.5694%	10.8065%

Note: each value in the table equals the (coefficient of the variable/the variable average) $\times$ 100%.

According to previous research [46,47], local health insurance decreased migrant workers’ urban hukou switching intentions significantly, which is consistent with our research results. However, their study observed that urban health insurance has no impact on migrant workers’ urban hukou switching intentions, which is contrary to what we have discovered. Our research suggests that the urban health insurance has a strong, positive, and significant impact on migrant workers’ urban hukou switching intentions. The reason leading to this opposite research result is the sample size. Our research uses a national sample survey, covering all provinces, municipalities, and autonomous regions in mainland China, while their study only covered survey sample from 8 cities in China. Our research results also support the significant influence on migrant workers’ intentions of citizenization from joining the urban employee health insurance [36], i.e., joining the urban employee health insurance would significantly improve migrant workers’ urbanized citizenization intention. The improvement is greater for new generation migrant workers than that for those of the old generation. The higher participation rate of health insurance among new generation migrant workers compared to the old generation indicates an intergenerational improvement in the protection of their legitimate rights and interests. In fact, the participation rate of migrant workers in urban employee health insurance is still relatively low in the urban labor market, where they are still at a disadvantage and their health insurance rights have not been fully protected.

The reasons resulting in the effectiveness differences on migrant workers’ urban hukou transfer intentions between urban and rural health insurance come from two aspects. First, the quality of rural health insurance has been improved constantly. Along with the overall development of Chinese health insurance, rural health insurance coverage and the quality of rural public services have improved dramatically, which increased the expected cost of migrant workers’ urban hukou switching and significantly reduces their switching intentions. Starting from 2003, the Chinese central government proposed, led, and implemented the New Rural Corporate Medical System (NCMS) in all rural areas in China, which provides generalized systems of reliable medical services. The premium of NCMS is RMB 30 initially, and increased to RMB 960 in 2022, a 30-fold growth. The reimbursement rate of NCMS also has been expanded to conquer the difficult access to and high price of care. Second, urban workers’ health insurance may cover more on inpatient service, but less on outpatient service. Most of migrant workers are young and healthy, having lower chances to suffer severe or chronic diseases. Migrant workers will benefit less from urban health insurance due to their low inpatient medical needs. Hence, the pull-in effect of urban health insurance on their hukou transfer intentions has been reduced.

We also need to pay attention to some other factors. Older migrant workers have stronger intention to switch their rural hukou to urban hukou. However, age and “transfer” have a non-linear relationship. For education level, comparing with the education level of elementary level and below, migrant workers with education levels of middle school, high school, and associate degree will increase their urban hukou switching intentions by 0.98%, 9.37%, and 18.93%, respectively. The migrant workers with education levels of high school and associate degree or higher indicated much higher intention to switch to urban hukou. The coefficients of the destined urban areas illustrate that migrant workers’ intentions to transfer to urban hukou is declining along with the decreasing of the city level. Migrant workers prefer to migrate to metro cities the most, capital cities second, prefecture cities third, and county-level cities last. Higher city level connotes higher economic development

level, more job opportunities, better public utilities and services, and stronger attractions for migrant workers. Regarding region difference, compared with the western area of China, migrant workers working in the central area have relatively lower urban hukou transfer intentions, and migrant workers working in the eastern area have relatively higher urban hukou transfer intentions. In China, the economic and social development level is the highest in the eastern region, the second highest in the central region, and the lowest in the western region. However, migrant workers working in the central region have a lower intention to switch to urban hukou compared with migrant workers in the western region, due to the implementation of the Western Development plan by the Chinese central government.

3.3. Heterogeneity Test Results

Table 4 is the heterogeneity test results regarding the impact on migrant workers' urban hukou transfer intentions from health insurance. Panel A is the sub-sample test result for the different education levels. Education level has been divided into two sub-samples, high school and lower (Model 1), and associate degree and higher (Model 2). In Model 1, the coefficient of original health insurance is -0.3306 ; in Model 2, the coefficient is -0.2704 . Evidently, the absolute value of the coefficient in Model 1 is higher than that in Model 2. For migrant workers with relatively lower education levels, local rural health insurance has greater hindering effects on their urban hukou transfer intentions. In Model 1, the coefficient of local urban health insurance is 0.2891 , which is greater than 0.2398 , the coefficient in Model 2. Obviously, for migrant workers with relatively lower education levels, local urban health insurance has greater pull-in effects on their intention. Overall, health insurance enrollment has greater effects on migrant workers with lower education levels.

