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Urbanization and rural development in the People's Republic of China

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ADB Working Paper Series

**URBANIZATION AND RURAL
DEVELOPMENT IN THE PEOPLE'S
REPUBLIC OF CHINA**

Zhao Chen, Ming Lu, and
Pengtu Ni

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Abstract

This paper presents research findings on how urbanization enhances productivity and economic growth in both urban and rural sectors. Through agglomeration effects, employment opportunities and income levels can largely increase. In addition, the mechanisms of sharing, matching, and learning are much stronger in cities, especially large cities. However, in the People's Republic of China (PRC), urbanization lags far behind industrialization. Institutional barriers against rural-to-urban and interregional migration, such as the *hukou* system, have reduced the ability of urban growth to absorb rural labor. As for rural development, urbanization has propelled agricultural productivity, rural income, and consumption levels. Moreover, agricultural productivity is driven to a large extent by capital accumulation, through capital deepening and remittance. Agricultural organizations, urbanization, and outflow of migrant workers make it possible for large-scale production and agricultural mechanization to occur.

JEL Classification: O14; R11; E23

Disclaimer: ADB recognizes "China" as the People's Republic of China.

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1. INTRODUCTION

With reforms and the opening up of the economy, the People's Republic of China (PRC) has experienced unprecedented economic growth and progress over the last 30 years. In this process, cities have acted as the centers of economic activities and pushed economic growth to high levels. The urbanization process tends to result in further agglomeration of economic activities. This chapter presents research findings on how urbanization enhances productivity and economic growth in both rural and urban sectors. Specifically, we explore the relationship between urbanization and economic advancement. As urbanization plays the key role in agglomeration effects and cities make a major contribution to the growth of manufacturing and services, the PRC's levels and pace of urbanization need to be carefully considered to assess urbanization's economic sustainability and potential. According to the "dual economy theory" proposed by Lewis (1954), in the urbanization process, industrialization and urbanization levels should rise simultaneously to make capital accumulation and the transition of rural labor to industrial sectors possible. However, in the PRC, urbanization lags far behind industrialization and we examine this gap to determine how better and healthier urbanization can be achieved. This chapter also examines how urbanization, migration, and remittance affect productivity, capital investment, and agricultural organizations in rural areas.

2. EMPIRICAL EVIDENCE ON URBAN AGGLOMERATION ECONOMIES AND ECONOMIC GROWTH

2.1 Growth and Productivity

2.1.1 Relationship between Urbanization and Economic Growth

Urbanization enhances economic growth. At the global level, the urbanization rate and gross domestic product (GDP) per capita are positively related, but the position of the PRC is below the average level and the 95% confidence interval, which means its urbanization lags behind its development stage by about 10 percentage points (see Figure 1).¹ Though the PRC suffers from lagged urbanization, its urbanization is positively related to economic development, measured by average wage at the city level (see Figure 2).

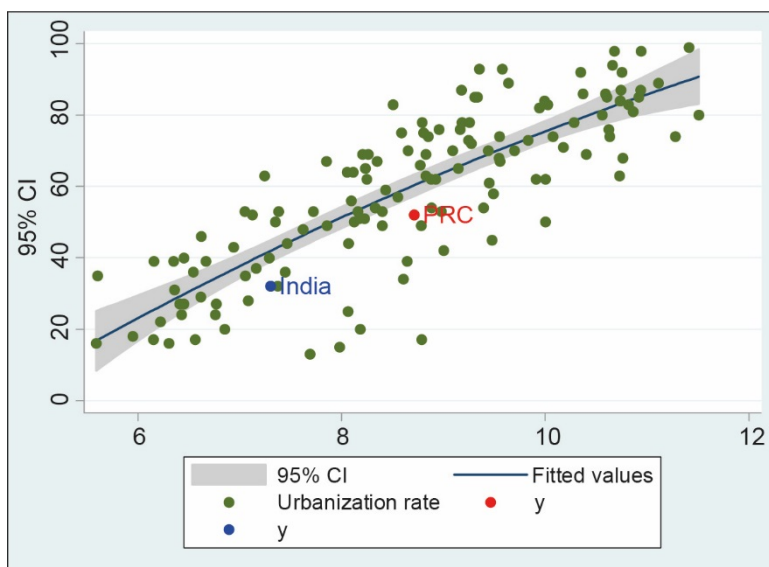
2.1.2 Relationship between Urbanization and Economic Growth

Though the relationships in Figures 1 and 2 are only correlations, endogenous growth theory and new economic geography theory argue that cities have the advantages of specialization and diversity, as well as human capital accumulation based on knowledge spillover and information exchange. Specifically, urbanization drives the expansion of cities in terms of numbers and area, and hence produces agglomeration effects. Firstly, transaction costs are reduced and transaction efficiency is markedly improved, which provides a stimulus for production and economic growth. Secondly, by attracting concentrations of industries and populations, cities have been centers for knowledge spillover and technological innovation. The concentration of population and

¹ India is also below the average level and the 95% confidence interval, as can be seen in Figure 1.

economic activities makes it easier for producers and labor to utilize the externalities of technology and knowledge to improve productivity and impel capital formation.

Figure 1: Global Comparison of Urbanization and GDP per Capita in 2012

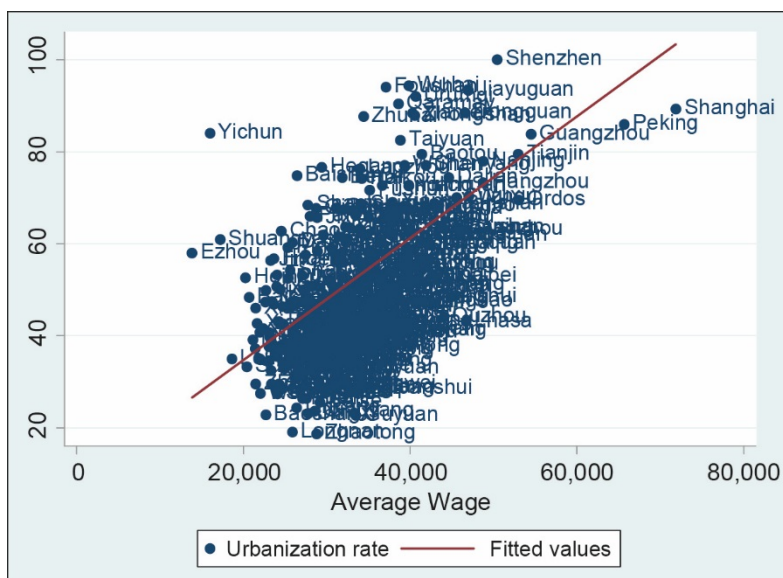


GDP = gross domestic product; CI = confidence interval; PRC = People's Republic of China.

Notes: X-axis: Urbanization rate in %; Y-axis: log(GDP per capita in current US\$). Liechtenstein and Monaco are outliers. Typical city-states including Singapore; Vatican City; Malta; Di San Marino; and the Maldives, and two Special Administrative Regions of the PRC (Hong Kong, China; and Macao, China) have been eliminated.

Source: Data is from the 2012 urbanization rate and GDP per capita is from the World Bank Database.

Figure 2: The PRC's Urbanization Level and Average Wage in 2010



PRC = People's Republic of China.

Notes: X-axis: urbanization level in %; Y-axis: annual average wage in yuan.

Source: Urbanization rate is computed from the national population census (2010); average wage comes from *China City Statistical Yearbook* (2011).

As in other countries, the PRC's urbanization also serves as the impetus for urban agglomeration economies, increasing employment opportunities and raising income levels.

