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ADB Working Paper Series

**HUMAN CAPITAL AND
URBANIZATION IN THE PEOPLE'S
REPUBLIC OF CHINA**

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Abstract

The relationship between human capital development and urbanization in the People's Republic of China (PRC) is explored, highlighting the institutional factors of the *hukou* system and decentralized fiscal system. Educated workers disproportionately reside in urban areas and in large cities, and the returns to education are significantly higher in urban areas relative to those in rural areas, and in large, educated cities relative to small, less-educated cities. In addition, the external returns to education in urban areas are at least comparable to the magnitude of private returns. Rural areas are the major reservoir for urban population growth, and the more educated have a higher chance of moving to cities and obtaining urban *hukou*.

Relaxing the *hukou* restriction, increasing education levels of rural residents, providing training for rural–urban migrants, and guaranteeing equal opportunity for all residents are necessary for a sustainable urbanization process in the PRC. In terms of health, rural–urban migration is selective in that healthy rural residents choose to migrate. Occupational choices and living conditions are detrimental to migrants' health, however. While migration has a positive effect on migrant children, its effect on “left-behind” children is unclear.

JEL Classification: J24, I12, R23

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1. INTRODUCTION

Human capital, which plays an essential role in economic development and the urbanization process, refers to the knowledge, skills, and strength accumulated by an individual to enhance his or her productivity. Indeed, today's economic sector has a greater demand for labor with more human capital, and urban areas—with large populations and high population densities—are ideal places for people to accumulate human capital. Cities provide places for knowledge, skills, and ideas to influence individuals informally, creating large spillover (i.e., external) effects.

In developing countries like the People's Republic of China (PRC), human capital also facilitates the process of population shifts from rural to urban areas, and the interaction between human capital development and urbanization is influenced by institutional arrangements and government policies. In the PRC, the decentralized fiscal system and *hukou* (i.e., household registration system) system have major impacts on this relationship.

This study examines how attainment of education performs in the urbanization process in the PRC, by noting changes in education levels for rural and urban areas and for different provinces and/or cities. Second, how returns to education vary between rural and urban areas, and across different provinces and/or cities, is assessed. This study then examines if the labor force with different education levels moves freely to meet the demand of cities of different sizes, particularly the responsiveness of the labor force with different education levels to regional labor demand shocks. The distribution of human capital and human capital returns in rural and urban PRC and across cities provides hints for evaluating and reforming policies affecting labor mobility.

As most of the population growth in urban PRC comes from rural–urban migration, the characteristics of rural–urban migrants in comparison to rural and urban residents are also analyzed to find if selection effects, in terms of education levels, exist in the urbanization process. Finally, migrant households' problems regarding education and health are noted, as well how to improve efficiency and equality in these areas. The institutional background of the relationship between human capital and institutions is analyzed, such as the role played by governments at various levels in allocating educational resources as well as that of the *hukou* system in determining migrants' access to education and health care. Then, educational attainment is discussed in the context of rapid urbanization, especially regarding developments in rural and urban PRC and across different regions.

Health issues and their relationship with urbanization, which certainly impact human capital development, are also analyzed, while policy implications are discussed in the last section.

Overall, this study finds that cities provide higher returns to education and attract more educated workers, but the *hukou* system still impedes sufficient labor mobility, which is especially true for educated workers, implying that the returns to education in cities are not fully realized. In addition, significant external returns to education exist in urban areas, and rural–urban migration is positively selected in terms of human capital levels.

2. INSTITUTIONAL BACKGROUND

In the PRC, labor mobility is controlled by the *hukou* system, which has greatly influenced the pace and pattern of urbanization (Au and Henderson 2006). Traditionally, a person's *hukou* status is categorized by both socioeconomic eligibility (i.e., agricultural and nonagricultural) and registered residential location (i.e., local and nonlocal) (Chan and Buckingham 2008).¹ *Hukou* status is primarily determined by birth and is passed from one generation to the next (Wu and Treiman 2004). Thus, by controlling migration, the *hukou* system has been an essential factor in the rural–urban divide (Knight and Song 1999, Zhao 2000; Lu 2003).

Today, urban *hukou* is associated with better-paid, more secure jobs; access to better public services; and more subsidies. Only a small number of rural residents with special achievements can obtain urban *hukou*; as such, going to university or a professional school has been a major channel of *hukou* conversion (i.e., rural to urban). Other channels that increase the probability of *hukou* conversion include joining the military, being promoted as a cadre (Wu and Treiman 2004, Fan 2008), purchasing urban housing (Deng and Gustafsson 2006), and converting land as a result of city expansion (Wong and Huen 1998).

The *hukou* system has been undergoing reform since the 1980s, and one major change has been the localization of *hukou* management, with many local governments receiving full power to determine their own criteria and number of new local permanent *hukou* registrations that they grant. It has also become easier for workers and households to transfer their *hukou* registrations to other locations—in particular, to small- to medium-sized cities—and temporary residence permits are being granted more often. Moreover, it has become possible for some with rural *hukou* to migrate to urban areas and be hired without valid permits.

However, many migrants without urban *hukou* are still excluded from formal urban sectors and earn significantly less than native urban *hukou* workers (Meng and Zhang 2001; Meng 2001; Maurer-Fazio and Dinh 2004; Gagnon, Xenogiani, Xing 2014; Démurger et al. 2009). If they do migrate to urban areas, these workers are not covered by urban social security systems and are thus not entitled to local welfare programs, subsidies, and public services, including education (Gagnon, Xenogiani, Xing 2014).

In the PRC, primary school education (i.e., ages 6–11 years) and lower middle school (ages 12–14 years) have been compulsory since the late 1980s. As a public service, local governments have mostly financed the operation of these schools. Before 2000, local governments in rural areas could collect agricultural taxes or fees for education expenditures, but these taxes and fees were cancelled in later years, putting financial stress on many local governments to adequately finance education. In urban areas, the schools are usually not funded to take migrant children. This decentralized feature, combined with the *hukou* system, has caused several problems regarding the allocation of educational resources. First, a large gap in educational resources has emerged not only between rural and urban areas but also across different regions, and even across different districts within a city. Second, with a large amount of migrant workers, many children were left behind in their parents' home province to attend school, but today, more children are migrating with their parents, attending schools at

¹ The first classification determines entitlement to state-subsidized food grain and other prerogatives. The second classification defines one's rights for many activities in a specific locality

their destination location. However, they are still required to take the university entrance examinations at their registered *hukou* province.

Universities are mainly located in cities, especially in municipalities and provincial capitals. Under the earlier central planning regime, higher education was heavily subsidized. With economic reforms and the enlargement of the scale of higher education, the government has gradually lowered subsidies for higher education. In fact, in 1993 guidelines on education reform and development, the central government emphasized that higher education is noncompulsory, and that students should pay tuition (Government of the PRC, State Council 1993). Thus, from 1995 to 2004, tuition fees increased from CNY800 per person per year to CNY5,000 per person per year on average (Yang 2006). Expenditures on education ranked first in total household expenditure in the Tenth Five-Year Plan, 2001–2005 (CYCRC 2007).

Another major reform of higher education in the 1990s was to cancel the planning system for allocating university graduates throughout the country. The new system is effectively a two-sided market. Graduates find jobs based on mutual agreement with employers, with much less intervention from the government. University graduates now face more competition, putting pressure on the labor market, especially in urban areas.

Universities are administered by different levels of government. Elite universities are generally funded by both the central government (through the Ministry of Education) and provincial governments, while many other local universities are mainly funded by provincial governments. There are very few privately run universities in the PRC. Universities admit students from all over the country, but usually the admission quota is higher for the province of location than for other provinces, which is true even for elite universities.

In the last 2 decades, the central government has initiated two major projects (i.e., the 211 Project and 985 Project), aiming to improve the quality of universities. Their objective is to promote the quality of teaching and research by building first-class universities. These projects have mainly focused on the elite universities.

Higher education is closely related to the urbanization process because it not only produces graduates with higher human capital levels but also has been a major channel through which rural individuals can obtain urban local *hukou*.

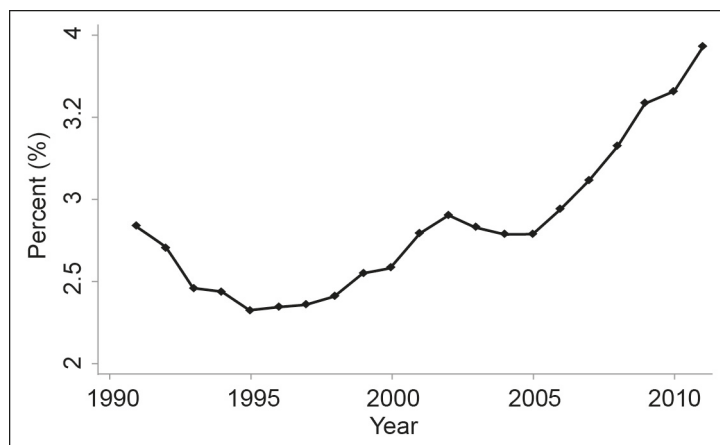
3. EDUCATIONAL DEVELOPMENT IN THE URBANIZATION PROCESS

3.1 Human Capital Development

3.1.1 Education Expansion

The PRC has experienced tremendous education expansion in recent decades. From 1990 to 2012, the PRC's gross domestic product (GDP) grew at an annual rate of 10%, and the amount of fiscal expenditure on education also grew rapidly. In the mid-1990s, the share of fiscal expenditure on education in GDP was below 2.5%, and by 2011, it reached 4.0% (Figure 1).