Table 4. Heterogeneity test results. Panel A IVprobit regression model based on education level. Panel B IVprobit regression model based on intergeneration.

Variable	Model (1)			Model (2)		
	High School and Below			Associate Degree and Above		
	Coef.	Std. Err.	$p > z $	Coef.	Std. Err.	$p > z $
omedin	-0.3306^{***}	0.0112	0.0000	-0.2704^{***}	0.0402	0.0000
dmedin	0.2891^{***}	0.0151	0.0000	0.2398^{***}	0.0444	0.0000
Other variables	controlled			controlled		
Log likelihood	$-300,715.0600$			$-39,028.5550$		
Wald test	752.2200			45.9600		
Prob > chi2	0.0000			0.0000		
Number of obs	295,754			27,254		

Variable	Model (1)			Model (2)		
	Old Generation			New Generation		
	Coef.	Std. Err.	$p > z $	Coef.	Std. Err.	$p > z $
omedin	-0.3699^{***}	0.0158	0.0000	-0.2695^{***}	0.0147	0.0000
dmedin	0.3134^{***}	0.0221	0.0000	0.2271^{***}	0.0191	0.0000
Other variables	controlled			controlled		
Log likelihood	$-155,782.3300$			$-186,217.2400$		
Wald test	464.6400			268.1400		
Prob > chi2	0.0000			0.0000		
Number of obs	152,035			170,973		

Note: *** represent 1% significant level.

Panel B is the sub-sample test results for the different generations. We divided generation into two sub samples, old generation (Model 1) and new generation (Model 2). For local rural health insurance, the absolute value of the coefficient of old generation migrant workers is 0.3699 (Model 1), which is higher than 0.2695, the absolute value of the coefficient in Model 2. Comparing with the old generation, the hindering effects from local rural health insurance for the new generation is relatively smaller. For local urban health insurance, the coefficient of Model 1 is 0.2891, higher than 0.2398, the coefficient of Model 2. The pull-in effects from urban health insurance on the new generation are relatively smaller than for the old generation. Old generation migrant workers have a much higher degree of dependency on health insurance than the new generation. Most new generation migrant workers, born after 1980, have the peak health status of their individual life cycle, with low illness probability and degree of dependency on health insurance. Old generation migrant workers were born before 1980. The illness probability for them is much higher, resulting in a higher demand for medical services and much higher level of dependency on health insurance.

3.4. Robustness Test Results

Table 5 is the robustness test results regarding the effects of health insurance on migrant workers' urban hukou switching intentions. We applied the logit model and 2SLS model with instrument variable to conduct the robustness test (in Table 5 Panel A). The logit regression results are demonstrated in Model 1; the regression results of 2SLS with IV is reported in Model 2. The coefficients of local rural health insurance are negative in both models, which proved the hungering effects from local rural health insurance. Additionally, the coefficients of local urban health insurance are positive in two models, which are also consistent with the positive pull-in effects. In both logit and 2SLS with IV models, the signs of coefficients and the significant level for rejections are consistent with the results of the probit and IVprobit models.

Table 5. Robustness test for migrant workers' urban hukou transfer intentions. Panel A robustness test using logit Regression and 2SLS Model. Panel B robustness test using new instrument variable.

Variable	Model (1)			Model (2)		
	Logit			2SLS		
	Coef.	Std. Err.	$p > z $	Coef.	Std. Err.	$p > z $
omedin	−0.2694 ***	0.0098	0.0000	−0.1138 ***	0.0038	0.0000
dmedin	0.2047 ***	0.0121	0.0000	0.0923 ***	0.0050	0.0000
Other variables	controlled			controlled		
Wald chi2	193,137.9400			25,073.1800		
Prob > chi2	0.0000			0.0000		
Number of obs	323,008			323,008		
Variable	Model (3)					
	2SLS					
	Coef.	Std. Err.	$p > z $			
omedin	−0.3865 ***	0.0205	0.0000			
dmedin	0.0812 **	0.0370	0.0280			
Other variables	controlled					
Wald chi2	22,666.2700					
Prob > chi2	0.0000					
Number of obs	323,008					

Note: *** and ** and represent 1% and 5% significant level.

