Chinese Sociological Review, 48(2): 137–161, 2016

ISSN 2162-0555 print/2162-0563 online
DOI: 10.1080/21620555.2015.1131926

Routledge
Taylor & Francis Group

Educational Disparities in Access to Health Insurance in China, 1989–2009

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Abstract: *Using data from the China Health and Nutrition Survey, we examine changes in educational differentials in access to health insurance over the period 1989–2009. Our analysis yielded three notable results. Firstly, regardless of level of education, the overall health insurance access rate exhibited a U-shaped change during the study period and the majority of people have been covered by health insurance by 2009. Secondly, the better educated enjoyed the advantage in receiving health insurance, particularly for employment-based insurance. Thirdly, educational disparity in access to health insurance changed over time. Specifically, the influence of education on overall access to insurance has been in decline during the two decades studied, indicating a convergence of access to health insurance across education levels. In contrast, employment-based insurance has converged across education level in the earlier years but diverged in more recent years over our study period. We argue that these patterns should be understood in the context of market reforms and changes of state-welfare provision over time.*

Introduction

As the costs of medical treatment have escalated rapidly, disparities of access to health insurance have become one of the significant elements of health stratification in China. From 1978 to 2012, annual *per capita* spending on

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healthcare grew from 11 yuan to inflation-adjusted 355 yuan, an average annual rate of 10.6 percent (National Bureau of Statistics of China 2013). One significant force shaping the distribution of health insurance during the transition has to do with market reforms in the health system and beyond; indeed, some studies have already linked this distribution and its development to market reforms (Henderson et al. 1995; Hu et al. 1999; Akin, Dow, and Lance 2004; Giles, Park, and Cai 2006; Du 2009; Xu and Short 2011).

Beyond the market reforms, the Chinese government has made substantial investments in the establishment of a welfare state over the last decade. A notable effort in this respect in recent years has been the impressive expansion of government finance for healthcare and health insurance coverage for both the rural and urban populations, as witnessed by a decreasing proportion of patient out-of-pocket expenses on healthcare (National Bureau of Statistics of China 2013). These measures made it possible for socio-economically disadvantaged groups to have insurance cover.

However, few studies have examined the implications of the development of state welfare programs for insurance coverage and the inequality of access across different social groups in an era that China has experienced both market reform and development of state welfare progressively. In this research, we focus specifically on education, not only because education is a key component of socioeconomic status (SES) that may influence access to health insurance, but also because education often exerts the strongest effect on health outcomes, when multiple indicators of SES—such as education, income, and occupation—are used (Beydoun and Popkin 2005; Lowry and Xie 2009). Two specific questions are addressed: firstly, what was the level of access to health insurance among different education groups? To what degree did access to health insurance hinge on education? Secondly, did the relationship between education and access to insurance change over time? We pay special attention to how the coevolution of labor markets and state welfare policies shape the distribution of health insurance across education groups in China. Given that the reimbursement rate of employment-based insurance to patients is much higher than that of other forms of health insurance in China and that employment-based insurance may be more influenced by market-oriented reforms, apart from the distribution of health insurance of any type, we also examine the distribution of employer-provided health insurance.

This article contributes to the literature by treating access to health insurance as an outcome of social stratification. Discussions in the literature of Chinese social stratification always focus on income, education, and occupation (for reviews, see Bian 2002; Bian, Wu, and Li 2008), and only a few studies have examined social inequality in terms of access to health insurance. Moreover, to the best of our knowledge, we are the first to systematically examine trends in the distribution of employment-based health insurance in China.

The second contribution of this article is that we investigate how economic reforms and state welfare policies jointly influence the distribution of health insurance in China, as the years covered by most of the existing literature are limited and they mainly focus on the effects of economic reforms on access to insurance and inequalities. In China, state welfare has undergone aggressive development in the recent years and there is a need to study this topic in the longer term. In this article, we analyze inequality of access to health insurance using an eight-wave dataset spanning twenty years.

Theoretical Background

Confirming the general pattern found in many other countries, the majority of the empirical studies have firmly documented a positive association of educational attainment with health in China (e.g., Chen, Yang, and Liu 2010; Lowry and Xie 2009; Hu 2015; Luo, Zhang, and Gu 2015). This is true no matter how health is measured. Lack of access to health insurance by the less educated people is generally viewed as an important determinant of their health status, since health insurance can shield individuals from the risk of having to pay medical expenses, thereby increasing the utilization of medical care (Liu et al. 2003).

The state and the free markets represent two primary sources for provision of health insurance. Although they follow fundamentally different logics of insurance allocation, they are not antithetical in the insurance allocation process. Rather, they not only coexist but also coevolve in response to each other.

The early forms of health insurance, such as mutual aid societies and sickness funds, appeared for some workers in the late nineteenth century in most developed countries (Cutler 2002). In the labor markets, less-well educated people often encounter significant barriers to accessing health insurance, whereas highly skilled people often have better access (Seccombe and Amey 1995; Ahluwalia and Bolen 2008). To explain this education-based stratification, scholars have put forward two theoretical perspectives, namely human capital theory and structural theory. Human capital theory asserts that well-educated people are more productive. To keep their highly skilled workers, employers need to provide them with better welfare benefits (Becker 1993). Structural theory argues that well-educated people are over-represented in larger companies, full-time jobs, the public sector and higher wage occupations, all of which are more likely to offer employment-based health insurance (Seccombe 1993).

Both theoretical perspectives show that highly educated people tend to enjoy employment-based health insurance, as they are more likely to be employed in the formal sector. For those who are self-employed or unemployed, they can still afford the payments for insurance premiums from private insurance providers, due to their higher income or their better family economic situation—for example, if a spouse or parent is a high earner.