Figure 1: Share of Fiscal Expenditure on Education in Gross Domestic Product (%)

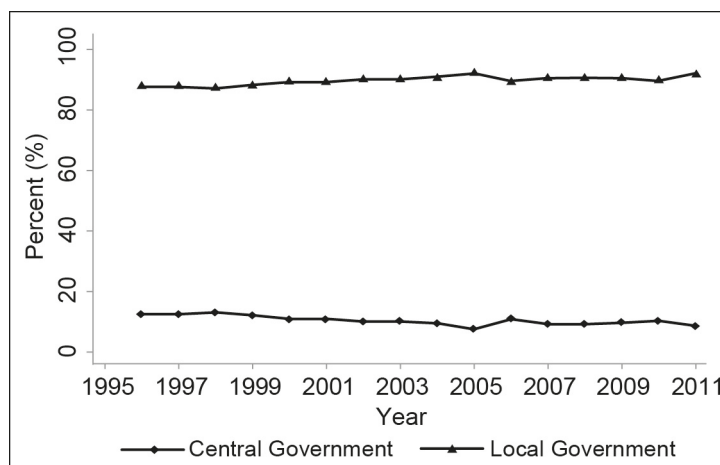


GDP = gross domestic product.

Source: Author.

Figure 2 shows that local governments are responsible for around 90% of the fiscal expenditure on education.

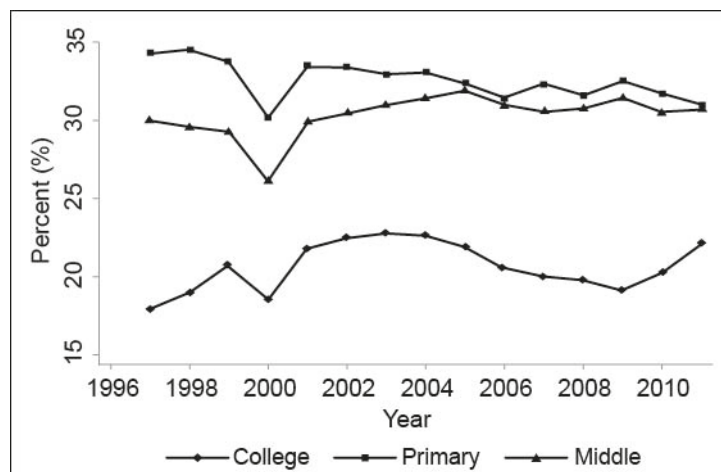
Figure 2: Share of Fiscal Expenditure on Education by Central and Local Governments (%)



Source: Author.

Figure 3 shows the share of fiscal expenditure on different education levels in total education expenditure. The share of primary education has declined continuously from around 35% to 30%, while that of tertiary education has increased significantly in recent years.

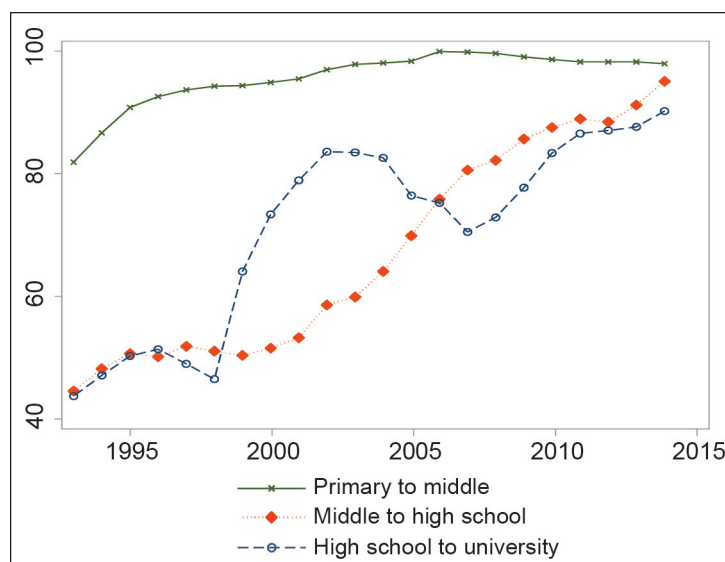
Figure 3: Share of Fiscal Expenditure in Different Levels of Education (%)



Source: Author.

Figure 4 shows that the share of primary school graduates admitted to middle school increased from 80% in the early 1990s to around 98% in the early 2010s due to the enforcement of the Law of Compulsory Education and increased subsidies, especially in poor regions.

Figure 4: Admission Rates at Various Education Levels



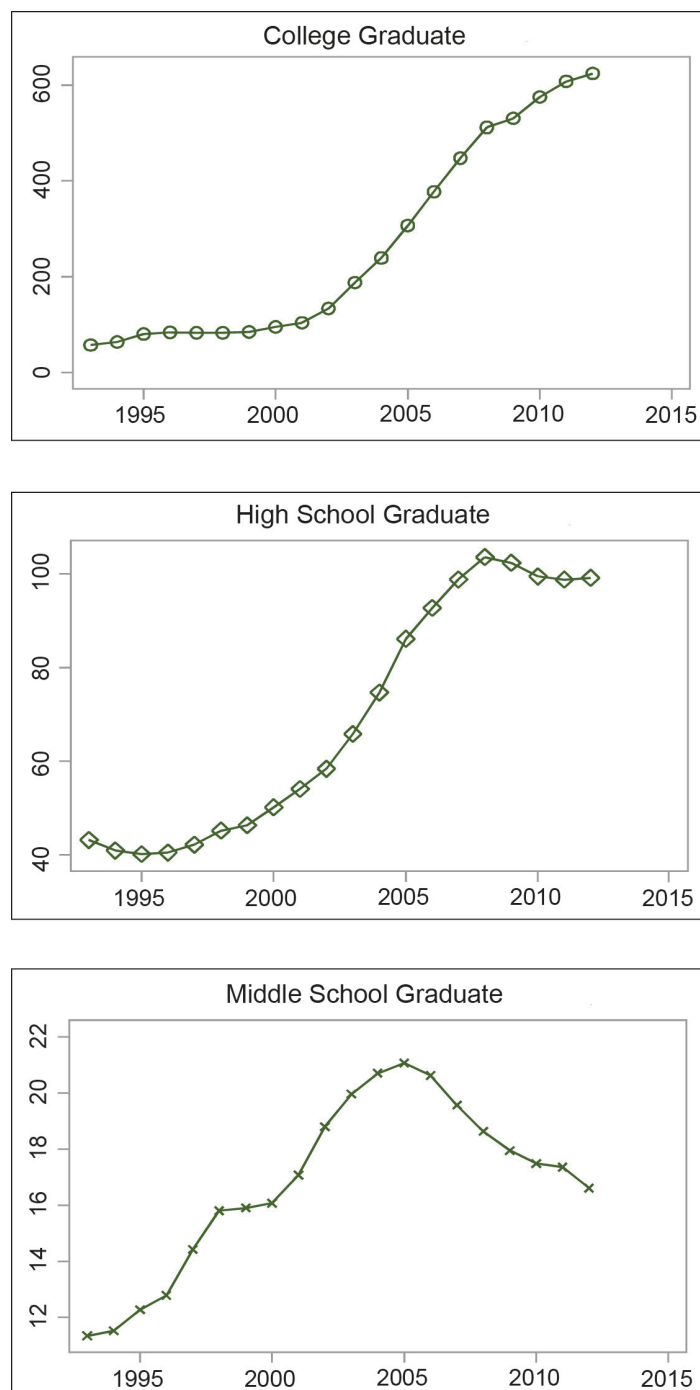
Source: NBS (2015).

The change in higher education was more dramatic. In 1998, fewer than 50% of high school graduates were admitted to university. The percentage increased to 65% in 1999, and it kept rising in subsequent years. The share of middle school graduates admitted to high school also increased continuously from around 50% in the late 1990s to nearly 90% in the early 2010s. However, as the returns to high school are low and the main function of high schools is preparation for university examinations, the expansion in high school can be largely regarded as a response to the expansion in tertiary education. Between 2003 and 2007, the increase in the number of high school graduates (and the middle school to high school admission rate) was so dramatic that

the share of high school graduates admitted to university decreased. Yet the number of students admitted to universities kept increasing. Starting from around 2008, the number of high school graduates stopped rising, and the admission rate into universities increased again.

As a result of education expansion, the number of university graduates increased dramatically starting from early 2000. For example, the number of university graduates in 2000 was 1.03 million. By 2012, the number reached 6.25 million (Figure 5).

Figure 5: Number of Graduates at Various Levels of Education
(million)



Source: NBS (2013).

3.1.2 Human Capital in Rural and Urban Areas

In this section, two nationally representative datasets are used to show that human capital development is unbalanced between rural and urban areas. The first dataset is from three waves of the PRC Household Income Project (CHIP) in 1995, 2002, and 2007 (Table 1).

Table 1: Distribution of Education Levels, 1995–2007
(%)

	1995		2002		2007	
	Urban	Rural	Urban	Rural	Urban	Rural
Primary and below	6.6	47.9	4.4	36.6	2.3	25.8
Middle school	32.0	40.7	27.9	47.4	19.9	55.2
High school	24.1	9.6	28.0	11.8	27.5	12.6
Technical school	15.3	1.3	11.0	3.0	10.6	3.8
Professional school	15.0	0.4	19.7	1.0	24.2	1.7
University and above	7.0	0.2	9.0	0.3	15.5	0.9

Note: Observations are restricted to those aged 22–54 years, who are able to work and are out of school.

Sources: Calculated using Risken, Renwei, and Shin (1995); Shi (2002); China Institute for Income Distribution (2007).

The increase in the level of human capital is dramatic in urban PRC, as the share of the sample with university degrees increased from 7% in 1995 to 16% in 2007. If education levels above professional school are included, the increase is even more dramatic, with the share increasing from 22% to 40% between 1995 and 2007. In contrast, the share of the sample with tertiary education in rural areas increased only slightly, from 0.6% in 1995 to 2.6% in 2007.