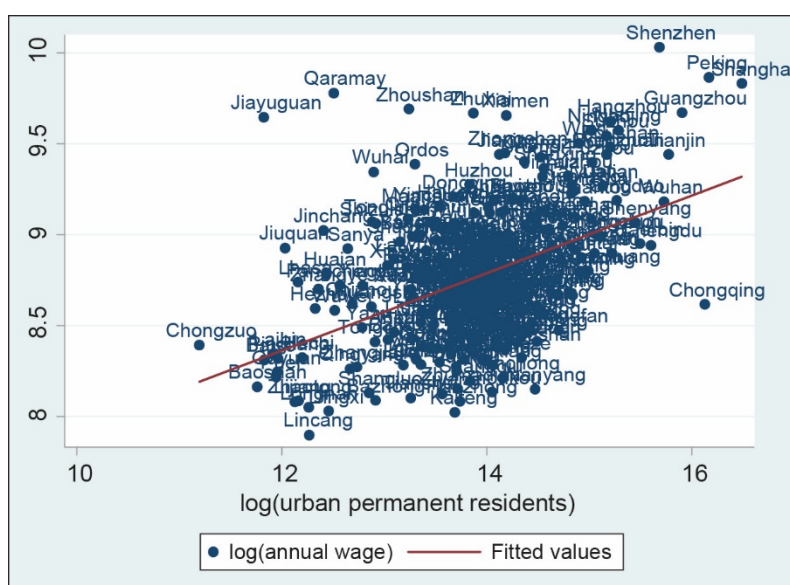
2.1.3 City Size and Employment Opportunities

An urban agglomeration economy can raise employment through two main channels. On the one hand, agglomeration improves labor productivity, thus driving labor demand. On the other hand, the rise of urban income increases demand for non-tradable commodities and expands job opportunities in non-tradable industries, especially in cities with more high-skilled labor. High-skilled labor requires low-skilled services, resulting in a “consumption spillover” to low-skilled labor. So high-skilled and low-skilled labor can both benefit from growing cities. Urban size has a positive influence on individual employment (Lu et al. 2012). A 1% rise in city population increases one's employment probability by between 0.044 and 0.050 percentage points. This positive effect is mainly due to the concentration of high-skilled workers in large cities. Ultimately, both high-skilled and low-skilled workers can benefit from the expansion of cities.

2.1.4 Urban Size and Wage Level

The higher wage in larger cities is a reflection of their productivity gains. The average output and wage level are higher in big-sized cities than in small-sized cities (Sveikauskas 1975). The doubling of city size will increase productivity of labor by 4.77%–6.39%. The relationship between urban size and labor productivity also holds in the PRC. Au and Henderson (2006) pointed to an “inversed-U shape” relationship between urban size and income per capita, indicating a positive relationship in the early stages of city development. Figure 3 shows the positive relationship between city size, measured by the number of urban permanent residents, and annual wage. Unlike the findings of Au and Henderson (2006), Figure 3 does not show an inversed-U shape relationship between city size and wage, but a linear one.

Figure 3: City Population Scale and Average Wage



log = logarithm.

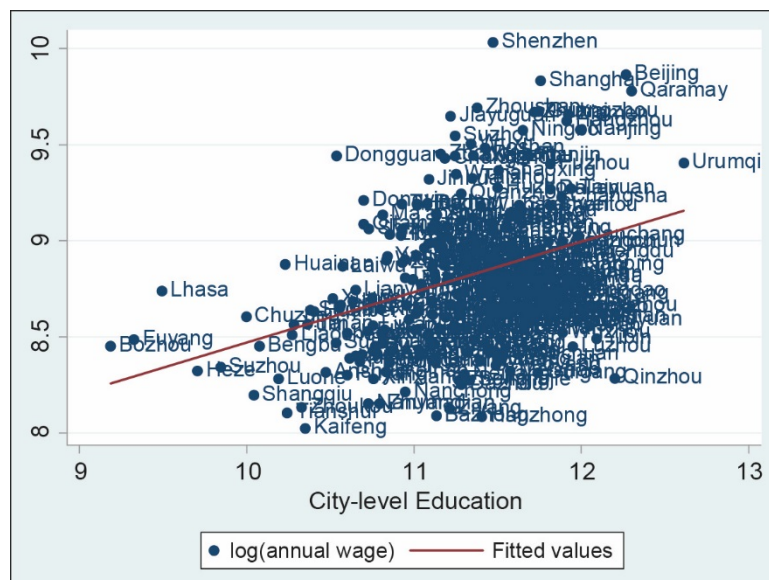
Note: Y-axis: log(annual wage); X-axis: log(urban permanent residents).

Source: The data for “urban permanent residents” is from the 2000 national population census; “annual wage” is computed from the 2005 national population census.

2.2 Sharing, Matching, and Learning

Urban agglomeration can largely improve labor productivity through the mechanisms of sharing, matching, and learning. Through these mechanisms, enterprises can reduce production costs by achieving economies of scale. Big cities supply more diversified products to meet the demands of consumers. Workers find it easier to get jobs, gain experience, and acquire knowledge in big cities. Of the three mechanisms of sharing, matching, and learning, sharing in cities has resulted in economies of scale, especially for transportation infrastructure facilities, and diversified consumer goods. As the benefits of sharing are more obvious, recent empirical research has focused on the mechanisms of matching and learning.

Figure 4: City-Level Education and Annual Wage in 2005



log = logarithm.

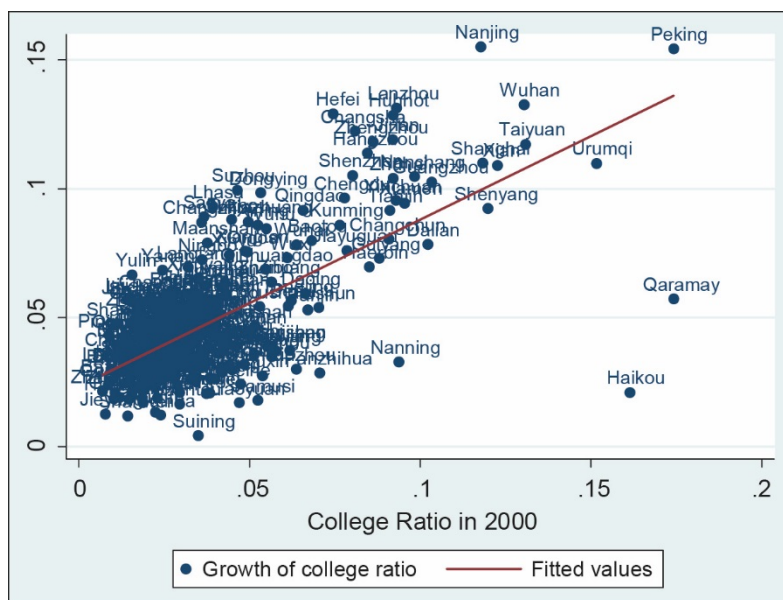
Note: Y-axis: log(annual wage); X-axis: log(city-level education).

Source: Annual wage and average education levels are computed from the 2005 national population census.

Due to social interactions, the expansion of urban size, especially the agglomeration of high-skilled laborers, provides more learning and market opportunities for workers, thus improving the productivity of labor. “Human capital externalities” is an effect of the learning mechanism, which is significant for educational returns. This not only improves individual education levels but also average education levels or the prospects of the highly educated population in a particular area, usually a city, thus promoting individual wages. Empirical studies have proved the existence of human capital externalities (Rauch 1993). In the United States, a 1% increase in the university graduate ratio can boost labor productivity by 0.6%–0.7% (Moretti 2004a) and wage level by 0.6%–1.2% (Moretti 2004b). In the PRC, cities with a more educated labor force also have higher incomes. An additional 1 year of city-level education increases the individual hourly wage by 22.7% (Glaeser and Lu 2013). Figure 4 presents a positive correlation between city-level average education and workers’ annual wage in the PRC. As big cities have greater effects of human capital externalities, they attract more high-skilled labor. Moretti (2004c) and Glaeser and Ponzetto (2010) found that cities with higher proportions of high-skilled professions experience larger increases in the proportion of high-skilled professions. In the PRC, college graduates are moving to live and work in places that already have a higher proportion of college graduates, usually big cities.