The state has its own interests that are not necessarily in congruence with the markets. While the market sector emphasizes economic efficiency and favors people with higher human capital, concerns about political stability, legitimation, and historical traditions have led to the clear equity considerations of the state in the overall health insurance distribution among different sections of society. Indeed, almost all governments intervene to a greater or lesser extent in health insurance stratification through state welfare policies. For example, in the United States, nearly everyone older than 65 years of age can obtain Medicare, the public health insurance; in other developed countries such as Canada, Great Britain and Sweden, insurance is relatively universal (Cockerham 2012). These welfare state programs, designed to provide affordable healthcare to citizens, especially those with barriers to obtaining health insurance from the market, tend to weaken the linkage between education and health insurance coverage. In this sense, the state serves as a complement to the market in the course of offering health insurance.

In provision of health insurance, the state and the market also adapt to and transform each other. On the one hand, given the important role played by the employer-sponsored insurance in pooling resources and spreading the financial risk associated with major medical expenses, the state has enacted mandates and incentives for employers to provide coverage (Zhu and Ding 2008). Partly to keep the health insurance obtained from the market attractive, partly to reduce the financial burden of the government, the state usually insures basic medical service through social welfare programs. The quality of medical services rendered by state-run health insurance is often not comparable to that of medical services by market-based health insurance (Cutler 2002). On the other hand, in response to the equal opportunities emphasized by the state, employers strive to guarantee equal access to health insurance and the benefits associated for all employees within their own work organizations.

Consequently, both the market and the state coevolve and interact with each other. China's health insurance system has undergone a dramatic transformation in the past three decades. The changing role of the state and free market in health insurance provision in China raises important questions about trends in access to health insurance, and about how different social groups have fared during this transformation. The following section will discuss the transition away from state provision of health insurance in China in the early reform period and how market forces have been evolving in the process.

The Evolving Health Insurance System in China

On the eve of market reforms, insurance coverage had reached the bulk of the Chinese population. This coverage included roughly 85 percent of the rural population and almost all of the urban population (World Bank

1997). Rural residents were insured by the Cooperative Medical Scheme (CMS), and urban residents were insured by the Labor Insurance Scheme (LIS) and the Government Insurance Scheme (GIS), both of which were employment-based. Insurance benefits differed between these schemes.

With the collapse of the agricultural commune system in the early 1980s, the cooperative medical system—no longer supported by collective farming income—disintegrated, leaving the great majority of rural residents uninsured. Despite various efforts to resuscitate the CMS in some localities and the introduction of some new forms of insurance, such as immunization insurance, and comprehensive prenatal, maternal and well-baby care (Henderson et al. 1995; Carrin et al. 1999; Ye et al. 1999), the majority of the rural population (roughly 79 percent) remained uninsured as of 2003 (Center for Health Statistics and Information, Ministry of Health of the People's Republic of China 2004). In the interim period, there had been some emergence of private insurance programs in rural areas, but only the most affluent families could afford it.

However, rural residents were not the only ones who had suffered from the reforms in provision of medical care. In urban areas, unprofitable SOEs—mostly small and medium-sized ones—were privatized or closed down, leaving many urban residents uninsured (Grogan 1995; Giles, Park, and Cai 2006; Du 2009). Even for those who kept their jobs in SOEs, with the spread of financial autonomy, the enterprises were often unable to guarantee full health insurance coverage (Hu et al. 1999). With the grant of personnel autonomy among SOEs and the abolishment of job assignment by government, the labor market started to emerge gradually in China, indicating that the highly skilled workers could be better compensated than before on wages and health insurance (Zhang et al. 2005).

In the late 1980s, reform efforts were initiated to reduce the reliance of the LIS on finance from the businesses themselves and increase insurance coverage among the employees, culminating in the government's policy initiative in 1998 by establishing a new insurance scheme (also known as Urban Employee Basic Medical Insurance Scheme [UEBMIS]) for urban workers (but not their dependents) and extending the coverage of medical insurance to include employees in the private sector. However, some business companies, such as township enterprises and the self-employed sector, were not required to join this scheme. Moreover, some enterprises, even SOEs, may not comply with government regulations concerning medical benefits. Up to 2008, 12.3 percent of the urban employed (excluding those in individually-owned business) had not been covered by the UEBMIS (Zhao et al. 2013).

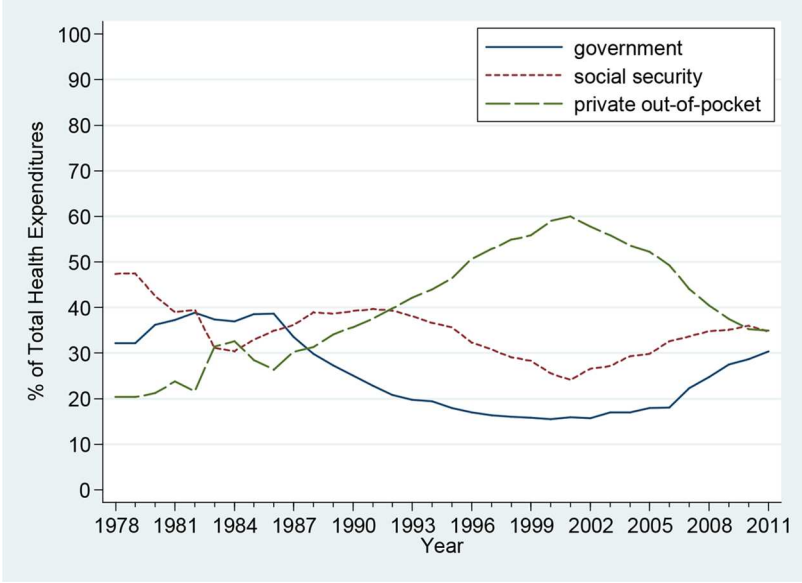
Parallel to the decline of health insurance coverage was the reduction of public funds channeled to public healthcare facilities. Public hospitals and rural health stations that once provided medical care at little or no cost came to function much like for-profit entities and operate on a fee-for-service basis. In this way, the financing gap that resulted from the reform was filled mainly

by private out-of-pocket spending. As a result, as shown in Figure 1, the share of healthcare spending borne by individuals has grown sharply from 20.4 percent in 1978 to 58.3 percent in 2002 on average, although with a significant reversal of the trend in recent years (to 34.4 percent in 2012, National Bureau of Statistics of China 2013). This contributes to problems in access to healthcare and affordability for those low-skilled workers and the unemployed.