Table 2: Distribution of Education Levels, 2000 and 2005
(%)

	2000				2005		
	By Hukou Type		By Hukou Type		By Type of Residence		
	Non-agricultural	Agricultural	Non-agricultural	Agricultural	Urban (city)	Suburban (town)	Countryside (village)
Share of various education levels within agricultural/non-agricultural Hukou or rural–urban areas (%, column total = 100)							
Below primary	1.3	8.0	1.3	8.6	2.1	4.5	10.1
Primary	9.2	39.0	7.9	34.3	13.2	21.7	37.1
Middle school	36.5	46.4	34.3	49.0	42.0	47.5	45.6
High school	22.5	5.8	32.4	7.5	26.1	17.4	6.3
Technical school	13.2	0.7					
Professional	12.3	0.2	15.8	0.5	10.3	6.8	0.8
University and above	5.1	0.0	8.5	0.1	6.4	2.1	0.1
Total	100	100	100	100	100	100	100
Agricultural–non-agricultural Hukou or rural–urban distribution for different education levels (%, row total = 100)							
Below primary	5.5	94.5	5.8	94.3	10.8	12.0	77.2
Primary	7.7	92.3	8.7	91.4	16.3	14.0	69.7
Middle school	21.7	78.4	22.4	77.7	31.0	18.2	50.9
High school	57.8	42.2	64.1	35.9	58.4	20.2	21.4
Technical school	86.2	13.8					
Professional	95.9	4.1	92.8	7.2	68.2	23.6	8.3
University and above	99.2	0.9	98.0	2.0	83.7	14.0	2.3
Total	26.0	74.0	29.2	70.8	33.0	17.1	49.9

Note: Observations are restricted to those aged 22–54 years, who are able to work and are out of school.

Sources: Calculated using random samples of NBS (2000) and NBS (2005).

This pattern is also observed in the second dataset, the 2000 census data and the 1% population survey for 2005 (Table 2).

Between 2000 and 2005, the share of population aged 22–54 years with professional school degrees and above increased from 18% to 26% in urban areas. In contrast, the share only increased from 0.2% to 0.6% in rural areas. The last four columns in Table 2 indicate that a majority of the less-educated population (i.e., middle school graduates and below) was concentrated in rural areas, while highly educated workers mostly resided in urban areas.

This pattern remains true when observing the population aged above 6 years, rather than the restricted sample of the working-age population (Table 3). Even in the most recent data from the 2010 census, a huge gap exists in education, especially in tertiary education.

Table 3: Education Levels for Population Aged above 6 Years, 2000 and 2010

	2000				2010			
	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural
	(10,000)		(%)		(10,000)		(%)	
Illiterate	1,165	6,930	4.2	9.8	803	4,417	2.1	7.2
Primary school	6,132	33,359	22.4	47.1	6,128	23,207	16.0	38.1
Middle school	10,145	26,025	37.0	36.7	13,859	27,381	36.1	44.9
High school	4,569	3,307	16.7	4.7	9,363	4,710	24.4	7.7
Technical (<i>zhongzhuan</i>)	2,176	849	7.9	1.2				
Professional	1,956	325	7.1	0.5	4,375	942	11.4	1.5
University	1,208	52	4.4	0.1	3,509	302	9.1	0.5
Graduate	84	2	0.3	0.0	378	12	1.0	0.0
Total	27,435	70,849	100	100	38,415	60,971	100	100

Sources: Calculated from NBS (2000) and NBS (2010).

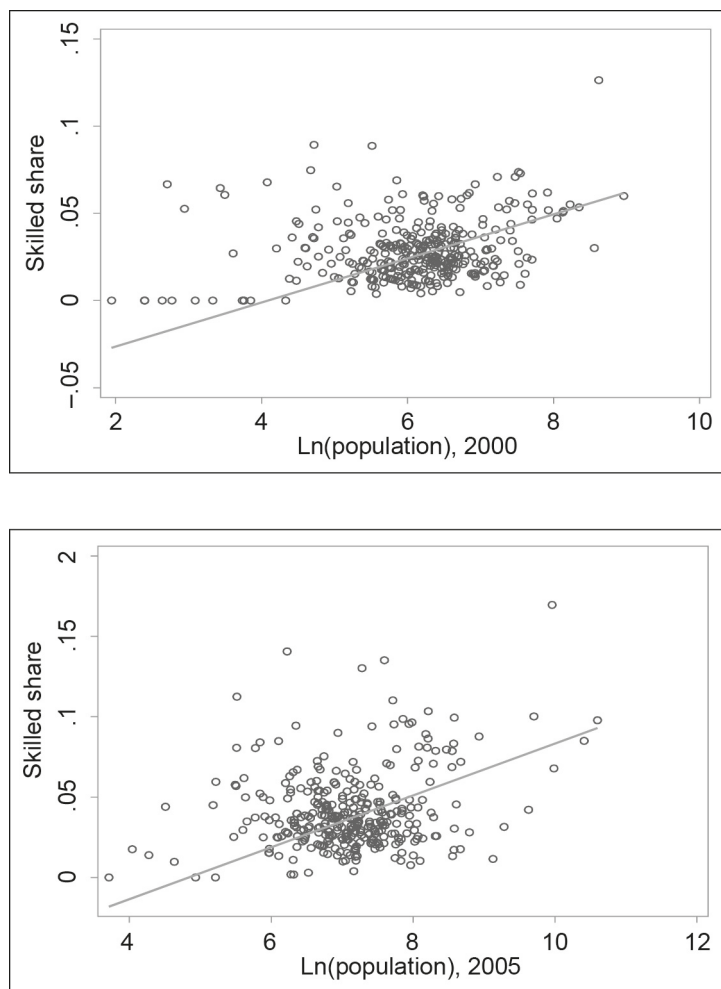
3.1.3 Human Capital across Provinces and Cities

Using random samples from 2000 census data and 2005 1% population survey, the size of the working age population (defined as those aged 23–55 years and not in school) was calculated, as was the share of workers with university degrees or above for each prefecture-level city.² Figure 6 shows the relationship between this share and the population for 2000 (left panel) and 2005 (right panel).

The figure suggests that individuals of different education levels were not randomly located in different cities; there is a positive correlation between the share of university graduates and population size, and the correlation seems to be stronger for 2005 than for 2000.

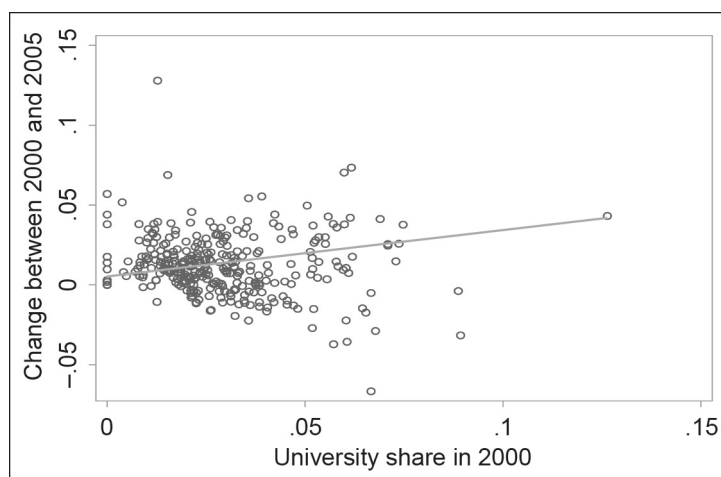
Figure 7 further shows changes in the share of university graduates in each prefecture-level city against the city's initial share of university graduates in 2000. There is a significantly positive relationship between the share of university graduates in 2000 and subsequent change in the share of skilled workers.

² As the sample is random, the number of observations are counted in each city and used as the city's population.

Figure 6: Share of Skilled Workers and Population, 2000 and 2005

Notes:

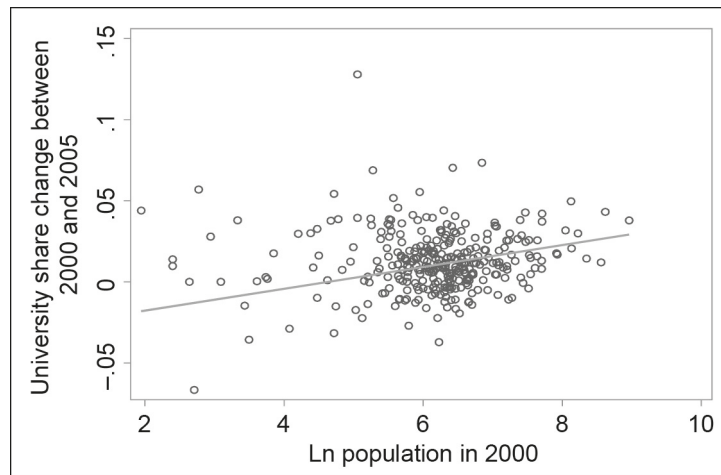
1. Population refers to the number of observations in each city in the dataset.
 2. Skilled share refers to the share of observations with university or above degrees.
- Sources: Calculated from NBS (2000) and NBS (2005).

Figure 7: Changes in the Share of University Graduates and Education Levels, 2000

Sources: Calculated from NBS (2000) and NBS (2005).

Figure 8 shows that there is also a positive correlation between the change in the share of university graduates and share of university graduates in 2000.

Figure 8: Changes in the Share of University Graduates and Population, 2000



Sources: Calculated from NBS (2000) and NBS (2005).

In summary, the evidence suggests that large cities have attracted more educated workers. Moreover, between 2000 and 2005, large and educated cities became more educated.

3.2 Returns to Education

Since education is a major form of human capital, educated workers, on average, earn more than less-educated workers. Returns to education (i.e., the wage increase associated with a certain number of years of schooling like 4 years of university education) depend on various circumstances such as infrastructure, economic structure, and population. In the following section, returns to education are shown to be significantly higher in urban than in rural areas in the PRC, and within urban areas, it is significantly higher in larger and more educated cities.

3.2.1 Returns to Education in Rural and Urban Areas

To estimate the returns to education for rural and urban PRC separately, rural and urban surveys of the CHIP data for 1995, 2002, and 2007 were used. Also, 2005 1% population survey data were used, which covered both rural and urban PRC. The returns to education were estimated by running ordinary least squares (OLS) regressions of the wages in log form on years of schooling and other standard controls including gender, experience, experience squared, and region dummies.