In Figure 5, data from the population censuses of 2000 and 2010 are analyzed. In cities with high college graduate ratios in 2000, the increase in the college graduate ratio in the following 10 years was higher as well. The PRC might display an unusually strong agglomeration of high-skilled labor because it still enforces the *hukou* (household registration) system, and residents with local *hukou* enjoy better public services and welfare of all sorts. The better social welfare in the rich cities motivates people to “over-pursue” higher education qualifications to obtain *hukou* in big cities.

Figure 5: Growth of College Graduate Ratio (2000–2010)

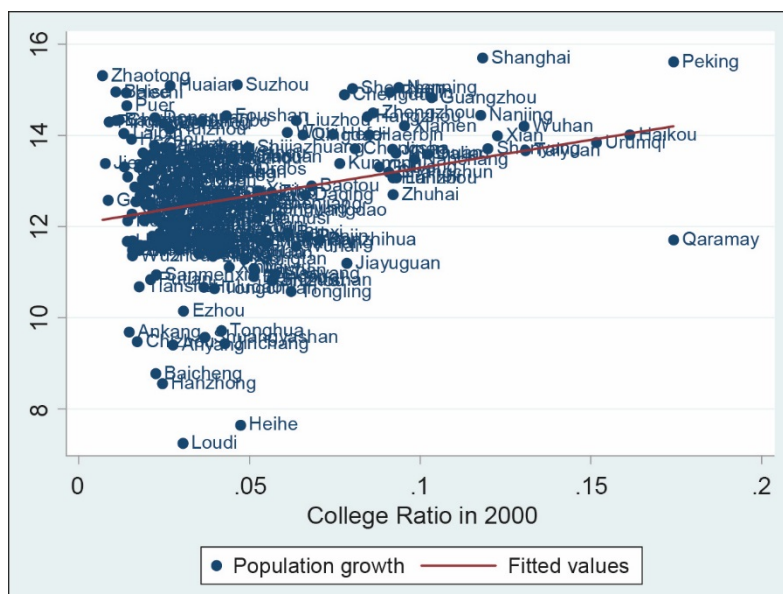


Notes: X-axis: 2000 college graduate ratio; Y-axis: 2010 college graduate ratio/2000 college graduate ratio.

Source: 2000 and 2010 college graduate ratios are computed from the 2000 and 2010 national population census, respectively.

What are the implications of the high college graduate ratio? The agglomeration of high-skilled workers has increased the demand for low-skilled workers in production and daily life, and also increased learning effects among them. Moretti (2004b) used United States data to check the substitution and spillover effects that high-skilled workers have on low-skilled workers. He found that a rise in the share of college graduates resulted in a larger wage increase for less-educated labor compared with highly educated labor. In the PRC, the wages of low-skilled workers are also higher in cities with higher education levels. Thus, both skilled and unskilled labor agglomerate in big cities. Figure 6 shows that there is a positive correlation between the 2000 college graduate ratio and the population growth over the 2000–2010 period. The scatter plot shows that the variance in the data is rather large, and this big variance could be due to the severe restrictions on the flow of low-skilled workers into the cities, especially the big cities, hence inhibiting the population agglomeration effect of cities with high educational levels and large populations.

Figure 6: Population Growth (2000–2010)



Notes: X-axis: 2000 college graduate ratio (%); Y-axis: log(2000 to 2010 population growth [in million] + 1).

Source: The 2000 college graduate ratio is computed from the 2000 national population census. The 2000 to 2010 college population growth is computed from the 2000 and 2010 national population census, respectively.

3. URBANIZATION: LEVEL, SPEED, AND REGIONAL VARIATION

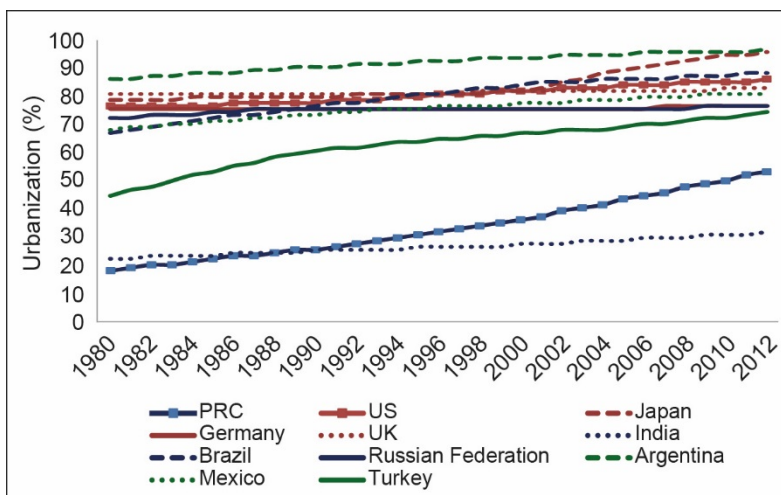
3.1 Urbanization Level and Speed

The laggardness of the rate of urbanization is the first important characteristic of the PRC’s urban development. Henderson (2009) showed that when the PRC’s urbanization rate reached 46%, countries with similar per capita incomes had urbanization rates of 55%, while developed countries had urbanization rates of 70%–85%. In Figure 7, three categories of countries are studied: developed countries; Brazil, Russia, India, and the PRC (the “BRIC countries”); and other developing countries. Compared with the urbanization of these three groups of countries, the PRC lagged behind all in 1980. Though the PRC has been catching up through reform and opening up since the late 1970s, its urbanization ratio still lags behind other countries, except India.

Not only does the PRC’s urbanization level lag, the current urbanization process is also not “complete.” With the advancement of urbanization, a large number of rural migrants have moved to cities without local registration status due to the strict *hukou* system. That is to say, those migrants who have resided in cities for more than half a year have already been included in the category of “urban residents,” although according to their *hukou* status, those workers in urban, non-agricultural sectors are still “peasants.” Considering the PRC’s large scale of rural-to-urban migration, there is a large gap between the urbanization rate of urban residents and that of urban registered residents with local urban *hukou*. In 2012, the gap was as large as 17.3 percentage points and it is still widening (see Figure 8). As the urbanization rate of permanent residents reflects the level of urbanization more accurately, the official publication *China Statistical*

Yearbook includes migrants living in cities for more than half a year as permanent residents. The urbanization rate in this report also follows this definition, using the urbanization rate of permanent residents.

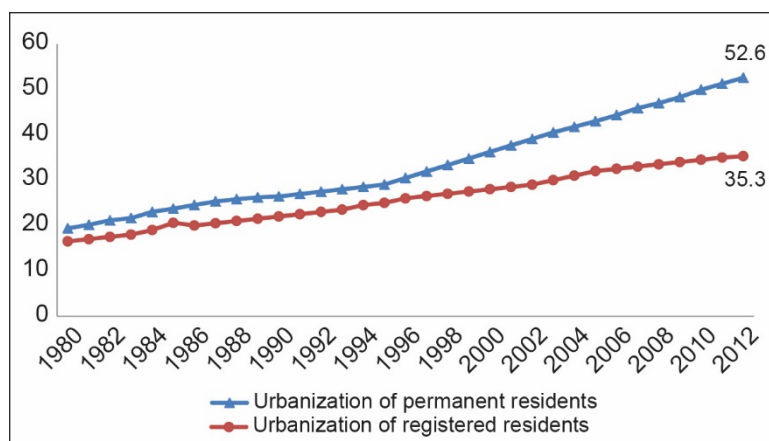
Figure 7: Cross-Country Urbanization Comparison



PRC = People’s Republic of China; US = United States; UK = United Kingdom.

Source: Yearly urbanization rate in the World Bank Database.