To further enhance our robustness check, we also identified another instrument variable, using the “health insurance participation rate at province level” as the instrument variable of “individual health insurance participation rate”. The results are illustrated in Table 5 Panel B. The sign of each coefficient and the significant level for rejections are

consistent with our first robustness test (Table 5 Panel A) and main regression results. Therefore, we can conclude that our empirical analysis results are robust.

4. Conclusions and Recommendations

Based on the National Migrants Dynamic Survey data collected by the National Health Commission of China, our study explores the impact on migrant workers' urban hukou transfer intentions from urban–rural binary health insurance. The results indicate that: (1) migrant workers' transfer intentions have been affected by urban–rural binary health insurance significantly. The local rural health insurance negatively impacts the hukou switching intention, while the impact of local urban health insurance is positive. (2) The hindering effects from local rural health insurance on migrant workers' urban hukou transfer intentions is greater, but the enhancement from local urban health insurance is smaller. (3) Comparing with new generation migrant workers, the dependency level of old generation on health insurance is much higher. Moreover, migrant workers' urban hukou transfer intentions are significantly different between city levels and regions. Capital cities and metro cities are much more attractive for migrant workers, compared with county-level cities.

To speed up the citizenization of migrant workers, improve the quality of urbanization, and promote the establishment of the national united labor market, our study made several policy suggestions as follows: First, speeding up the establishment of an urban–rural united health insurance system. The current health insurance system is managed by each county/district separately in China. The central government may formulate a national united health insurance policy to break the administrative barriers and increase coordination. Second, increase migrant workers' urban health insurance participation rate. The government should enhance and extend regulation and eligibility to boost migrant workers' urban health insurance enrollment and furtherly improve the quality of the labor force and human capital resources for the economic development in China. Third, give migrant workers equal rights to utilize urban public services and utilities. During the initial step of new policy implementation, the government could consider providing migrant workers with more urban benefits to magnify the attractiveness of urban hukou. For example, migrant workers with long-term official and stable employment and living history may enjoy equalized urban public services and benefits.

China's urban–rural binary health insurance system provides a good lesson for many developing countries all over the world. For a long time, rural residents and farmers did not have health insurance in any format to cover their medical expenses in China. Their move-out decision would be unrelated to health insurance. However, without health insurance coverage, the cumulation of rural healthy human resources and improvement of the rural labor force quality would be hindered. Therefore, the central government initiated rural health insurance enrollment trials in 2013, expanded the enrollment population gradually, and eventually completed the establishment of NCMS at the end of 2008. At the beginning of the development of the health insurance system, the government did not anticipate the negative impact on labor force mobility from regional segmentation and compartmentalization [48,49]. Recently, due to the improvement in rural health insurance coverage and reimbursement, rural residents prefer to stay at their origin instead of moving out, which is deleterious to the nation-wide united labor force market construction. With other developing countries, we share similar economic and social gaps between urban and rural areas. The governments of many developing countries do not provide health insurance for rural residents at all or supply health insurance with limited coverage and reimbursement. China's example could be a great lesson for those developing countries when designing their own health insurance systems. The impact of health insurance on labor force mobility and national united labor market is an essential consideration in order to provide health protection for both urban and rural residents, boost healthy human resources, and cumulate a high-quality labor force to contribute to economic development in the future.

There are still several shortcomings in our research. Our research explored the impact of the urban/rural binary health insurance structure on migrant workers' intentions to switch from rural to urban hukou, utilizing nationwide large-scale on-site micro survey data and applying the instrument variable methods to solve the endogeneity problem. Meanwhile, it is also essential to explore and examine the mechanism and pathway of how health insurance could affect migrant workers' urban hukou switching intentions. However, due to the limitations of data and variables, we were not able to further investigate the mechanism and pathway. In the future, we plan to design and execute more detailed questionnaires and surveys to collect necessary variables and data and enhance our research results and conclusions.

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