The study notes that returns to education were significantly higher in urban than in rural areas, and the gap seems to increase from the 1990s. In the mid-1990s, for example, the returns to education were around 5.0% in urban PRC, while that for rural areas were 2.0%. By 2007, the returns to education increased to 11.0% in urban areas, while remaining low at 2.7% in rural areas. The gap is also large in 2005, for which year the data from the 1% population survey were used (13.0% versus 4.0%) (Table 4).³

³ The Heckit model was also used to correct for selection bias and to obtain similar results. The results from another dataset (China Health and Nutrition Survey) showed similar patterns of rural and urban returns to education.

Table 4: Returns to Education in Rural and Urban People's Republic of China
(coefficients on years of schooling in wage equations)

	1995 (1)	2002 (2)	2005 (4)	2007 (3)
Urban	0.049*** (0.002)	0.094*** (0.003)	0.125*** (0.000)	0.111*** (0.003)
Rural	0.020* (0.010)	0.034*** (0.004)	0.042*** (0.001)	0.027*** (0.004)

Notes:

1. Experience, experience squared, gender, and provincial dummies in the ordinary least squares regressions are controlled for.
2. The sample is restricted to those aged 22–54 years, who are able to work and are not in school.
3. *, **, and *** are significance levels at 10%, 5%, and 1%, respectively.
4. Standard errors are in parentheses.

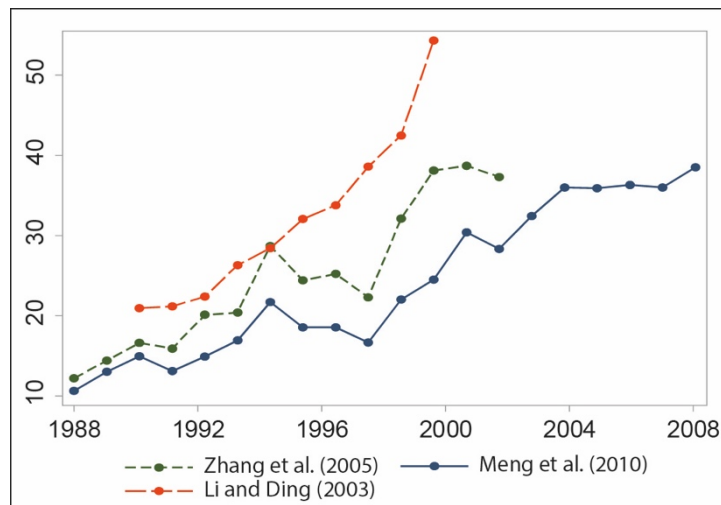
Sources: Risken, Renwei, and Shin (1995); Shi (2002); China Institute for Income Distribution (2007). were used for the 1995, 2002, and 2007 results, respectively, and NBS (2005) was used for the 2005 data. The dependent variable is log of hourly wage, except for 2007, for which annual wage was used.

There are two important, related aspects that need to be emphasized. First, the returns to education in rural areas do not take into consideration the role of education in increasing the probability of rural people migrating to urban areas. Chen and Xing (2006) showed that the probability of having a nonfarm job increases significantly with education level. More importantly, as mentioned earlier, going to university has been a major channel of converting one's *hukou* status from rural to urban.

3.2.2 University Premiums

Within urban areas, education expansion was accompanied by a continuous increase in the returns to higher education. Figure 9 summarizes several studies and shows that the university premium increased dramatically in the 1990s.

Figure 9: Returns to University, 1988 to 2008
(%)



Note: The reference group is high school graduates.

Sources: Zhang et al. (2005); Meng, Shen, Xie (2010); Li and Ding (2003).

As indicated in Figure 9, by the end of the 1990s, the returns to university education reached 30%–50%. Possibly due to the expansion policy, the increasing trend stopped after 2003, but university premiums were still approaching 40% (Meng, Shen, Xie 2010).⁴

Recent research has also shown that the unemployment rate increased for young university graduates. Even with an unemployment rate of 20%, the expected returns from a university education could still be as high as 30%. Moreover, the unemployment rate for university graduates of older ages was much lower than for those of other education levels.

3.2.3 Returns to Education across Regions and Cities

Given the considerable effort devoted to estimating the returns to education, the extension to include a regional dimension is a natural next step. As a large developing country in economic transition, the PRC's various regions have different levels of economic development. Possible reasons for regional dispersion in returns to education include institutional factors such as different shares of the private sector across regions, different degrees of openness (in terms of trade activity and foreign direct investment), and sets of “place-based” policies.⁵

Evidence from CHIP Data, 1995, 2002, and 2007. The returns to years of schooling and to various levels of education were estimated for a number of provinces using two different models:

$$\ln(WAGE) = \beta_0 + \beta_1 * SCHOOLING + \gamma X + \varepsilon \quad (1)$$

$$\ln(WAGE) = \beta_0 + \sum_i \gamma_i * EDU_i + \gamma X + \varepsilon \quad (2)$$

In model 1, *SCHOOLING* is years of formal schooling, and in model 2, *EDU_i* are dummies for various education levels. *X* controls for the same factors as in model 1. Results for these models are reported in columns 4–9 of Table 5.

For the earlier period (1995–2002, columns 4–5), the returns to years of schooling increased sharply across all regions. There was also large variation across regions in the returns to education. In 1995, the returns to years of schooling varied by around 3%–4%. In 2002, Guangdong had the highest returns to schooling (8.4%), while Hubei and Yunnan had the lowest returns (4.6%–4.7%).

Between 2002 and 2007 (columns 5–6), returns to education stopped rising or even declined in the central and western provinces. For coastal regions, the returns to education kept rising, however; in some cases, the increase was dramatic (e.g., 6% to 11% in Beijing). The regional dispersion in the returns to education became larger. The university premium shows similar patterns, but its dispersion increased only slightly (columns 7–9).

Due to the limitation of space, the returns to other education levels are not reported, although some features of these returns are worth noting. First, most of the increases in the returns to education were concentrated in higher levels of education, especially university education. Second, coastal regions witnessed rising returns for almost every

⁴ These results were obtained using employed observations.

⁵ For a more detailed discussion, see Whalley and Xing (2014).

tertiary education level. Finally, the returns to high school decreased between 1995 and 2007.

Table 5: Returns to Education and University Premium in Urban People's Republic of China, by Province, 1995–2007

Province	Skilled Workers' Share			Returns to Years of Schooling			College Premium (college vs. high school)		
	1995 (1)	2002 (2)	2007 (3)	1995 (4)	2002 (5)	2007 (6)	1995 (7)	2002 (8)	2007 (9)
Beijing*	51.6	47.7	61.2	0.026	0.059	0.114	0.207	0.414	0.618
Shanxi	43.4	44.0	49.9	0.037	0.059	0.066	0.193	0.315	0.470
Liaoning*	39.2	41.0	48.6	0.048	0.075	0.078	0.333	0.602	0.510
Shanghai*			46.8			0.135			0.895
Jiangsu*	32.9	36.4	45.4	0.034	0.058	0.117	0.057	0.537	0.657
Zhejiang*			43.7			0.114			0.574
Anhui	34.0	41.8	47.0	0.031	0.072	0.053	0.248	0.401	0.345
Fujian*			51.9			0.091			0.442
Henan	38.8	42.2	62.6	0.039	0.056	0.066	0.325	0.445	0.504
Hubei	41.3	51.3	55.3	0.027	0.046	0.080	0.334	0.365	0.499
Hunan			53.0			0.077			0.513
Guangdong*	36.3	41.2	52.7	0.037	0.084	0.117	0.433	0.684	0.700
Chongqing	42.8	40.3	48.4	0.039	0.056	0.066	0.164	0.559	0.587
Sichuan	41.6	36.9	51.4	0.028	0.058	0.089	0.199	0.495	0.640
Yunnan	45.6	51.7	52.3	0.027	0.047	0.090	0.219	0.332	0.566
Gansu	37.4	43.1	48.7	0.039	0.074	0.072	0.367	0.504	0.457
Standard Dev.	40.2	43.4	51.6 (52.4)	0.007	0.012	0.024 (0.022)	0.104	0.113	0.127 (0.101)

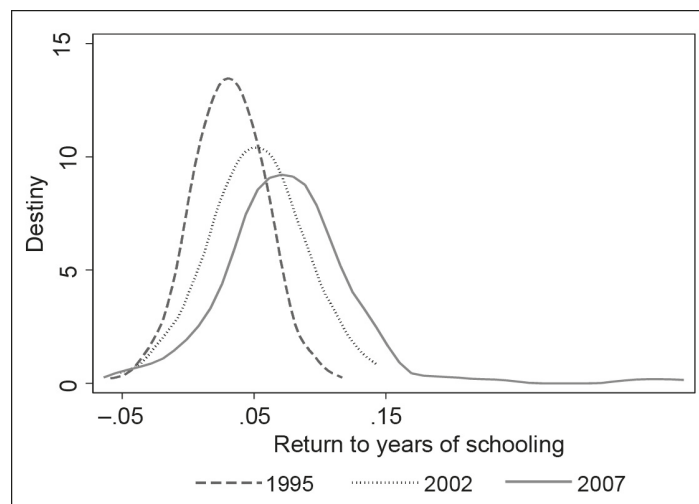
Notes:

1. For each province, an ordinary least squares regression of wage equations was run to obtain returns to education.
2. Experience, experience squared, gender, industry, and ownership dummies were controlled for.
3. In the first three columns, skilled labor includes those with university degrees (3 or 4 years) or above and technical school graduates. Those with high school degrees or below are classified as unskilled workers.
4. Numbers in parentheses are calculated by excluding the newly added provinces in 2007.
5. Coastal provinces are marked with "**".

Source: Author.