Figure 8: Urbanization Rate of Permanent Residents and Registered Residents (%)



Source: National Plan, “Planning for New-Type Urbanization (2014–2020),” p.7. http://www.gov.cn/zhengce/2014-03/16/content_2640075.htm

Urbanization in the PRC is still in its rapid growth phase. After the beginning of “reforms and opening up,” the average annual speed of urbanization was 0.26% from 1980 to 1992, 0.7% from 1993 to 2001, and 1.42% from 2002 to 2010. Different urbanization speeds in the three periods are related to the different models of economic development adopted in the PRC. From 1980 to 1992, the transition to market economy started and the government emphasized reforms in agriculture as a larger proportion of people resided in rural areas. Given the PRC’s restrictions on interregional migration, many township-and-village enterprises were developed to absorb rural labor into manufacturing without moving them to cities. The speed of urbanization in this phase was quite slow. With the advancement of market economy and the “opening up” from 1993 to 2001, urbanization increased strongly as large

numbers of people from rural areas poured into cities in pursuit of greater opportunities. From 1955 to 1994, the government had issued food coupons (*liangpiao*) for urban residents to buy food in the market, whereas rural residents did not have food coupons, and were thus faced with a major obstacle to migration. Around 1994, the PRC stopped using food coupons, which made rural-to-urban migration much freer. From 2002 to 2010, after joining the World Trade Organization (WTO), the PRC stepped into a new era and urbanization increased sharply to meet the needs of economic growth. In general, since the start of reform and opening up, but especially since the mid-1990s, the PRC has been loosening its regulation on migration by reforming the *hukou* system, though the megacities still tightly control population inflow. We believe that with *hukou* system reforms and high economic growth, even if slower than before, rapid urbanization will continue in the PRC.

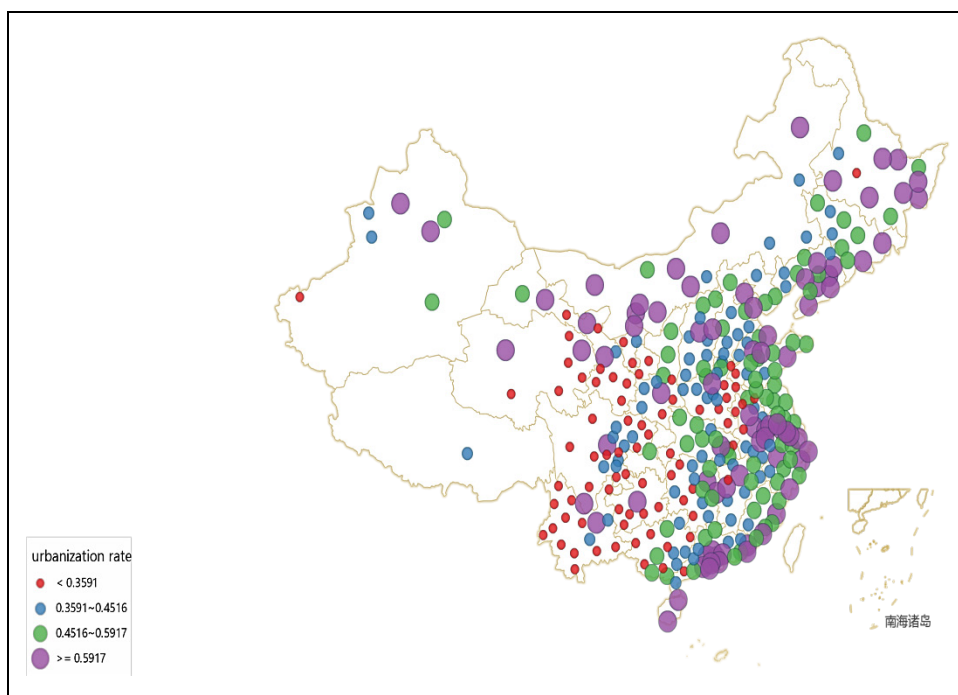
Although the urbanization level of the PRC lags behind that of many comparable countries, its speed is quite high (Figure 7). The question is whether the speed of PRC urbanization is too high. To be able to judge this, a comparison with the urbanization speed of developed countries in different time periods is required. According to Jian and Huang (2010), developed countries had all experienced rapid urbanization, especially Germany and Japan. They presented the data on urbanization in the main developed countries. From 1851 to 1861, urbanization in the United Kingdom increased from 54% to 62.3%, at an average annual growth rate of 0.83%. From 1900 to 1910, urbanization in the United States increased from 39.6% to 45.7%, at an average annual increase of 0.61 percentage point. From 1871 to 1910, urbanization in Germany rose from 36.1% to 60%, and from 1890 to 1900 it rose by 11.9 percentage points, as the average urbanization speed was about 1.2 percentage points per year. Japan's urbanization rose even faster than that of Germany, increasing from 37.5% in 1950 to 56.33% in 1955, at an average annual rate of 3.8 percentage points. Japan also experienced a relatively fast pace of urbanization growth, with an average annual increase of 1.3 percentage points from 1950 (37.5%) to 1980 (76.2%).

The PRC's urbanization rose from 19.4% in 1980 to 52.6% in 2012 after the reforms and opening up. Its annual average urbanization speed over that period was 1.03 percentage points. The high economic growth in the PRC is similar to that experienced by developed countries. The PRC's urbanization speed is, therefore, reasonable in this context and has the potential to accelerate, given the PRC's below-average urbanization in global terms and the ongoing reforms to the *hukou* system.

3.2 Regional Variations in Urbanization Level and Speed

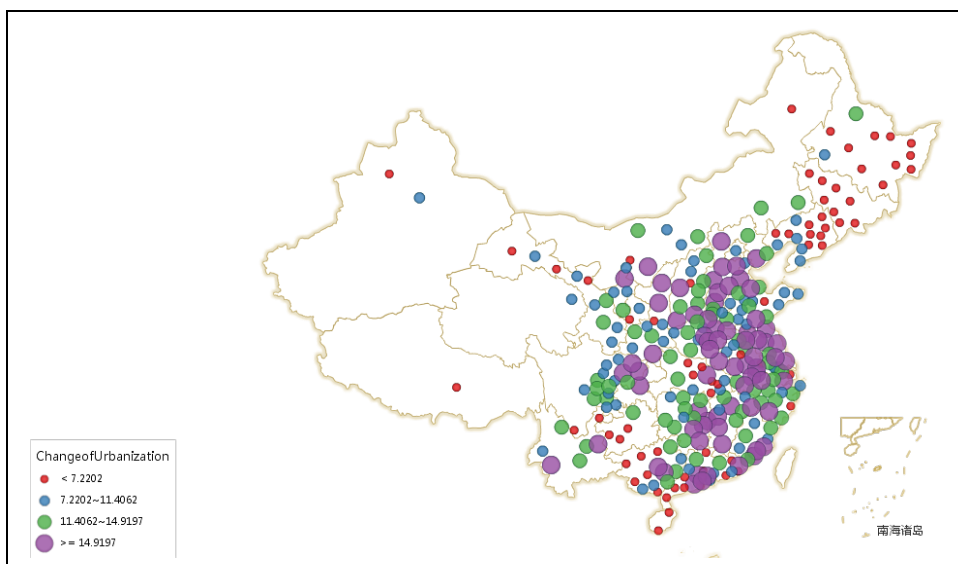
Being a vast country, the PRC has huge interregional differences in urbanization levels. The urbanization rate is higher in the eastern region, which is richer than the inland region (see Figure 9). From 2000 to 2010 the eastern region experienced faster urbanization than the inland region (see Figure 10). Another indicator of regional urbanization variation is the distribution of the increase in urban permanent residents (see Figure 11). It is consistent with the regional distribution of the urbanization rate. These figures indicate that the eastern region has had both higher urbanization levels and speed than the inland region. On the one hand, this regional variation is a manifestation of unbalanced urbanization. On the other hand, the different levels of urbanization among regions clearly illustrate the agglomeration effects in more industrialized and developed areas.