The reversal in the share of private finance in total healthcare expenditure in the past decade is mainly due to the substantial healthcare investment, especially health insurance provision made by central and local governments. Since the early 2000s, a more proactive state health insurance program, targeting the socio-economically disadvantaged, has been established to increase the coverage of health insurance in both rural and urban areas.

In rural areas, the government introduced the New Rural Cooperative Medical Scheme (NRCMS) in 2003. The aim of this scheme is to provide insurance covers to the majority of the rural Chinese population by 2010. In urban area, efforts have been made mainly to increase the coverage of the Urban Resident Basic Medical Insurance Scheme (URBMIS). In 2003, about 200 million urban residents without formal employment were still left out of the "the state health care 'safety net'" (Center for Health Statistics and Information, Ministry of Health of the People's Republic of China 2004).

Figure 1. **Government, social security, and private out-of-pocket health spending, as a percentage of total healthcare expenditure. *Source*: National Bureau of Statistics of China 2013.**



Although some affluent families bought private insurance, it played only a minor role. Only 5.6 percent of urban residents had private insurance in 2003 (Center for Health Statistics and Information, Ministry of Health of the People's Republic of China 2004). Following trials in seventy-nine cities in 2007 and advanced trials in 80 percent of China's cities, the URBMIS was carried out on a full scale in 2010. The URBMIS provides insurance coverage to urban residents who are not covered by the UEBMIS (including the elderly, students, children, and other nonworking urban residents).

The newly implemented URBMIS, combined with UEBMIS and NRCMS, indicates that universal healthcare insurance is beginning to become a reality in China, which might shift the inequality of health insurance coverage across different social stratification groups.

Hypotheses

Based on the above-mentioned statement, the state and the free markets in China have coevolved with each other in health insurance provision in the past three decades. As the state aims to promote mass access to insurance and the market emphasizes merit-based reward in the distribution of health insurance, the degree of state intervention should have been buffering or enhancing the relationship between the level of education and health insurance in the historic transformation period.

In the early reform era, the state had a significant retreat from healthcare provision, making many people resort to the free markets for health insurance. A common presumption was that the market-oriented reforms would enlarge educational disparities in health insurance coverage. Nevertheless, market failures in the early transition period may cause new types of economic inefficiency in the health sector, and removal of safety nets may deteriorate access to health insurance for some groups, even those in higher socioeconomic strata (Akin, Dow, and Lance 2004; Du 2009). Therefore, we propose two competing hypotheses about the effect of education on access to overall health insurance during the initial course of economic transitions:

Hypothesis 1a: the effect of education on having health insurance will increase over time if the market performs well.

Hypothesis 1b: the effect of education on having health insurance could decrease over time if the market tends to fail to compensate for those highly skilled people.

As the markets are advancing toward maturity in the more recent period, the effect of level of education on having insurance should have increased over time, regardless of who provides the insurance. However, given a large proportion of people failing to obtain health insurance from the markets, after 2003, the state resumed its role in the social safety net through the gradual provision of NRCMS in rural China and, since 2007, URBMIS in urban

areas. Both schemes emerged as the social security policies that proactively target the disadvantaged groups as they were much less selective than the UEBMIS. The recognition of the strong re-expansion of the state in health-care provision leads us to hypothesize that:

> *Hypothesis 2: the effect of education on having health insurance will decline over time in the more recent period, regardless of the source of insurance provision.*

The implications of the coevolution between the state and the market on the distribution of employment-based health insurance across educational groups may be different from overall health insurances. Access to employment-based insurance is mainly influenced by two factors: (1) the state policy that requires employers to buy insurance for their employees; and (2) possibilities of working in better-performed companies or sectors that are more likely to provide fringe benefits. Although the state strives to extend the insurance coverage to include the private economy, its effort is not very successful, except in some large private companies. The state sector remains the primary source of employment-based health insurance. This situation could induce different consequences in terms of the changes in the educational disparities in employment-based insurance. On the one hand, with the increase of financial and personnel autonomy for SOEs, the strength of education as determinants of entry into the state sector has become increasingly important (Zhou, Tuma, and Moen 1997), hence leading to an increasing education-based gap in insurance coverage. On the other hand, driven by the economic structuring, job mobility from the SOEs may lead to the narrowing of the gap in insurance coverage across educational categories through at least two causal mechanisms. First, restructuring of the SOEs resulted in widespread labor dislocation. Beginning in the mid-1990s, 50 million workers, or about 40 percent of SOE workforce, have gradually been laid off (known as *xiagang*); the massive labor retrenchment in SOEs had not been stopped until 2005 (National Bureau of Statistics and Ministry of Labor and Social Security of China 2006; Naughton 2007). Laid-off workers either became unemployed or switched to private enterprises, thereby losing their health insurance (Du 2009). These laid-off workers often were better educated, for example, in 1999, with an average of ten years of schooling compared with the average of 9.6 years for the general urban labor force (Appleton et al. 2002; National Bureau of Statistics of China 2002). Since laid-off workers often went without health insurance, their entry might have reduced the educational inequality in this aspect. Second, attracted by higher economic payoffs—mainly income—in the private sector, some highly educated people transferred from the state to the private sector (Wu and Xie 2003). These people were also likely to lose health insurance benefits; their entry into the market sector possibly led to the diminishing differential in health insurance across education categories.