The estimate wage equations were also estimated for 62, 61, and 91 cities for 1995, 2002, and 2007, respectively, using the same specification as in model 1. After calculating the returns to education, their yearly kernel densities were estimated nonparametrically, each city being treated as an observation without using city population or employment as weight. The Epanechnikov kernel function was used, and the bandwidth was set at 0.02. The distributions are reported in Figure 10.⁶

⁶ Kernel densities of the returns to education were also estimated across cities using cities that were covered in all three surveys. While only 33 cities remained, and the estimates became less accurate, the regional distribution evolved in a similar pattern. It is not reported here due to space constraints.

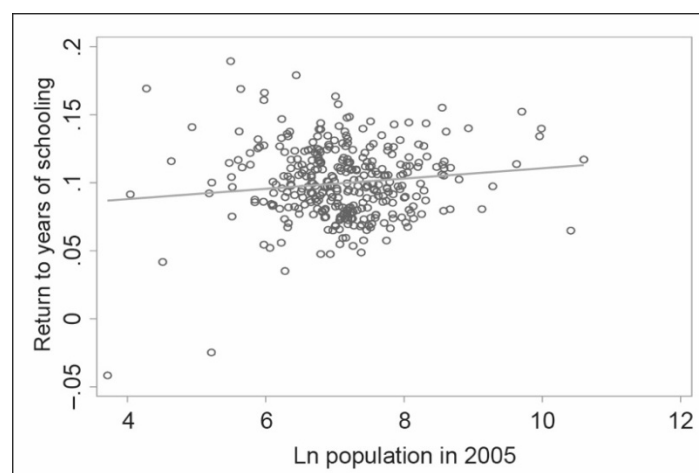
Figure 10: Distribution of Return to Years of Schooling at the City Level

Source: Author.

Apparently, they are nondegenerate in all 3 years. The distribution moves to the right and becomes more dispersed between 1995 and 2002. In the second period (2002–2007), it moves slightly to the right. A fatter right tail is observed in the 2007 distribution, which is likely due to the fairly high returns to education of some coastal cities.

Evidence from the 1% population survey in 2005. Using the 1% population survey of 2005, the returns to education for all prefecture-level cities were estimated. Using the sample for each city (i.e., individuals aged 22–55 years and out of school), regressions of the individual income in log terms on years of schooling, age, age squared, and gender were run.

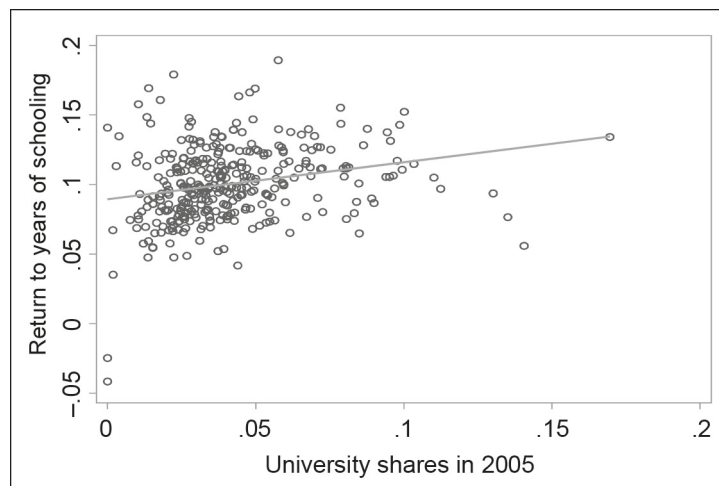
The estimated returns (i.e., the coefficients on years of schooling) show a large regional variation, with the returns for most cities ranging from 5% to 15%. The correlation between the returns to education and city size and the education level of the city population are particularly interesting. Figure 11 shows that the returns to years of schooling are positively correlated with city population; larger cities had higher returns. Of course, there is large heterogeneity in cities of similar size.

Figure 11: Returns to Education and Population, 2005

Source: Author.

Figure 12 also shows a positive correlation between the returns to years of schooling and the share of university graduates in a city.

Figure 12: Returns to Education and Share of University Graduates, 2005



Source: Author.

The fact that the returns to education have not been equalized across provinces and cities indicates that across-region mobility of skilled labor is insufficient to meet the regional demand shocks. Figure 13 provides further evidence supporting this conclusion.

The left panel of Figure 13 shows that around one-third of skilled workers were migrants in Beijing, Shanghai, and Guangdong, and over 10% of skilled workers in 23 provinces were migrants; these shares are much lower than those for unskilled workers, especially in coastal regions (i.e., right panel of Figure 13). Taking into consideration the large difference in the number of skilled and unskilled workers, skilled migrants were much lower in number than unskilled migrants.⁷

Figure 13 also reports the relationship between these shares and the real wages of skilled and unskilled workers. The results suggest that skilled workers were less responsive to regional income differentials than unskilled workers. While wage differences were much larger for skilled workers, their migrant share differences were lower than the share for unskilled workers.⁸

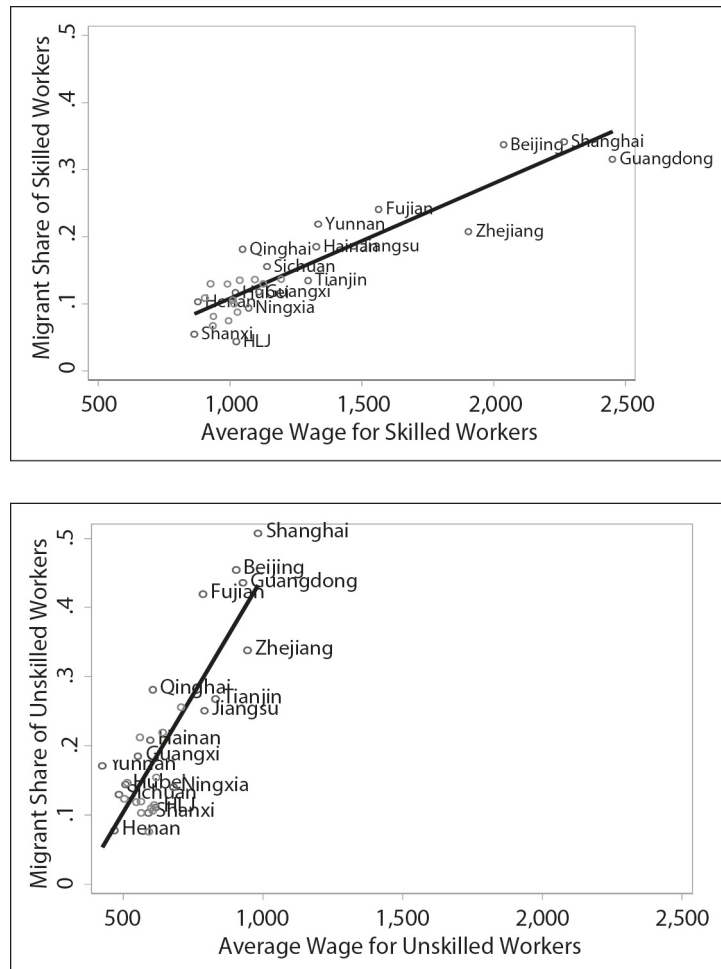
These results point to how university graduates should be allocated, favoring coastal regions over noncoastal regions. As it still poses high costs for a large proportion of skilled workers, relaxing the *hukou* system could also help facilitate the migration of skilled workers. Indeed, skilled workers seem to have a greater potential to move than unskilled workers. By 2007, they had larger regional wage differentials than unskilled workers. The expanded wage differentials mainly reflect local wage increases among

⁷ According to the calculation based on the 2005 1% population survey, the ratio of unskilled to skilled migrants is 5.8 to 1.0 in the urban labor market.

⁸ Regressing provincial incomes of skilled workers on migrant shares of skilled urban workers, a coefficient of 0.00017(0.000015) was obtained, which is much smaller than the results for unskilled workers, 0.00068(0.00008). Dropping Yunnan Province produced the results 0.00017(0.000014) and 0.00072(0.000080), respectively.

skilled workers in coastal regions, suggesting a lower geographic mobility among skilled workers.⁹

Figure 13: Relationship between Real Wages and Migrant Share of Skilled and Unskilled Workers



Notes:

1. Wages are deflated using provincial-level urban consumer price indexes.
2. The price levels for all provinces are normalized to one in 1995.
3. Skilled workers are those having degrees higher than high school and with positive wage income.
4. Migrants are those who have left their *hukou* registration location and have been working in another city for more than half of a year.

Sources: NBS (2005); China Statistical Yearbook (1997–2006).

Further, the results in Table 6 indicate that skilled migrant households had a stronger preference for permanent housing, social security, and public services that are closely related to *hukou* status.¹⁰ Panel A in Table 6 shows that skilled migrant households were more likely to purchase permanent housing rather than rent an apartment or live in construction site dormitories. Around 54% of the skilled migrant households purchased permanent housing, while only 24% of unskilled migrant households had. In

⁹ This is consistent with Topel (1986), which showed that the largest local wage adjustments occur among workers who exhibit the least geographic mobility.

¹⁰ Panel A uses the 2005 1% population survey; panels B and C use the floating population monitoring data for 2012 compiled by the National Health and Family Planning Commission.

large cities, the percentages for both skilled and unskilled migrant households were significantly lower than in small- and medium-sized cities, perhaps due to high housing prices and discrimination against migrant households.

Table 6: Migrants' Propensity to Purchase Housing and Willingness to Settle Down and Change *Hukou*
(%)

	Top 10 Largest	11th–50th	Remaining	Total
A: share of migrant household purchasing permanent housing (2005 1% population survey)				
Unskilled	17.54	24.05	30.80	23.92
Skilled	48.96	57.75	58.14	53.63
Total	24.53	30.07	35.27	29.61
B: share of migrant household willing to stay for 5+ years (2012 migrant survey data)				
Unskilled	64.49	57.28	57.23	59.34
Skilled	72.35	60.57	56.99	64.48
Total	66.11	57.74	57.20	60.13
C: share of migrant household willing to change <i>hukou</i> (2012 migrant survey data)				
Unskilled	60.37	45.64	41.55	48.48
Skilled	72.66	51.36	43.50	58.07
Total	62.90	46.44	41.78	49.95

Note: The skilled are households whose household heads have professional degrees or above.