Figure 9: Urbanization Rate at the City Level in 2010

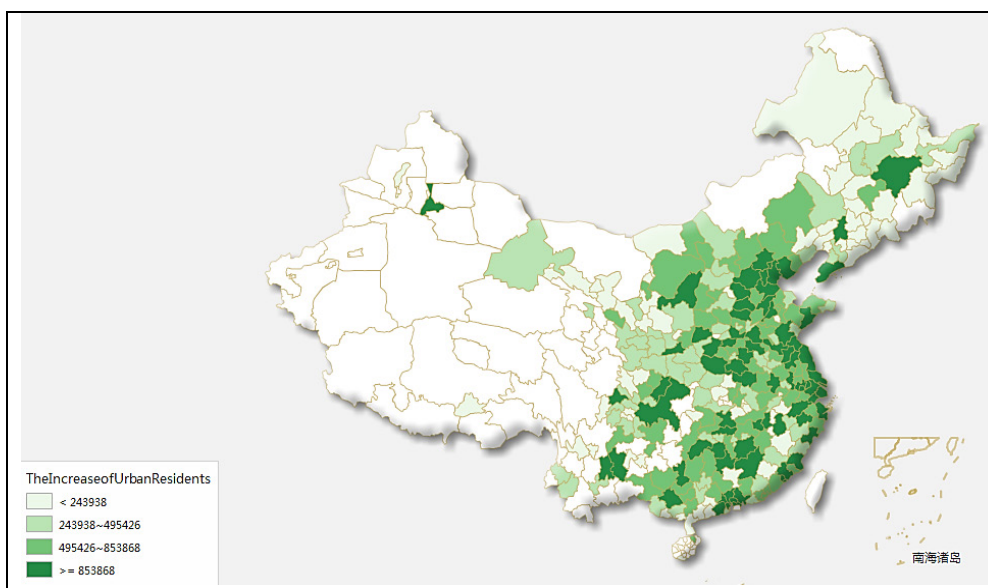


Source: The urbanization rate of 2010 is estimated from the 2010 national population census. The urbanization rate at the city level indicates the share of urban residents in the region that the city governs.

Figure 10: Increase in the Urbanization Rate from 2000 to 2010



Source: The increase in the urbanization rate is calculated on the basis of the urbanization estimates from the 2000 and 2010 national population census.

Figure 11: Increase in Urban Permanent Residents from 2000 to 2010

Source: The increase in urban permanent residents is calculated on the basis of the estimates of urban permanent residents from the 2000 and 2010 national population census.

4. THE URBANIZATION–INDUSTRIALIZATION GAP

4.1 Urbanization and Industrialization in the PRC from 1980

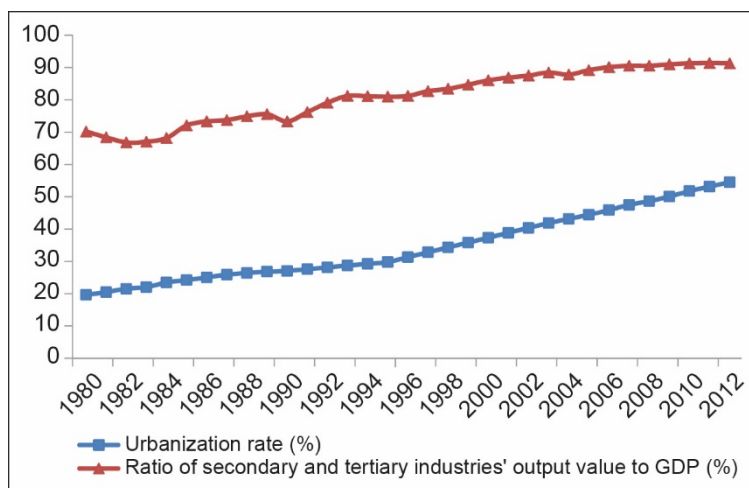
Since its reforms and opening up, the PRC has experienced a steady rise in its urbanization level. However, the level of industrialization exceeded that of urbanization throughout the period, reflecting the characteristic of PRC urbanization lagging behind industrialization. The most important reason for this gap is the institutional barriers that hinder rural-to-urban migration and restrict the access of migrants to public services (Chen et al. 2013). In Figure 12, the level of industrialization is measured by the ratio of secondary and tertiary industries' output value to GDP and the level of urbanization measured by the proportion of urban permanent residents. The gap between urbanization and industrialization has shown a narrowing trend: it was about 50 percentage points in 1980, and declined to about 40 percentage points in 2012. The narrowing gap between urbanization and industrialization benefits from the development of the urban services sector that can absorb more rural surplus labor, largely increasing the number of urban permanent residents. However, the disparity between industrialization and urbanization is still huge.

4.2 The Urbanization–Industrialization Gap and Average Wage at the City Level

With ongoing economic development, the services sector will create more jobs for migrants. When cities need more labor, the social costs of discriminating against migrants in public services become increasingly higher, so policy makers will have to remove the instruments of discrimination and allow in more migrants (Chen et al. 2013). Figure 13 shows that, at the city level in 2010, the gap between urbanization

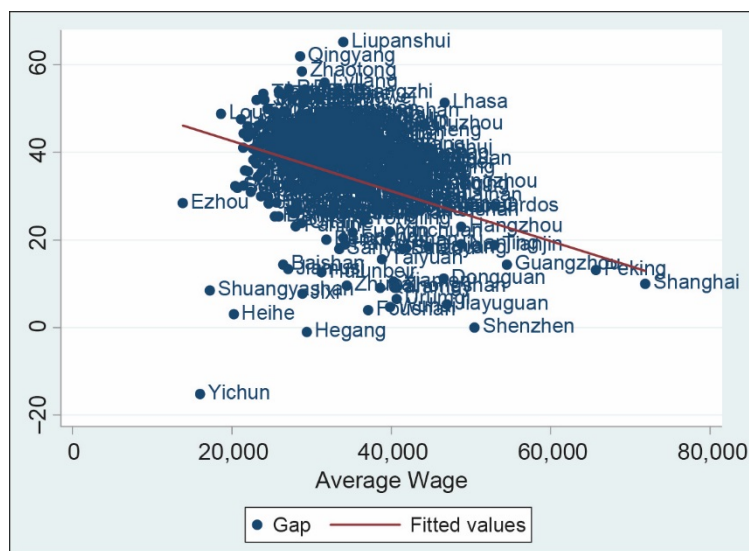
and industrialization was negatively related to average wage, which means economic growth can narrow the urbanization–industrialization gap.

Figure 12: The Urbanization–Industrialization Gap



Source: *China Statistical Yearbook*, 2013.

Figure 13: The Urbanization–Industrialization Gap and Average Wage Level



Note: Y-axis: gap between industrialization and urbanization (%); X-axis: average annual wage in yuan.

Source: The urbanization rate is computed from the 2010 national population census; industrialization is represented by the ratio of secondary and tertiary industries' output value to gross domestic product, using data from the 2011 *China City Statistical Yearbook*. Average wage data is from the 2011 *China City Statistical Yearbook*.

4.3 Urbanization of People Lagging behind Urbanization of Land

Usually, in a market economy, urbanization of people refers to the process of transforming rural labor into workers in the urban economy, while urban land expansion is also determined by land price. What are the implications of urbanization lagging behind industrialization? It directly reflects the fact that reallocation of population to cities is not in sync with the development of urban industry. Clearly, this is not because the development of industry in the PRC's cities did not adopt labor-intensive production

methods. The migrant workers that flooded into the cities, beginning in the 1990s, just happened to work in labor-intensive industries. The key to the issue is that when cities are attracting rural surplus labor, they do not have a plan to let these people take root in the city as “urban residents.” Outsiders find it difficult to truly settle in the city, which necessarily makes mobility to urban areas incomplete.