As a result, we developed the following two competing hypotheses about the effect of education on employment-based insurance during the initial course of economic transitions:

Hypothesis 3a: the effect of education on the uptake of employment-based insurance will increase over time.

Hypothesis 3b: the effect of education on having employment-based insurance will decrease over time.

However, after massive labor dislocation from the state sector, China has continued its progress toward a market economy. Market competition will gradually cause organizations to formalize their insurance schemes to attract skilled workers, as evidenced by the rise of employment-based insurance in the nonstate sector (Zhao et al. 2013). Therefore, the continuing advance of market mechanisms leads us to hypothesize that:

Hypothesis 4: the effect of level of education on employment-based insurance will enlarge over time in more recent years.

Data, Variables, and Method

Data

The data used in this research are from the China Health and Nutrition Survey (CHNS), an ongoing large-scale longitudinal survey. We included eight waves of the data (1989, 1991, 1993, 1997, 2000, 2004, 2006, and 2009) in our study. It employs a multistage random cluster sampling process to separately identify households from urban and rural areas in nine provinces: Liaoning, Heilongjiang, Jiangsu, Shandong, Henan, Hubei, Hunan, Guangxi, and Guizhou.[1] Although the CHNS data are not nationally representative, households were randomly selected from a set of provinces which are diverse in terms of geographical location, level of economic development, and public resources. Previous studies show that the characteristics of the CHNS households and individuals are comparable to those from national samples (Chen 2005).

The CHNS provides a good opportunity to understand the impact of health insurance reform on changes in levels of access and inequalities. There are several reasons for this. First, it spans a long time period and covers the critical period of health insurance reforms in China. Second, it includes a detailed health insurance module that has changed little over the eight waves of the data. Third, it includes new households in each survey wave to replace those households lost to follow-up. As a result, although it is a panel study, due to the changing nature of the sample, the data have more of the characteristics of a repeated cross-section survey.

For this study, the sample is restricted to adults 21–60 years of age at the time of the interview. We make this restriction because young-adult

respondents may have not finished their education and the majority of the more mature respondents may have withdrawn from the labor market. After excluding invalid and incomplete cases, our analytical sample consists of 8,100 individuals in 1989, 7,636 in 1991, 7,323 in 1993, 7,967 in 1997, 8,720 in 2000, 7,308 in 2004, 7,036 in 2006, and 7,088 in 2009. Because of the striking differences in levels of economic development and government policy, as well as the health insurance schemes, we performed separate analyses for rural and urban residents.

Variables

The primary variables of interest in this research are the possession of health insurance of any type, and the possession of employment-based insurance in particular. Employment-based insurances were GIS, LIS, and UEBMIS. Respondents were coded as having (employment-based) health insurance (1) or as having no (employment-based) health insurance of any type (0).

Our key independent variable of interest is the education group-specific change in the probability of insurance possession over time, represented by the interaction between education and survey year in the regression models. As in previous studies (e.g., Akin, Dow, and Lance 2004; Xu and Short 2011), we treated education as a categorical variable. We measure it at three levels: primary school and below, lower secondary school and upper secondary school and above.[2] In the regression analyses, survey year was also entered as dummy variables.

The covariates in our multivariate analysis included age, age-squared, sex, household income per capita and province. Age is a continuous variable measured in years. Age and age-squared will be included simultaneously to model the curvilinear relationship between age and insurance status (Hu et al. 1999). Sex was a dummy variable (0 = female; 1 = male). Household income per capita was inflated to the 2009 purchasing value by consumer price index. We also adjusted for any skewness in data on income per capita by transforming it using the logarithm function. To control for potential provincial variations in health insurance coverage, we controlled for the effects of province with dummy variables (reference group = Liaoning). Appendix A presents descriptive statistics for variables used in this study by year, separately for rural and urban residents.

Analytical Strategy

To determine how disparities of access to health insurance had changed, we pooled the data from all available waves of the CHNS and estimated a series of random-intercept logistic regression models. An important advantage of the random-effect model is that it adjusted for clustering of time-specific

observations of insurance status within the same person over time (Rabe-Hesketh and Skrondal 2008). Moreover, we computed robust standard errors to correct for the potential correlation of insurance status between people of the same household and community, and for heteroscedasticity of residuals at the lowest level (i.e., occasion).

Results

Educational Inequality in Overall Health Insurance

Table 1 presents the basic descriptive trends in possession of health insurance by educational category, separately for rural and urban residents. In general, rural and urban subsamples show largely similar patterns pertaining to educational differences in insurance rate. First, better-educated people consistently enjoyed higher insurance rates: the insurance rate was highest for those with upper secondary or above education, followed by those with lower secondary education, and those with primary school education or below. Second, all three education groups achieved great gains in insurance rate after 2003. For example, in rural areas, 33.2 percent of people with upper

Table 1

Health Insurance Coverage Rates Among Chinese Adults 21–60 Years of Age by Residence, Year, and Education

Residence	Year	Educational level			(7–9 Years)–(≤6 Years)	(≥10 Years)–(≤6 Years)
		≤6 Years	7–9 Years	≥10 Years		
Urban	1989	49.77%	65.49%	82.65%	15.63%	32.88%
	1991	47.59	66.99	82.00	19.40	34.41
	1993	36.64	51.34	74.77	14.70	38.13
	1997	23.47	37.59	63.78	14.12	40.31
	2000	20.43	27.12	55.25	6.69	34.82
	2004	19.81	33.77	60.17	13.96	40.36
	2006	35.90	38.00	64.78	2.10	28.88
	2009	79.06	80.80	87.49	1.74	8.43
Rural	1989	9.56	19.26	32.13	9.70	22.57
	1991	10.80	18.77	33.63	7.97	22.83
	1993	9.15	16.90	32.93	7.75	23.78
	1997	13.90	19.02	32.65	5.12	18.75
	2000	10.48	12.12	27.06	1.64	16.58
	2004	15.41	16.44	33.21	1.03	17.80
	2006	47.04	47.38	54.63	0.34	7.59
	2009	94.96	93.38	89.60	−1.58	−5.36

secondary education or better were insured in 2004, while this figure was 89.6 percent in 2009. In urban areas, 60.2 percent of people with upper secondary education or better were insured in 2004, compared to 87.5 percent in this education group in 2009. Finally, insurance rate differentials across education groups narrowed down after 2003. The only difference between rural and urban subsamples was changes in educational differentials in coverage rates before 2003: in rural areas, educational differentials in coverage rates were reduced, whereas in urban areas, no clear trend emerged on educational differentials in coverage rates.