Source: Author.

Panel B shows that 64% of the skilled migrant households were willing to stay in cities for over 5 years, while 59% of unskilled migrant households were willing to do so. Skilled migrant households had an even stronger willingness to stay in the top 10 largest cities relative to unskilled migrant households (72% versus 64%). For small cities, the percentages were roughly the same for both household types.

Panel C shows that skilled migrant households were more willing to change *hukou* registration than the unskilled. In the top 10 largest cities, 73% of skilled households wanted to change their *hukou* registration, and the percentage for the unskilled was 60%. The percentages were much lower in small- and medium-sized cities for both skilled and unskilled migrant households, and the difference between skilled and unskilled households became smaller as the city size decreases.

The difference in the willingness to settle down or convert *hukou* status may be due to the fact that migrants with higher education levels are better treated in destination cities. In some big cities, for example, migrants with university degrees are more likely to get an urban local *hukou*, perhaps providing an explanation for their greater willingness to settle down near their workplaces. If this is true, educated workers without local urban *hukou* would be willing to accept a job with lower wages in exchange for chances of converting their *hukou* in the future.

However, the results in Gagnon, Xenogiani, and Xing (2014) indicated that urban migrants (i.e., migrants with urban *hukou*) earn significantly more than urban native workers. One explanation is that urban residents who usually have higher education levels often need to sacrifice *hukou*-related benefits in their origin *hukou* registration locations to move to other places. They must thus be compensated in monetary terms

to make a move. An alternative explanation is that workers must earn significantly more than local workers to pay for local *hukou*-related services, but this latter explanation is less likely to hold because a wage premium for rural migrants was not observed. Either explanation means that the wage premium for urban migrants actually indicates high opportunity costs for educated workers in migration. Finally, the fact that there are many skilled migrants without local *hukou* suggests that the *hukou* system restricts the mobility of skilled migrants.

These results again suggest that relaxing the *hukou* system, particularly the *hukou* restriction in large cities, would encourage more skilled rather than unskilled workers to move to cities with high skill premium. Such reforms will not only let skilled workers respond to regional demand changes but also help reduce inequality in high-premium cities. This, of course, does not mean that the mobility of unskilled workers should be restricted, nor does it mean that the current restriction on the mobility of unskilled workers needs not be reformed. On the contrary, given the complementarity between skilled and unskilled workers and the shortage of migrant workers, *hukou* restrictions should also be relaxed for unskilled workers.

3.3 Externalities of Human Capital

Although there is more recent literature on estimating external returns to education, little is known about this aspect of human capital in the PRC, except through studies like Liu (2007) and Glaeser and Lu (2013). Both studies found that external returns to education in cities are significantly high. Liu (2007) used CHIP data from 1988 and 1995 and found that the external returns are at least as high as private returns to education. In particular, OLS estimates of the external returns ranged from 4.9% to 6.7%. He also used the compulsory education law as an instrumental variable. The two-stage least square estimates indicated that a 1-year increase in city average education could increase individual earnings by between 11% and 13%.

Glaeser and Lu (2013) utilized more recent data and employed another strategy to address the endogeneity issue. Using university relocation in the 1950s as an instrumental variable, they found that the external returns to education in urban PRC are large—the OLS regressions showed that 1 more year in city-level education leads to a 11.9% increase in hourly wage. After using IV, the human capital externality rose to 21.9%, almost twice of the OLS estimates. The change in the estimate of human capital externality is greater for the most skilled workers.

Thus, given large external returns to education, governments should subsidize human capital investment. Whether local (i.e., provincial) or central governments should fund this subsidy depends on the mobility of educated workers. If the educated workers are highly mobile (similar to many developed countries like the United States), the central government should take more responsibility in subsidizing higher education. If, on the other hand, highly educated workers tend to stay where they obtain their education, local governments should share more responsibility.

Disregarding the financing of higher education, local governments should create measures to attract educated workers. Such measures include relaxing *hukou* restrictions to reduce the cost of moving, industrial policies that can create jobs for educated workers, and also efforts to provide more amenities valued by educated workers (e.g., cleaner air, quality education, museums, and libraries).

4. HUMAN CAPITAL AND URBAN DEVELOPMENT

4.1 Selectivity of Rural–Urban Migration

In the 2002 urban survey of CHIPS, urban residents were asked when they received urban *hukou*. Those who answered with a specific year were, of course, former rural residents who had successfully obtained urban *hukou*, helping identify permanent migrants. As shown in Table 7, around 20% of urban residents were not born with urban *hukou*, among whom over one-half obtained urban *hukou* within the last 2 decades, a figure consistent with the fact that the *hukou* system has become less restrictive.

Table 7: Permanent Migrants
(%)

Time of Obtaining Urban <i>Hukou</i>		Ways Former Rural Residents Get Urban <i>Hukou</i> (%)							Total
		Education	Cadre Promotion	Join Army	Lose Land	Buy Housing	Others	Missing	
Born urban	16,278	–	–	–	–	–	–	–	–
–1950	133	18.05	8.27	15.79	2.26	9.02	37.59	9.02	100
1951–60	509	28.29	4.91	13.36	0.59	3.93	40.86	8.06	100
1961–70	484	18.18	3.93	31.82	1.45	2.27	33.88	8.47	100
1971–80	839	23.60	4.53	14.18	2.86	1.91	49.70	3.22	100
1981–90	1,312	33.16	1.45	5.34	8.08	3.96	43.45	4.57	100
1991–	884	16.52	0.68	2.71	12.44	7.81	53.05	6.79	100
Missing	193	–	–	–	–	–	–	–	–
Total	20,632								

Source: Author.

Table 7 also describes channels through which rural residents obtained urban *hukou*. The largest share obtained it through formal education, and the second-largest share through joining the military. Other channels take up a relatively small share of the permanent migrant population.

Different channels of *hukou* conversion play different roles in different time periods.¹¹ Among those who obtained urban *hukou* in the 1980s, more than 30% did so through education. Even during the 1960s, when joining the military was the major channel, more than 18% of permanent migrants still obtained their *hukou* via education. Membership in a cadre and joining the military both played smaller roles. From the 1970s to the 1990s, the number of rural residents who gained urban *hukou* after having their lands occupied or after purchasing housing in urban areas grew significantly, from less than 5% to more than 20%.

In the next analysis, data were restricted to individuals aged 18–60 years¹² who were not in school. The share of the rural and urban samples remained almost unchanged. To avoid the endogeneity problem of education, permanent migrants who obtained urban *hukou* under the age of 16 years were dropped. Next, the subsamples were compared with the first two (i.e., urban natives and permanent migrants) having

¹¹ Nearly one-half of the permanent migrants did not report how they obtained their urban *hukou*. Here, only those who reported this information were considered.

¹² The results were unaffected by increasing the cut-off age to 22 years. When using per capita income, all dependents were included in the calculations.

urban *hukou* and the last two (i.e., rural residents and temporary migrants)¹³ having rural *hukou*.

Table 8: Rural and Urban Residents and Migrants Aged 18–60 Years

	A: Male				B: Female			
	Urban Residents		Rural Residents w/o Migrants		Urban Residents		Rural Residents w/o Migrants	
	Natives	Migrant w/ <i>Hukou</i>		Migrant w/o <i>Hukou</i>	Natives	Migrant w/ <i>Hukou</i>		Migrant w/o <i>Hukou</i>
Years of schooling	11.14	11.67	7.67	8.18	10.65	9.9	6.33	7.52
By education level								
Primary and below	0.03	0.05	0.27	0.19	0.06	0.13	0.50	0.31
Middle school	0.29	0.20	0.53	0.60	0.30	0.33	0.40	0.55
High school	0.39	0.31	0.18	0.19	0.42	0.35	0.10	0.13
College and above	0.29	0.44	0.02	0.02	0.22	0.19	0.01	0.01

Note: High school includes professional schools.

Source: Author.

Panel A of Table 8 presents statistics for men. Urban natives and rural residents (without migrants) are first compared. The urban natives were better educated than rural residents, with the average number of years of schooling for the two groups being 11.1 and 7.7, respectively. In terms of age, ethnicity, and political status, urban natives were older, less likely to be minorities, and more likely to have party memberships. Finally, around 81% of urban natives had wage incomes in 2002, while this percentage was only 42% for rural residents.

Migrants without local urban *hukou* were slightly more educated than rural residents, much younger, and less likely to have party memberships. Among permanent migrants, more than 40% had an education above a university degree—a figure much higher than that for urban natives. Permanent migrants' share of party memberships was also much higher than that of urban natives. The dissimilarities are more significant when comparing permanent migrants with rural residents. These characteristics indicate that permanent migrants were positively selected, and that the selection effect was larger for permanent migrants than for temporary migrants.

Panel B of Table 8 presents the statistics for women. The contrasts between rural women and urban women are similar to those between rural and urban men. Urban women had higher levels of education, were less likely to be minorities, and were more likely to be party members and wage earners. However, for female urban residents, the differential patterns for natives and migrants were dissimilar to those for men. Both the migrants' education level and labor participation rate were slightly lower than those of their urban native counterparts, and their likelihood of being party members was almost the same as that of the natives.

Table 9 gives summary statistics for wage earners (workers). Wage earners had slightly higher levels of education than the whole sample, especially women. The contrasts between urban and rural residents, and between urban natives and permanent migrants, are similar to those presented in Table 8. Because the labor participation rate was relatively high for urban residents and migrants, statistics for wage earners are similar to those in Table 8.

¹³ The rural resident sample did not include migrants.