PRC urbanization is propelled not by population growth, but by administrative changes at the district level. This implies that each region’s local government may cause the expansion of an urban area to become disjointed with local population density and industrial development in pursuit of rapid urbanization. Data in the introduction of the National Bureau of Statistics’ “Provisions Regarding Statistically Demarcating Urban and Rural Areas (1999 Trial Implementation)” shows that after the State Council approved the Ministry of Civil Affairs’ “Report Regarding Adjustment of the Standard for Designating Townships” in November 1984, and the “*Report Regarding Adjustment of the Standards for Creating Municipalities and the Conditions for Municipalities Leading Counties*” in April 1986, standards for designating municipalities and townships widened. Subsequently, actions to retract counties and designate municipalities, and retract *xiang* and designate townships were pervasive, causing a nationwide increase in the number of municipalities and townships. The designation distributes the urban population to relatively smaller municipalities and townships to support their growth, causing the urban population density to decline at the district administration level. According to statistics, since 1995, the area of 338 municipalities nationwide at the prefectural level and above grew from 16,000 square kilometers to 25,000 square kilometers—an increase of 60%. Over the same period, the urban district population (including migrant workers) of the 338 cities rose from 270 million to 300 million, an increase of only about 10%. The rate of increase in urban areas is six times as high as that of the rate of increase in the urban district population (Yan and Jiang 2007). Most cities’ population density has decreased significantly in recent years (Lu 2013a). This indicates that the PRC’s urbanization of people lags far behind its urbanization of land (Lu 2011; World Bank 2014).

This is a very thought-provoking phenomenon. On the one hand, PRC urbanization is lagging behind. On the other hand, under an economically decentralized system, local governments seek to expand urban areas in an unbalanced manner and obtain revenue from land lease during the process of turning agriculture-use land into construction-use land. In particular, since the aggregate amount of construction-use land quota is regulated in the PRC, the government provides comparatively more construction-use land quotas for inland areas than for areas in the eastern region to facilitate industrial development in the former and promote balanced regional development. This is a vital measure to support the growth of underdeveloped areas. After 2004, the proportion of development zones in inland areas rose strikingly due to the policy inclination of directing construction-use land quotas toward underdeveloped areas. However, more construction-use land quotas in inland areas have led to inefficiency in land use. Local governments use construction-use land quotas as tools for attracting investment. As inland regions are underdeveloped, governments can fulfill construction-use land quotas by lowering land-use prices to subsequently attract investment for the local economy. Local governments also compete with each other through some preferential policies including subsidizing enterprises and reducing land prices. As a result, land price increase has been restrained and relatively inefficient companies are more willing to move to inland areas. These preferential policies have caused severe losses of land assets and inefficient land use. As the distribution of construction-use land quotas are relatively inclined toward the inland regions, the phenomenon of the expansion of constructed urban areas exceeding the growth of the non-agricultural population is even more severe in the western regions, followed by

the central regions, whereas the gap between the two figures is relatively small in the eastern provinces (Lu 2011). While developed areas have higher labor productivity, relative to inland regions reducing construction-use land quotas has increased land prices (Sridhar et al. 2013) and driven enterprises to become more efficient in the east. Therefore, a more even allocation of construction-use land quotas is widening the gap of economic development between developed and laggard regions.

5. RURAL DEVELOPMENT

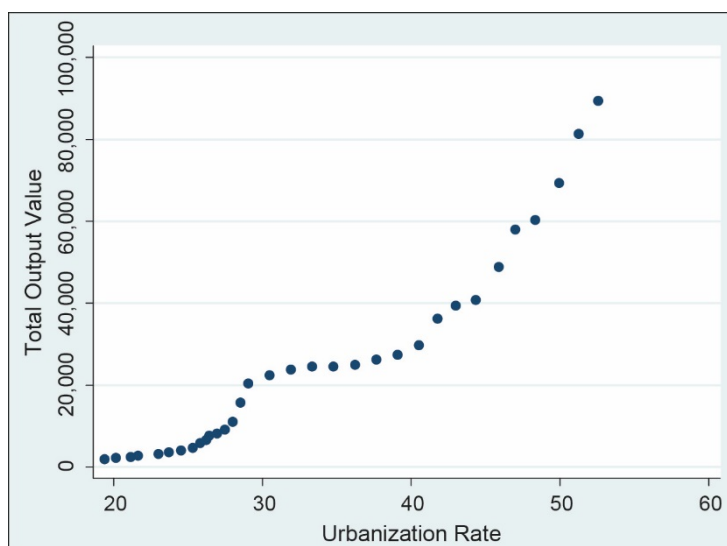
Urbanization is not only a process of the development of secondary and tertiary industries in cities, but also of rural development. Rural areas have seen great advances in terms of agricultural productivity, capital investment, and agricultural organizations. First, in the urbanization process, more rural labor was attracted to work in non-agricultural industries and live in cities without local registration status because of the strict *hukou* system. Per capita resources such as agricultural output and grain production have been increasing, which is likely to further increase the scale of agricultural operations. Second, with the rise of rural labor working and living in cities, cities' capital accumulation gradually spills over to the countryside, where urban-to-rural remittance is a significant channel. During the process of capital deepening and upgrading of the production scale, agricultural technology like mechanization could markedly improve and attract more capital to rural areas. So agricultural productivity, capital investment, and agricultural organizations are linked, influencing the process of urbanization and promoting rural development.

5.1 Growth, Productivity, and Income

5.1.1 Urbanization and Agricultural Output from 1980

Many people, especially those in favor of national food security, worry that urbanization and rural-to-urban migration will hurt agriculture, but so far this has not been the case in the PRC. Agricultural output has risen, thus propelling urbanization (Figure 14). More importantly, agricultural output per capita has seen trends similar to the urbanization rate and has been growing faster than urbanization since 1980 (Figure 15).

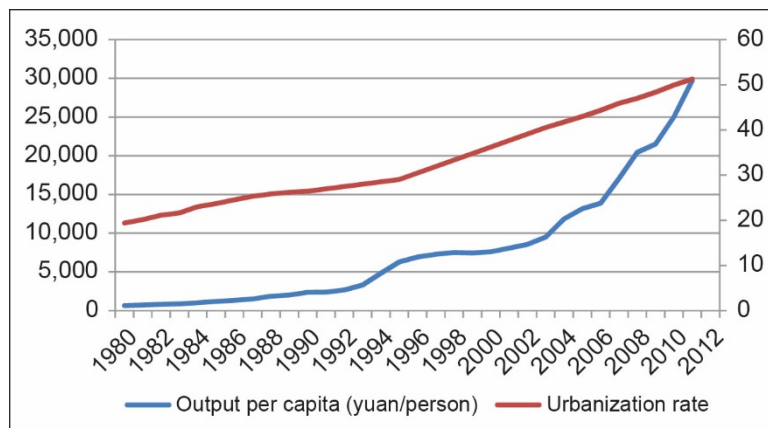
Figure 14: Total Agricultural Output and the Urbanization Rate



Note: Urbanization is denoted by the ratio of urban permanent residents to total permanent residents.

Source: Total agricultural output value, urban permanent residents, and total permanent residents come from database of the National Bureau of Statistics, <http://www.gov.cn/shuju/>. This database is consistent with *China Statistical Yearbook*.

Figure 15: Agricultural Output per Capita and the Urbanization Rate



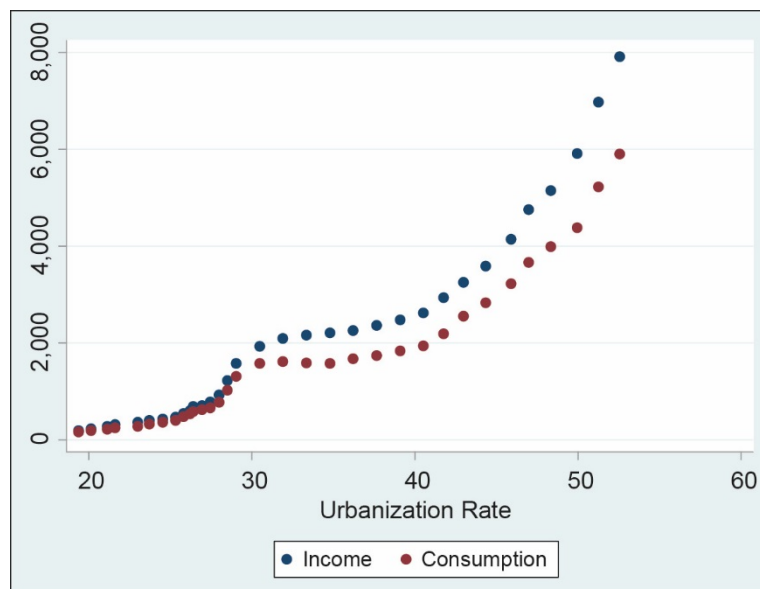
Notes: Y-axis on the left represents output per capita in yuan and Y-axis on the right denotes the urbanization rate in %. Urbanization is measured by the ratio of urban permanent residents to total permanent residents. Agricultural output per capita is signified by the ratio of total output value to agricultural labor.