To systematically examine how the distribution of health insurance across educational categories changes over time, we estimated the random-intercept logistic regression models described above. We conducted separate analyses for rural and urban areas of China. Models for urban residents are presented in the two left-hand columns of Table 2 and models for rural residents are in the remaining columns of the table.

For urban residents, the results show that the coefficients for the education dummy variables are positive and significant, indicating that both groups of people with lower secondary education and with at least upper secondary education are more likely to have health insurance than their counterparts who have only primary education or lower. Note that these coefficients reveal baseline differences in 1989. Specifically, the odds of receiving health insurance were about 16.3 times greater for the highest education group (i.e., $\exp[2.848]-1=16.3$), and about 3.3 times greater for the mid-education group (i.e., $\exp[1.453]-1=3.3$), than for the lowest education group in 1989. The coefficients for the main effect for survey years indicate that the log-odds of having health insurance first declined among those with primary school education or lower until 2000 and thereafter experienced a dramatic increase. Determining whether the relationship between education and access to health insurance has changed over time requires paying attention to the interaction terms for year-by-education categories. The statistically insignificant interactions between mid-education group and each of survey years 1991 through 2004 (excluding 2000) indicate that the gap in the probability of being insured between the middle- and lowest-education groups has generally not changed during the period 1989–2004; in contrast, both the interaction between middle education and 2006 and the interaction between middle education and 2009 are negative and statistically significant, suggesting that disparities narrowed between the middle- and lowest-education groups. The trend of the gap between the highest- and lowest-education groups in the probability of being insured exhibits a similar pattern: this gap remained unchanged during the period 1989–2004, but narrowed thereafter.

Turning to the results for rural residents (the right half of Table 2), we also found that higher education is associated with higher likelihood of having insurance in the beginning of 1989 (main effects of middle and

Table 2

Random-Intercept Logistic Regression Models of the Association Between Education and Having Health Insurance over the Survey Period by Residence

	Urban		Rural	
	coefficient	Robust S.E.	coefficient	Robust S.E.
Education (vs. $\leq$ 6 Years)				
Education: 7–9 Years	1.453***	0.165	1.300***	0.119
Education: 10+ Years	2.848***	0.186	2.221***	0.147
Year (vs. year 1989)				
Year 1991	−0.174	0.118	0.182+	0.092
Year 1993	−0.847***	0.137	−0.202+	0.092
Year 1997	−2.139***	0.191	0.559***	0.110
Year 2000	−2.731***	0.224	−0.062	0.112
Year 2004	−2.586***	0.229	0.557***	0.117
Year 2006	−1.064***	0.249	3.045***	0.116
Year 2009	2.110***	0.311	7.320***	0.190
Interaction: education 7–9 years x				
Year 1991	0.270	0.179	−0.321*	0.135
Year 1993	−0.207	0.197	−0.207	0.136
Year 1997	−0.029	0.243	−0.601***	0.155
Year 2000	−0.560*	0.276	−0.959***	0.153
Year 2004	−0.256	0.283	−1.104***	0.160
Year 2006	−1.568***	0.303	−1.209***	0.152
Year 2009	−1.641***	0.370	−1.642***	0.222
Interaction: education 10+ years *x*				
Year 1991	0.000	0.198	−0.336*	0.154
Year 1993	−0.195	0.209	0.012	0.159
Year 1997	−0.035	0.248	−0.700***	0.187
Year 2000	−0.404	0.272	−0.861***	0.180
Year 2004	−0.448	0.282	−1.097***	0.188
Year 2006	−1.727***	0.304	−2.099***	0.190
Year 2009	−2.607***	0.368	−3.533***	0.261
Male (vs. female)	0.396***	0.075	0.182***	0.049
Age	0.138***	0.024	0.077***	0.016
Age2	−0.001**	0.000	−0.001***	0.000
Logged household income per capita	0.578***	0.043	0.355***	0.022

(*Continued*)

Table 2 **Continued**

	Urban		Rural	
	coefficient	Robust S.E.	coefficient	Robust S.E.
Provinces (vs. Liaoning)	8 dummies		8 dummies	
Intercept	−8.202***	0.608	−7.626***	0.373
Goodness-of-fit				
BIC (smaller is better)	18074.35		30406.35	
Observations	18,193		42,985	
Number of groups	6,664		12,009	

Notes: $^{***}P < 0.001$, $^{**}P < 0.01$, $^{*}P < 0.05$, $^{+}P < 0.1$.

highest education = 1.300 [$P < 0.001$] and 2.221 [$P < 0.001$]). The negative sign of interactions between higher education and survey year indicates that this positive association between education and health insurance in base year decreased over time during the period 1989–2009. Although educational differentials tend increasingly to narrow down over time among rural residents throughout the two decades of the study period, the reason underlying the narrowing for the first decade studied is different from that for the second decade. For the first decade, the narrowing gap arises due to the slightly rising ownership of insurance among the lowest education but the decline in the insurance coverage among the two higher-education groups. For the second decade, educational inequality in insurance coverage converged over time among rural residents, because the insurance coverage of the lowest education group rose faster relative to the two higher education groups.