Table 9: Summary Statistics for Wage Earners Aged 18 to 60 Years

	A: Male				B: Female			
	Urban Natives	Migrant w/ <i>Hukou</i>	Rural Local Workers	Migrant w/o <i>Hukou</i>	Urban Natives	Migrant w/ <i>Hukou</i>	Rural Local Workers	Migrant w/o <i>Hukou</i>
Years of schooling	11.42	12.06	8.00	8.16	11.51	11.12	7.60	7.64
By education level								
Primary and below	0.02	0.04	0.21	0.19	0.02	0.04	0.33	0.30
Middle school	0.26	0.16	0.54	0.60	0.20	0.25	0.44	0.56
High school	0.39	0.30	0.23	0.19	0.47	0.41	0.21	0.13
College and above	0.33	0.49	0.02	0.02	0.31	0.30	0.02	0.02

Note: High school includes professional schools.

Source: Author.

The above analysis used CHIPS data for 2002, which were relatively old. However, the evidence is consistent with the existence of positive selection in recent years. First, categories like buying a house and losing land have become increasingly important. Although migrants of these categories were less educated than those who changed their *hukou* status through the educational channel, they remain positively selected from the rural population. Second, as shown previously, the rural population had an extremely low share of university graduates, and this situation has improved only marginally since the early 1990s.¹⁴ Meanwhile, the number of rural high school graduates taking university entrance exams has increased dramatically since the late 1990; thus, there must have been positive selection in recent years. Third, the returns to education (both private and external) were significantly lower in rural than in urban areas, which provided an incentive for more educated workers to migrate to cities.

The selectivity in migration has a major impact on the pattern of urbanization. One major implication for education policy in urbanization is that education for rural residents is important because they constitute a reservoir for urban population growth. Improving the quality of rural education should be a policy priority given the large rural–urban gap in this aspect. One alternative is to let rural children be educated in cities, but the financial and psychological costs are usually high, especially for primary and secondary education.

4.2 Higher Education Expansion Promotes Urbanization

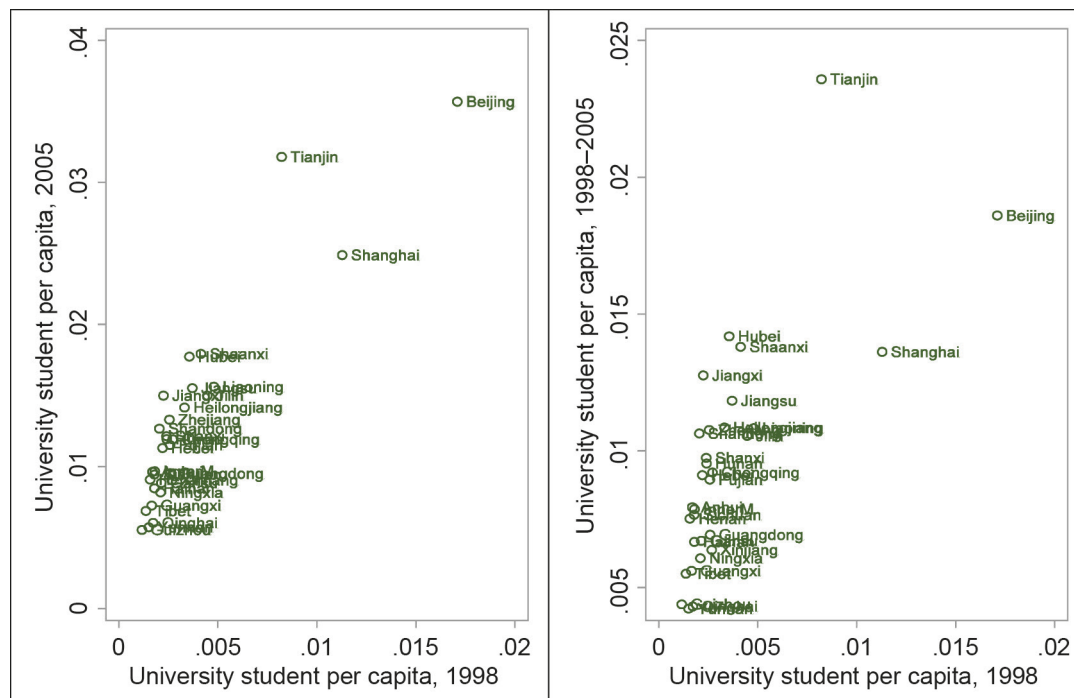
As mentioned earlier, the PRC's higher education expansion not only increased the education levels of the labor force but also accelerated the urbanization process. It had differential impacts not only on the education levels of both rural and urban areas but also on the education levels and development across different regions. To see these effects more clearly, the facts that higher education plays an important role in helping rural residents obtain urban *hukou* and that higher education expansion is unevenly distributed across provinces are taken into consideration.

Figure 14 shows the number of university students per capita in different provinces between 1998 and 2005. The left panel indicates that the number of students in universities is strongly correlated between 1998 and 2005, and the education expansion since 1999 increased rather than reduced the regional gap in the number of students. The right panel shows that the more students that a province had in 1998, the larger the increase in that province between 1998 and 2005. This feature is mainly

¹⁴ While the share of university graduates increased from 7% to 18% in urban PRC between 1993 and 2006, the same for rural PRC only increased from 0.1% to 1.3%.

driven by the facts that higher education expanded by increasing the admission quota of existing universities (rather than establishing new universities).

Figure 14: Number of University Students in School and Changes between 1998 and 2005, by Province



Source: Author.

In a recent empirical study, Xing (2013) explored this regional variation in higher education expansion and found that this policy significantly increases the probability of an urban resident having a university degree. The research suggested that the probability of rural residents going to university also increases significantly and those who were admitted to universities stay on in urban areas. Without higher education expansion, they may not have migrated out of rural areas or may have worked in urban areas as “peasant workers” rather than in the formal sector. Therefore, education expansion is a major policy instrument that facilitates the PRC’s urbanization process.

In this sense, education policy should offer equal education opportunities for rural residents who are the major source of urban population growth. This policy could potentially guarantee qualified skilled workers for urban growth. For youth from rural PRC, 3–4 years of university education also means a process of assimilation. Other policies that could help university graduates find jobs should also be designed. In particular, graduates from rural areas should not be discriminated against in finding jobs in urban labor markets.

5. OTHER EDUCATIONAL ISSUES IN URBANIZATION

The PRC’s urbanization has created various challenges in human capital development, sometimes at the price of sacrificing or threatening the human capital of the next generation. Many of these problems are caused by institutional arrangements, in particular the *hukou* system and fiscal arrangement.

Due to the restrictions of the *hukou* system, the majority of rural migrants in cities do not have access to pensions, health care, public education, and other social benefits at the place that they live. The number of migrant children aged 6–14 years in cities is estimated at 20 million. However, funding for elementary education is mainly determined by the number of children with local *hukou* and is not portable across administrative units. Therefore, local authorities lack incentives and financial resources to accommodate migrant children in public schools. Three options, instead, are available for migrant families: (i) they can send their children to local public schools (although school-choice fees are sometimes required), (ii) they can send them to privately run migrant schools (which are often poorly run), or (iii) they can leave their children at home in the custody of relatives.

Literature has been trying to assess the impact of migration behavior on children's human capital. Chen and Feng (2013) found that migrant students who are unable to enroll in public schools perform significantly worse than their counterparts in both Chinese and mathematics. An earlier study by Liang and Chen (2007) also showed that temporary migrant children are much less likely to be enrolled in schools compared with local children.¹⁵ Goodburn (2009) concluded that administrative and financial barriers, as well as discrimination, prevent migrant children from entering public schools, and temporary migrants with less than 1 year of residence in cities suffer the most.

In recent years, the urban population increased dramatically in many cities, especially in the large ones. Due to inelastic housing supply in urban centers, most newly arrived migrants live in suburban or newly converted urban areas, where the public schools or newly established migrant schools are of low quality. On the contrary, quality education resources tend to be distributed in urban centers. As a consequence, spatial sorting in terms of both residence and education emerges. Breaking this spatial sorting and promoting equal distribution of education resources are major policy challenges necessary for many large cities.

6. HEALTH AND URBANIZATION

Urbanization and health also influence each other significantly. Economists have realized that better health can improve productivity and income levels (Strauss and Thomas 1998). Economic development, urbanization in particular, can impact health, either positively or negatively, through several channels: (i) higher income with urbanization enables individuals and households to invest more in nutrition and health; (ii) better health facilities help urban residents improve health; (iii) living conditions for migrants are generally disadvantaged; (iv) migrant workers tend to work in economic sectors that are bad for their health or have higher risks (e.g., construction); (v) newly arrived migrants bear psychological scars because of new environments and possible discrimination against them; and (vi) urban areas have higher risks of epidemic diseases. This section will examine the issues regarding the relationship between health and urbanization, paying particular attention to issues related to migrant workers.

¹⁵ However, perhaps somewhat surprisingly, permanent migrant children are more likely to be enrolled in schools than local children, largely due to the highly selective nature of their parents.

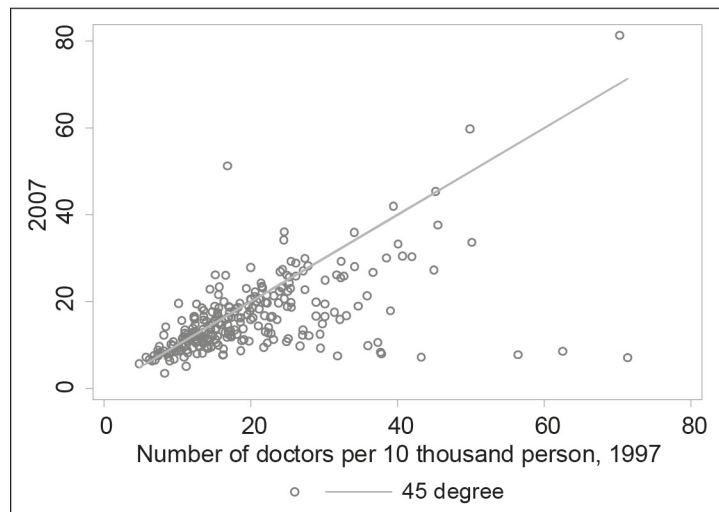
6.1 Health Facilities and Inelastic Supplies

In contrast to the tremendous expansion in education, the PRC's health services sector has not witnessed significant growth in the last 2 decades. Figure 15 shows the number of hospitals, hospital beds, and doctors in different cities in the PRC in 1997 and 2007.