Source: These indices come from the Database of National Bureau of Statistics, <http://www.gov.cn/shuju/>

5.1.2 Income and Consumption Level in Rural Households from 1980

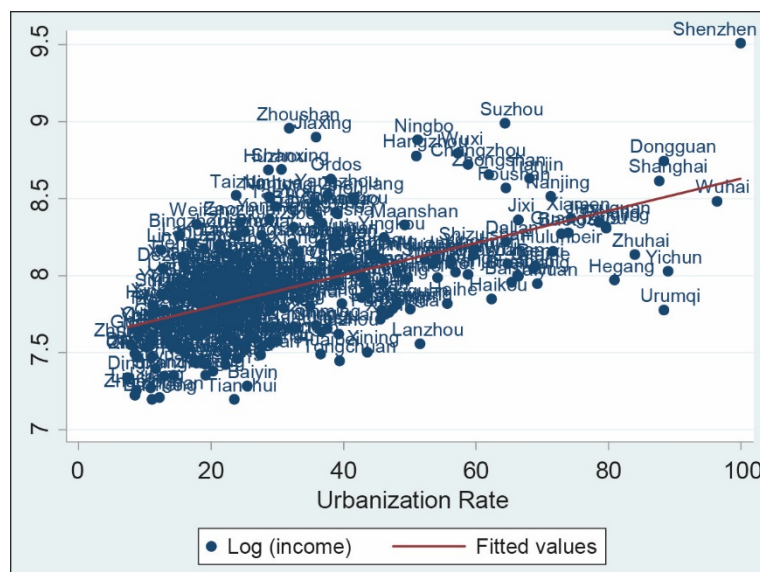
In line with productivity growth, the income level of rural households has improved along with the urbanization process, which boosts rural consumption and makes rural people better off. Moreover, income levels rise more quickly than consumption, as households save to secure their future (see Figure 16). Figure 17 further illustrates the relationship between rural income and urbanization. At the city level, the positive connection between rural income and urbanization is manifested in the 2005 national population census. This evidence shows that urbanization not only promotes agricultural output, but also raises incomes and quality of life in the countryside.

Figure 16: Income and Consumption of Rural Households



Note: Y-axis: average annual consumption and wage in yuan; X-axis: urbanization rate in %.

Source: Database of the National Bureau of Statistics, <http://www.gov.cn/shuju/>

Figure 17: Income Level in Rural Households and Urbanization in 2005

log = logarithm.

Note: Urbanization rate = (local urban residents + migrant permanent residents)/(local residents + migrant permanent residents). Income of rural residents = total income of rural residents/ number of rural residents.

Source: Authors' estimation using the 2005 national population survey.

5.2 Capital Deepening

With the spread of urbanization, capital deepening and migrants' remittance have been important phenomena for rural development. Capital investment plays an important role in agricultural labor productivity.

5.2.1 Capital–Labor Ratio and Agricultural Productivity during Urbanization from 1980

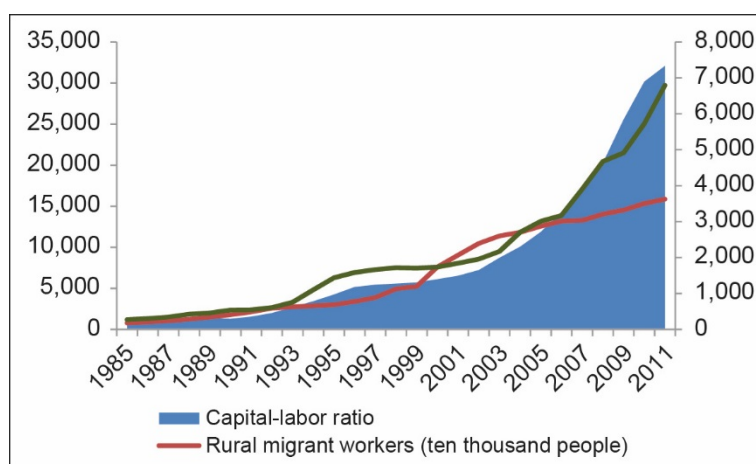
First, we examine capital deepening in agricultural sectors in the PRC. The measurement of capital deepening is the capital–labor ratio (Kumar and Russell 2002). For the agricultural sector, capital deepening indicates an increase in the ratio of agricultural capital stock to labor engaging in agriculture.

From 1990, the capital–labor ratio rose strongly, denoting the existence of capital deepening in the agricultural sector. The extent of capital deepening has also been rising as a result of the increase in agricultural investment and the transfer of rural labor to other non-agricultural industries. Agricultural capital takes two forms. The first is the enhancement of agricultural infrastructure and tools of production at the material level. The second is the increase in value of productive fixed assets of rural households (Luo 2013).

As the level of capital accumulation in the urban sector continues to rise, rural labor is increasingly attracted to working and living in cities. Those that do form the group of “rural migrant workers.” The trend of the capital–labor ratio is, therefore, in accordance with the rising number of rural migrant workers. The same rising tendencies of the capital–labor ratio and the number of rural migrant workers corresponds with the finding that capital deepening generally induces a reallocation of capital and labor (Acemoglu and Guerrieri 2008).

What is the effect of capital deepening in the agricultural sector? The most significant influence is the strong growth of agricultural output per capita (Figure 18). So capital deepening in the agricultural sector, the increasing number of rural migrant workers, and rising agricultural output per capita are closely linked. Furthermore, increasing capital can partly explain the growth of agricultural labor productivity.

Figure 18: Capital–Labor Ratio and Urbanization



Note: Y-axis on the left represents rural migrant workers and output per capita; Y-axis on the right represents capital–labor ratio.

Source:

- (1) Capital–labor ratio is the ratio of agricultural capital to rural labor. Collective and individual fixed assets data from *China Rural Statistics Yearbook* make up agricultural capital. Rural labor data is from the Database of the National Bureau of Statistics, <http://www.gov.cn/shuju/>
- (2) Output per capita is denoted by the ratio of total agricultural output to rural labor and the data is from the Database of the National Bureau of Statistics, <http://www.gov.cn/shuju/>
- (3) Rural migrant workers refer to labor with rural *hukou* working out of rural communities. The data from 1985 to 2005 is from Lu (2013b); the data from 2006 to 2012 is from *Peasant Worker Report* of the National Bureau of Statistics, <http://finance.people.com.cn/n/2013/0527/c1004-21624982.html>; http://www.stats.gov.cn/tjsj/tjgb/nypcgb/qgnypcgb/200802/t20080227_30465.html

5.2.2 Remittance of Rural Migrant Workers

Remittance refers to the money that rural migrant workers send and take back to their communities of origin (Murphy 2006). Since the group of rural migrant workers emerged, remittance has become the most vital source of capital to improve the lives of rural households and stimulate the rural economy. More importantly, remittance has been the main channel of capital accumulation for rural households. Since the mid-1990s, cities have attracted the lion's share of physical capital formation and, as a consequence, there has been a shortage of investment in the countryside. Remittance can play a role in redistributing capital between different areas and in leading capital back to rural areas (Li 2001).