In sum, by level of education, there is an apparent narrowing of differentials on having health insurance occurring in more recent years, consistent with our hypothesis, that is, the effect of level of education on overall health insurance will decline over time during the period of the state's re-expansion in healthcare provision. In addition, before the re-expansion period, we also saw a converging trend across education groups on insurance coverage among rural residents but not among urban residents. One possible explanation for this is that educational difference between retrenched workers and rural labor force is larger than that between retrenched workers and urban labor force. Since retrenched workers always went without health insurance, their entry into the private economy will make the converging trend in insurance coverage more pronounced among rural residents. In the next section, we examine the effects of level of education on insurance disparity for employment-based health insurance, to see whether it will shed some light on this speculation.

Educational Inequality in Employment-Based Health Insurance

Table 3 provides the percentages of employment-based health insurance coverage and the changes by education group for rural and urban residents. The education-based gap in employment-based insurance rate nearly closed from 1989 to 2004 and experienced a steady increase thereafter among both rural and urban residents. Further inspection of the data reveals that the year-trend was also similar across these three education-level subcategories: the overall pattern is an apparent decline during the period 1989–2004, but with a significant recovery in recent years.

Table 4 presents findings from the estimation of random-intercept logistic regression models, controlling for the potential confounders. Similar to Table 2, the model was specified in a parsimonious fashion: it includes controls for educational dummies, year dummy, interactions between year and education dummy, sex, age, age-squared, the log of household income per capita, and provincial dummies. The regression results generally supported the main findings of the basic descriptive results. We begin with the first two columns of Table 4, which refer to the urban sample on employment-based insurance.

Among urban residents, the significant coefficients for the education dummy variables are in the expected positive direction, indicating higher

Table 3

Employment-Based Insurance Coverage Rates Among Chinese Adults 21–60 Years of Age by Residence, Year, and Education

Residence	Year	Educational Level			(7–9 Years)–(≤Years)	(≥10 Years)–(≤6 Years)
		≤6 Years	7–9 Years	≥10 Years		
Urban	1989	43.61%	60.84%	78.96%	17.23%	35.35%
	1991	42.37	63.75	79.98	21.38	37.61
	1993	33.90	47.86	72.68	13.96	38.78
	1997	17.34	30.89	57.03	13.55	39.69
	2000	13.22	21.85	48.90	8.63	35.68
	2004	10.54	19.62	35.57	9.08	25.03
	2006	17.22	25.92	57.16	8.70	39.94
	2009	18.05	32.66	62.55	14.61	44.50
Rural	1989	5.34	14.21	28.10	8.87	22.76
	1991	5.09	12.79	27.65	7.70	22.56
	1993	4.83	11.94	26.68	7.11	21.85
	1997	3.00	5.24	20.36	2.24	17.36
	2000	2.69	3.81	18.81	1.12	16.12
	2004	2.37	4.03	15.70	1.66	13.33
	2006	2.87	6.63	23.70	3.76	20.83
	2009	2.91	7.29	30.57	4.38	27.66

Table 4

Random-Intercept Logistic Regression Models of the Association Between Education and Having Employment-Based Insurance over the Survey Period by Residence

	Urban		Rural	
	Coefficient	Robust S.E.	Coefficient	Robust S.E.
Education (vs. ≤ 6 Years)				
Education: 7–9 Years	1.488***	0.166	1.573***	0.179
Education: 10+ Years	2.861***	0.182	2.950***	0.217
Year (vs. year 1989)				
Year 1991	−0.113	0.121	−0.112	0.145
Year 1993	−0.566***	0.148	−0.373*	0.149
Year 1997	−2.417***	0.203	−1.258***	0.204
Year 2000	−3.148***	0.260	−1.824***	0.222
Year 2004	−3.642***	0.311	−2.345***	0.242
Year 2006	−2.656***	0.268	−1.889***	0.243
Year 2009	−2.998***	0.285	−2.288***	0.257
Interaction: education 7–9 years *x*				
Year 1991	0.380+	0.185	−0.163	0.209
Year 1993	−0.346	0.210	−0.135	0.212
Year 1997	−0.137	0.253	−0.622*	0.274
Year 2000	−0.518+	0.307	−1.121***	0.290
Year 2004	−0.544	0.356	−0.824**	0.309
Year 2006	−0.889**	0.314	−0.405	0.293
Year 2009	−0.273	0.321	−0.059	0.292
Interaction: education 10+ years *x*				
Year 1991	0.138	0.199	−0.333	0.231
Year 1993	−0.299	0.222	−0.193	0.235
Year 1997	−0.075	0.253	0.051	0.293
Year 2000	−0.345	0.295	−0.443	0.305
Year 2004	−1.304***	0.350	−0.671*	0.336
Year 2006	−0.652*	0.310	−0.066	0.318
Year 2009	0.069	0.321	0.958**	0.314
Male (vs. female)	0.526***	0.079	0.760***	0.098
Age	0.125***	0.024	0.006	0.028
Age2	−0.001**	0.000	0.000	0.000
	0.680***	0.056	0.975***	0.066

(*Continued*)

Table 4 **Continued**

	Urban		Rural	
	Coefficient	Robust S.E.	Coefficient	Robust S.E.
Logged household income per capita				
Provinces (vs. Liaoning)	8 dummies		8 dummies	
Intercept	−8.835***	0.677	−12.670***	0.773
Goodness-of-fit				
BIC (smaller is better)	17890.01		15726.03	
Observations	18,193		42,985	
Number of groups	6,664		12,009	

Notes: $^{***}P < 0.001$, $^{**}P < 0.01$, $^{*}P < 0.05$, $^{+}P < 0.1$.