Figure 15: Growth in Health Sector, 1997–2007



continued on next page

Figure 16 continued

Sources: NBS (1998), NBS (2008).

6.2 Urbanization, Migration, and Health

6.2.1 Living Conditions

Migrants face high living costs, which can affect their health. Table 10 shows that a majority of migrant households lived in rented apartments provided by private landlords. Very few (i.e., less than 10%) could afford to buy an apartment. Importantly, although the income levels increased for migrants between 2005 and 2010, their living conditions have not improved.

Table 10: Sources of Housing for Migrants

		2005	2010	
Purchased	Commercial	6.45	Commercial	6.74
	Affordable	0.97	Affordable	1.08
	Former public housing	2.23		
Self-constructed	Self-constructed	4.54		
Rent	Public	10.55	Provided by unit	6.47
	Commercial	56.29	Provided by government	0.08
			Private	75
Free			Free (by unit/government)	7.56
Other		18.97	Other	3.07
Total		100		100
Obs		106,381		215,764

Sources: Li (2013).

Facilities inside living quarters were also examined to determine the living conditions of migrants. Around 30% of the migrant households lived in houses without toilets, and another 40%–50% lived in places with shared toilets. This reflects the poor living conditions of migrants (Table 11).

Table 11: Availability and Type of Toilet in Migrant Housing (%)

	2005	2010
Toilet (self-use)	34.87	37.13
Shared toilet	7.54	11.4
Other type (self-use)	15.25	10.94
Other type shared	11.07	12.9
No toilet inside	31.28	27.62
Total	100.01	99.99

Source: Li (2013).

Next, living area space of migrant households was examined (Table 12). In 2005, the average living area for those living in rented rooms was around 12 to 13 square meters. According to Li (2013), around 30% of migrant workers' living area per capita was below 6 square meters, which is the poverty line in terms of size of living area.

Table 12: Living Area per Capita for Migrant Workers, 2005 and 2010

2005			2010	
Purchased	Commercial	26.86	Commercial	24.97
	Affordable	22.77	Affordable	22.25
	Former public housing	19.53		
Self-constructed	Self-constructed	26.16		
	Public	12.06	Provided by unit	12.59
Rent	Commercial	12.66	Provided by govt	13.76
			Private	12.35
Free			Free (by unit/govt)	10.3
Other		8.57	Other	19.63

Source: Li (2013).

From 2005 to 2010, living areas increased slightly for those renting houses, but for those living in purchased housing, the area actually decreased slightly, possibly due to the increased housing prices in many cities.

Generally, the living conditions for migrants are poor, which may have a negative impact on their health (Niu et al. 2011; Wang, Su, Wen 2011).

6.2.2 Health Insurance

Due to the *hukou* system, many migrant workers are disproportionately distributed in the informal sector, with many not covered by health insurance. Table 13 shows that according to the 2005 1% population survey, less than 10% of migrant workers working in the informal sector (i.e., self-employed or those without formal labor contracts) had medical insurance. The situation is better if they had jobs with formal contracts, with the share increasing to 71%. For urban residents with local *hukou*, 54% of this population had medical insurance. If urban residents with formal contracts are examined, around 60% had health insurance. Urban migrants who had urban *hukou* but migrated lie in between, with less than 20% of people working in the informal sector having medical insurance.

Table 13: Share of People with Health Insurance, 2005
(%)

	Total	Employees with Formal Contract	Self-Employed	Employees without Contract
Urban residents	54	59	19	48
Rural migrants	15	29	6	7
Urban migrants	36	52	16	17

Source: NBS (2005).

Table 14 shows that fewer than 20% of rural migrant workers had health insurance in urban areas, and the situation improved only slightly in recent years.

Table 14: Share of Rural Migrants with Health Insurance, 2008–2012
(%)

	2008	2009	2010	2011	2012
Urban medical insurance	13.1	12.2	14.3	16.7	16.9
Urban insurance for injuries	24.1	21.8	24.1	23.6	24.0

Source: NBS (2013).

A major issue is that insurance is largely confined within the locality of the workplace. By 2010, most rural residents were covered by the New Rural Cooperative Medical scheme, and migrants were covered in their respective *hukou* registration places. If a migrant must visit a hospital in another county, he or she must pay first. The cost is later reimbursed by the insurance from his or her *hukou* registration place, but the process is usually complicated and time-consuming.

6.2.3 Health Consequences of Migration

Health and migration behavior are closely related. Empirically, researchers have examined the effect of migration on health by comparing the health conditions of migrant workers and urban residents or rural nonmigrant residents. Zhou and Lu (2014) found that migrant workers' health is significantly better than that of urban natives (Table 15).

Table 15: Self-Reported Health of Migrant Workers and Urban Natives

	Whole Sample N = 3,439	Rural Migrant Workers N = 668	Urban Native Workers N = 2,771
Self-reported health	3.99 (0.94)	4.12 (0.89)	3.96 (0.94)

Notes:

1. Rural migrant workers are those with rural *hukou*, but are working outside or have returned temporarily.
2. Urban native workers are those with urban *hukou* who are working.
3. Self-reported health takes values from 1 to 5, representing poor health, fairly poor, so-so, fairly good, and excellent.
4. Standard deviations are in parentheses.

Source: Zhou and Lu (2014).

This, however, is a selection effect; rural people migrating to cities tend to be younger and healthier. This is clearer in Table 16, where health conditions are reported by age group. In most of the cases, self-reported health was actually better for rural migrants than for urban native workers.

Table 16: Self-Reported Health of Migrant Workers and Urban Natives by Age Group

Age	Migrant Workers		Urban Native Workers	
	No.	Health	No.	Health
<=30	230	4.42 (0.77)	589	4.31 (0.81)
31–40	209	4.06 (0.85)	843	4.10 (0.85)
41–50	152	3.91 (0.93)	796	3.86 (0.94)
51–60	62	3.74 (1.04)	418	3.60 (1.03)
>=61	15	4.07 (0.96)	123	3.24 (0.95)

Notes:

1. Rural migrant workers are those with rural *hukou*, but are working outside or have returned temporarily.
2. Urban native workers are those with urban *hukou* who are working.
3. Self-reported health takes values from 1 to 5, representing poor health, fairly poor, so-so, fairly good, and excellent.
4. Standard deviations are in parentheses.

Source: Zhou and Lu (2014).

The selection process happened not only at the beginning but also after migrants arrived in urban areas. Among migrants, those suffering from poor health who tended to return home (early) after spending some time in urban areas. Table 17 shows that over 80% of migrant workers in bad health returned home; this share was around 50% for those in good health.

Table 17: Health and Return Migration

	No.	Share of Return Migrants
Healthy	532	0.49
Fairly healthy	565	0.56
So-so	315	0.64
Fairly poor	170	0.81
Poor	36	0.92

Notes: Migrants are defined as those working outside of *hukou* registration, those who return temporarily to their place of *hukou* registration, and those who return permanently to their place of *hukou* registration. The last category is regarded as returnees.

Source: Zhou and Lu (2014).

In addition to the selection effect, working conditions in specific industries in urban areas tend to have negative effects on the health of migrant workers. Zhou and Lu (2014) found that the health of those working in the construction industry tends to deteriorate more rapidly than that of urban residents. Niu (2013) also found that the migration experience can be detrimental to migrants' health. Thus, if health is thought of as another type of human capital, the depreciation rate is higher for migrant workers.

More literature has examined the effect of migration on the health of two groups of children (i.e., migrant and "left-behind" children). Xu and Xie (2013) investigated the effect of migration on children's well-being, finding that migration may be a double-edged sword. On the one hand, migration to cities exposes children to an urban environment that is characterized by new ideas, more permissive social norms, expanded peer networks, quality schools, nutrition-rich food, and modern hospitals. In these respects, migration can be an empowering experience for children. On the other hand, migrant children are confronted with the challenge of assimilating into a new social environment, which is somewhat alien to and perhaps even discriminatory toward them. The study also pooled origin–destination child samples to form

appropriate comparisons and applied propensity score-matching methods to estimate the average treatment effects, finding significant positive effects of child migration on their objective well-being but no negative effects on their subjective well-being. It also found little difference between the left-behind and nonmigrant children across multiple life domains, highlighting the important role of migration in narrowing the long-standing rural–urban gap in child development in the PRC.

Ren and Treiman (2013) looked at the effect of migration on left-behind children's emotional well-being. While the expected effect was negative, the empirical results suggested that migration did not affect the health of “left-behind” children.

7. POLICY IMPLICATIONS

Human capital is an important factor in the urbanization process. Policies and institutional arrangements during this process also influence the human capital of both rural and urban residents. According to the analysis, several policy implications emerge:

- (i) The *hukou* system is still a major barrier to the mobility of the labor force and needs to be reformed. Both rural and urban migrant workers seem to be hindered by this system, as it seems that the system has higher costs for unskilled workers.
- (ii) The provision of both educational and health services are inelastic to the emerging demand in cities, especially large cities. Institutional reforms (including *hukou*) are needed to make the supply more elastic to surging demand. Private investment should be encouraged, and the government should subsidize and supervise such investment.
- (iii) The central government should take more responsibility in financing education at various levels, because education has externalities, and educated workers are highly mobile across regions. Education and health resources should also be allocated more equally across regions.
- (v) Housing is also a major obstacle for migrants, as poor housing is a major factor impacting migrants' health. The housing supply should be more elastic, and the current land regime should be reformed.
- (vi) Rural areas are and will still be the reservoir of labor force in the urbanization process. Thus, education and medical services in rural areas should be improved, and a portable, nationally coordinated health care system established.

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