probability of having employment-based health insurance. These coefficients again reflect baseline differences in 1989. While employment-based insurance coverage has declined somewhat for all the three education groups from 1989 to around 2005, the decline has been more pronounced for the middle- and highest-education groups, thus diminishing the education-based gap. This result is reflected in the increasingly negative coefficients for the year dummy variables and the generally increasingly negative coefficients for interaction-terms during this period, which are presented in the first column of Table 4. Specifically, the odds for the relative insurance-coverage difference between the lowest- and highest-education groups decreased from a high of roughly 17.5 (i.e., exp[2.861] = 17.5) in 1989 to a low of 4.7 (i.e., exp[2.861–1.304] = 4.7) in 2004, a decrease of nearly 73 percent; the corresponding difference between the lowest- and middle-education groups decreased from a high of 4.4 (i.e., exp[1.488] = 4.4) in 1989 to a low of 1.8 (i.e., exp[1.488–0.889] = 1.8) in 2006, a decrease of roughly 59 percent. The possible explanation for this finding during this period is that market forces were slow to respond to competition in the labor market through welfare benefits in the early reform era. On the one hand, the market economy was immature in the early period in both labor market and insurance market. On the other hand, the market sector also relied on the support of state policy to develop suitable insurance plans for the employees. We further examined the situation in the most recent years.

The results in the first two columns of Table 4 also reveal a steady improvement in employment-based insurance coverage for all the three education groups among urban residents in the most recent years. Owing to a greater increase in coverage among the highest education group, the coverage gap between the highest and lowest education groups in terms of access to employment-based insurance widened in urban areas during the period

2004–2009, which confirmed our expectation that the effect of level of education on employment-based insurance would enlarge over time after the massive labor dislocation from the state sector ended in China. Specifically, the chances of receiving employment-based insurance were about 3.7 times greater for the highest education group than for the lowest education group in 2004. By 2009, the chances for the highest education group were about 16.7 times greater. For the same reason, the coverage gap between the middle and lowest education groups also expanded during the period 2006–2009.

The remaining two columns of Table 4 turn to the results for rural residents. The insurance coverage gap between the middle- and lowest-level education groups was large in 1989, and has since decreased until 2000, because decline in coverage was greater among the middle education group: the interaction effect coefficient was increasingly negative and statistically significant. Nevertheless, this model indicated that, the insurance coverage gap between the highest- and lowest-education groups remained largely unchanged among rural residents from 1989 to 2000; in 2004, this gap, however, did experience a decline. As mentioned above, a converging trend across education groups in terms of overall insurance coverage is found among rural residents even before the re-expansion of the state in healthcare provision. Thus, in corroboration of our speculation, this convergence may result from the closing gap in employment-based insurance.

The results in the last two columns of Table 4 also suggested that, among rural residents, educational disparities in the employment-based insurance increased in the recent years; this again provides supportive evidence for our hypothesis that the effect of level of education on employment-based insurance will enlarge over time in the more recent years. Combining the coefficients for the education dummy variables and for the interaction terms, we can find that, the odds ratio for the relative coverage difference between the lowest-and highest-education groups increased from 9.8 (i.e., $\exp(2.950–0.671) = 9.8$) in 2004 to 49.8 (i.e., $\exp(2.950 + 0.958)$ in 2009. During the same period, this figure for the relative coverage difference between the lowest- and middle-education groups increased from 2.1 (i.e., $\exp(1.573–0.824)$ to 4.5 (i.e., $\exp(1.573–0.059)$.

Conclusion and Discussion

Using an eight-wave dataset from the CHNS spanning the period 1989 to 2009, we examined the distribution of access to health insurance across different educational groups in China. We have argued that changes in insurance access and inequality over time are jointly determined by market-oriented reforms and state welfare policies. In support of our argument, the results present a complex picture of access to insurance and its variability for different education groups over the twenty-one years studied.

Our analysis has yielded three notable results. First, consistent with the state's withdrawal from and resumption of provision of health insurance in the past two decades, Chinese people's overall health insurance access rate experienced a U-shaped change during the study period. This pattern also holds true within each educational subgroup. Around 2000, access to insurance declined to a strikingly low level. This sheds some light on the puzzle: China made dramatic health gains when it was relatively poor, but then saw stagnation during a period of rapidly rising income (Tang et al. 2008). Largely driven by availability of insurance provision from the government, overall access to insurance has increased dramatically since 2004. In the meanwhile, influenced by the recovery of employment-based insurance, the overwhelming majority of people were covered by some type of health insurance by 2009. This constitutes an important move, raising the affordability of medical care and thus the accessibility of healthcare services (Wagstaff et al. 2009). However, to guarantee the effect of the expanded access on health outcomes, the governments still need take actions to address the relatively low quality of care delivered by grass-roots providers, especially in rural area (Sylvia et al. 2015).

Secondly, analyses highlighted the significant advantages in health insurance experienced by the better-educated group. Throughout the twenty year study period, the better educated people enjoyed advantages over the less educated in receiving health insurance, particularly employment-based insurance. As mentioned above, employment-based insurance is the most generous medical insurance scheme in China. Given that the overwhelming majority of the population of China has been covered by some type of insurance, enacting mandates and incentives for employers in the nonstate sector to provide coverage, as well as improving reimbursement rates of patient service in other medical insurance schemes, may be the next steps needed to reduce health disparities.

Thirdly, we see clear evidence that education-based inequality in possession of health insurance has changed over time. Specifically, this inequality did not increase over time during the period 1989 to 2004 or so, when the state largely withdrew from the healthcare provision and the market force started to emerge gradually. Different from the common presumption that market-oriented reforms would increase educational inequalities in access to health insurance, we found that educational inequalities actually narrowed down in this period of marketization. We speculate this pattern is due to the immature market economy in this time stage, as it is always a step slow for the market to respond to the withdrawal of state health insurance, and it takes time for the market and government to develop alternative insurance schemes; that is, neither the free market nor the state were in a good position to provide health insurance programs at that time period, which potentially lowered the education disparity in the access of health insurance over time. To further look into this matter, we examined

employment-based insurance separately and it also showed the similar pattern in both the urban and rural samples, which is consistent with our speculation. This situation was reversed when state provision was restored in the later period. During the period 2004–2009, state welfare policies succeeded in mitigating educational inequalities in respect of overall health insurance. During the same period, in contrast, we find that an education-related gap in employment-based insurance grew in response to progress toward marketization.

These results resonate with many scholars' call for the responsibility of the government in providing basic health services in China (Bloom and Gu 1997; Liu 2004). Strong government intervention is necessary for a wide and sustainable health insurance system, especially the one covering the socioeconomically disadvantaged groups. In spite of the narrowing of educational differentials in health insurance coverage in the initial stage of economic reform, relying on markets to distribute health insurance will ultimately lead to increased differences in coverage across education groups.

In closing, several limitations of this study should be acknowledged. First, the CHNS is a household survey and it did not include the household members who have been migrating. Compared to nonmigrating counterparts, the migrating population has a lower incentive to join the NRCMS. This is because they often cannot enjoy medical benefits provided by this scheme unless they return to their home town. Since the migrating population tends to be better educated than their rural counterpart, our results possibly overestimate inequality in health insurance. Second, this study focused on level of education—only one aspect of SES. Future studies could be built on our results and examine additional measures of SES, including occupation, income, and type of work unit, which would provide an opportunity to examine SES on insurance access from a more comprehensive way. Together with level of education, this should lead to a solid result about social inequality in relation to access to health insurance.

Acknowledgements

We are grateful to Lei Jin, Yu Xie, and three anonymous reviewers for their comments and suggestions. The ideas expressed herein are those of the authors.

Funding

The research is supported by the Natural Science Foundation of China (Grant No. 71490735) and a research fund of School of Social Development and Public Policy at Fudan University.

Notes

1. Liaoning dropped out of the survey in 1997 and was replaced by Heilongjiang; Liaoning has returned to the survey since 2000.

2. China has seen a great educational expansion in the recent decades (Treiman 2013). We test for the importance of such compositional changes by dividing the sample of each wave into education terciles. We find that the use of the relative measure of education does not greatly alter the main substantive results.

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Appendix A: Descriptive Statistics for Variables in the Study, by Year and Residence

	1989	1991	1993	1997	2000	2004	2006	2009
Urban								
Health insurance (yes = 1)	0.662	0.661	0.558	0.466	0.402	0.452	0.519	0.842
Employment-based insurance (yes = 1)	0.614	0.626	0.530	0.400	0.341	0.264	0.413	0.469
Education (yes = 1)								
0–6 years	0.324	0.315	0.279	0.204	0.172	0.152	0.135	0.130
7–9 years	0.335	0.342	0.357	0.341	0.321	0.336	0.335	0.328
10+ years	0.341	0.344	0.365	0.454	0.507	0.512	0.531	0.541
Male (yes = 1)	0.484	0.484	0.482	0.488	0.493	0.47	0.47	0.482
Age	37.894	38.470	38.676	39.106	39.996	42.606	43.753	44.432
Logged household income per capita	7.961	7.928	7.995	8.203	8.448	8.536	8.653	9.029
Province (yes = 1)								
Liaoning	0.126	0.119	0.104		0.091	0.088	0.078	0.077
Heilongjiang				0.134	0.126	0.124	0.122	0.111
Jiangsu	0.111	0.118	0.114	0.120	0.113	0.113	0.110	0.122
Shandong	0.117	0.122	0.116	0.105	0.104	0.092	0.109	0.105
Henan	0.127	0.126	0.134	0.131	0.114	0.127	0.116	0.124
Hubei	0.122	0.134	0.143	0.127	0.116	0.107	0.097	0.099
Hunan	0.124	0.124	0.138	0.124	0.111	0.132	0.146	0.139
Guangxi	0.151	0.133	0.128	0.115	0.107	0.106	0.108	0.128
Guizhou	0.123	0.125	0.124	0.145	0.118	0.112	0.115	0.095
N	2,702	2,439	2,097	2,315	2,423	2,063	2,028	2,126

(*Continued*)

Appendix A *Continued*

	1989	1991	1993	1997	2000	2004	2006	2009
Rural								
Health insurance (yes = 1)	0.156	0.163	0.148	0.184	0.138	0.186	0.485	0.932
Employment-based insurance (yes = 1)	0.111	0.105	0.101	0.061	0.057	0.052	0.081	0.101
Education (yes = 1)								
0–6 years	0.552	0.552	0.527	0.472	0.420	0.426	0.404	0.360
7–9 years	0.319	0.319	0.348	0.398	0.421	0.416	0.419	0.450
10+ years	0.129	0.129	0.126	0.130	0.160	0.158	0.177	0.190
Male (yes = 1)	0.499	0.502	0.504	0.512	0.511	0.486	0.477	0.48
Age	36.592	37.339	37.755	38.352	39.314	42.429	43.258	43.380
Logged household income per capita	7.344	7.505	7.601	7.840	7.997	8.182	8.311	8.694
Province (yes = 1)								
Liaoning	0.123	0.117	0.113		0.113	0.119	0.122	0.117
Heilongjiang				0.116	0.103	0.112	0.111	0.110
Jiangsu	0.107	0.115	0.122	0.134	0.125	0.105	0.105	0.108
Shandong	0.119	0.113	0.115	0.117	0.096	0.106	0.111	0.113
Henan	0.135	0.133	0.132	0.125	0.110	0.120	0.112	0.115
Hubei	0.131	0.132	0.126	0.125	0.114	0.107	0.103	0.104
Hunan	0.120	0.118	0.115	0.102	0.095	0.098	0.109	0.108
Guangxi	0.139	0.138	0.140	0.141	0.126	0.123	0.126	0.132
Guizhou	0.126	0.133	0.137	0.138	0.120	0.110	0.102	0.094
N	5,398	5,197	5,226	5,652	6,297	5,245	5,008	4,962