Following the large-scale migration of rural labor since the 1990s, rural migrant workers' income has been the major source of income in their communities of origin, especially in the middle and western areas, where the total earnings of rural migrant workers exceed the local fiscal revenues (Yu 2006). Compared with other countries, PRC rural migrant workers send or take a larger proportion of earnings back to their hometowns, accounting for 20%–50% of rural household income (Fang 2005). According to a survey conducted by the agricultural team of the National Bureau of Statistics and the agricultural ministry, the annual average remittance of rural migrant

workers is in the range of CNY3,200–CNY4,600, and total remittance amounted to CNY270 billion–CNY520 billion from 1997 to 2004 (Hu et al. 2008).² In terms of individual rural migrant workers' remittances, most of them remit in the range of CNY2,000–CNY8,000 annually and the average remittance in the sample is CNY4,538 (Hu et al. 2008).

As immigrants in inland provinces make up about 50% of total immigrants and the majority of them head to big cities in eastern areas for work opportunities and higher earnings, rural migrant workers in inland provinces remit more money. In 2000, total remittance in Sichuan Province amounted to CNY202 billion, which is equivalent to the local fiscal revenue, and in Anhui the remittance of CNY174 million surpassed the local fiscal revenue (Murphy 2006). Remittance is more likely to flow into low-income and mostly agricultural rural households, inland areas, and villages rather than cities or towns, accounting for regional differences in remittance (Li 2001).

Most of the money remitted is used for living expenses, mainly for building houses, purchasing consumer goods, and education expenditure (Murphy 2006). Some remittances are put into production and investment, spurring local economic development. Married and older rural migrant workers tend to use remittances for health and education expenditure, whereas migrants with higher education and longer working experience are more likely to use remittances for future venture investment (Hu and Shi 2013). Li et al. (2008) gathered data on the use of remittances from September 2006 to September 2007 and found that the top three preferable uses of remittances are providing for the elderly, family support, and educational fees.

Given the capital deepening in agricultural sectors, the use of agricultural investment needs to be explored further. According to Li et al. (2008), only about 3% of remitters they surveyed put agricultural investment in first place, and agricultural investment ranked fifth among all the uses of remittances. However, they pointed out that the proportion of remittances used for agricultural investment has been gradually increasing. It demonstrates that importance is still attached to agriculture due to the security provided by land ownership, the interest of big families in the countryside, and its connection with the origins of migrants.

Considerable remittances have relieved the pressure of capital demands and become important sources of educational, medical, and living expenditure for rural households, giving a boost to the rural economy (Cheng 2006). Remittance exerts an indirect influence on rural social progress, mainly in the field of consumption, family education, supporting the family, and income. In rural consumption, building houses accounts for a large proportion of capital investment, which can propel markets of building materials, decorative objects, household furniture, electrical equipment, and articles for daily use. In this way, remittances provide a significant boost to the local and rural economy. On the other hand, remittances are used for supporting the elderly, reducing pressure on public expenditure on social security for the elderly in the countryside (Li 2008). Remittances also offer children more educational opportunities, reduce the school dropout rate, and reduce children's working time in agriculture (Hu and Li 2009). Remittance directly increases rural income (Taylor et al. 2003). The income transfer of comparatively poor rural families is higher than that of wealthy families (Du and Park 2003). This denotes that the poverty rate can decline with the use of remittance. But

² According to Cheng (2006), apart from remittances through regular financial institutions including commercial banks, rural post offices, and rural credit cooperatives, rural migrant workers take a part of their income back home by themselves, accounting for 25%. Since it is hard to estimate the capital taken home, the actual amount of capital moved by rural migrant workers back to their rural communities could be much higher.

the effects of remittances are limited for rural households with low incomes because this group lacks the resources and capabilities to work in cities far away.

Agricultural production and productive investments highlight the importance of remittance. Remittances substitute rural labor. As a result, increasing remittances counteract the negative effects that reducing rural labor has on agricultural production (Rozelle et al. 1999; Li 2001). An investigation by the Rural Economic Research Center of the Agricultural Ministry shows that additional cash inputs provide greater marginal benefits to agricultural production than additional labor does (Li 2001).

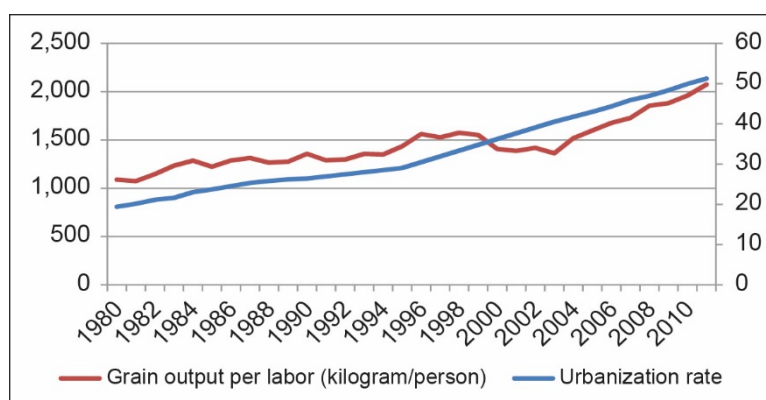
Overall, remittances play an important role in the rural economy, particularly in terms of social advancement, capital accumulation, agricultural production, and productive investments.

5.3 Agricultural Organization and Production Scale

5.3.1 Scale of Operation in Agriculture

With an increasing proportion of the rural population migrating to the cities, their land is transferred to local rural residents. As a result, while the proportion of rural labor is decreasing, rural land per unit of agricultural labor increases, which makes large-scale production and organization possible, giving an impetus to agricultural growth. The shifting of rural labor to non-agricultural industries is the fundamental premise of agricultural scale of operation (Han 1998). Furthermore, the operation scale of land is limited by circulation speed. If the numbers and rate of urbanizing rural labor speed up, more land can be transferred, making large-scale operations possible (Liu 2006). Figure 19 shows that grain output per capita dropped partly due to the rising numbers of rural migrant workers from 1995 to 2002, but after that it gradually rose. The large-scale fiscal transfer to support agriculture since 2003 and the agriculture tax abolition in 2006 can partly explain the recent growth of per capita agricultural production. But agricultural productivity growth can also be partly explained by the increasing operation scale of land and the mechanized substitution for labor, as labor is no longer critical in agricultural production.

Figure 19: Grain Output per Unit of Labor and Urbanization



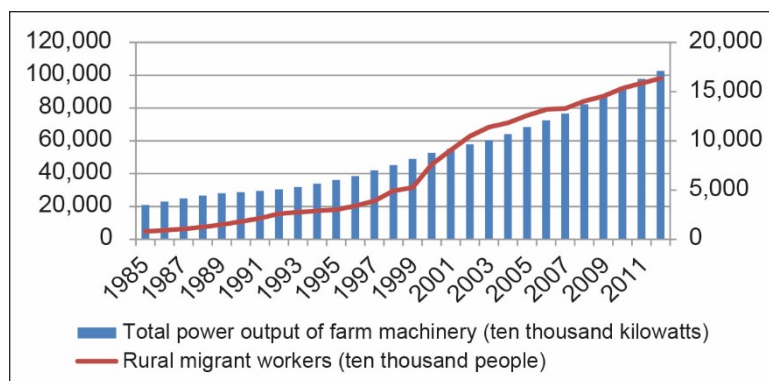
Note: Y-axis on the left represents grain output per unit of labor and Y-axis on the right represents the urbanization rate.

Source: The data of grain output per labor is from the Database of the National Bureau of Statistics, <http://www.gov.cn/shuju/>

5.3.2 Mechanization in Agricultural Production

Agricultural mechanization is the replacement of rural labor, along with large-scale cultivation (Liu 2006). Total output power applied in agriculture is gradually ascending with the growth of rural migrant workers (see Figure 20). Apart from the total output power, it is more appropriate to use output power per capita to represent mechanization (see Figure 21). The trend has been that mechanization grows faster than the urbanization rate, stressing the striking improvement of agricultural mechanization. So agricultural mechanization in the substitution of labor has advanced following the urbanization process.

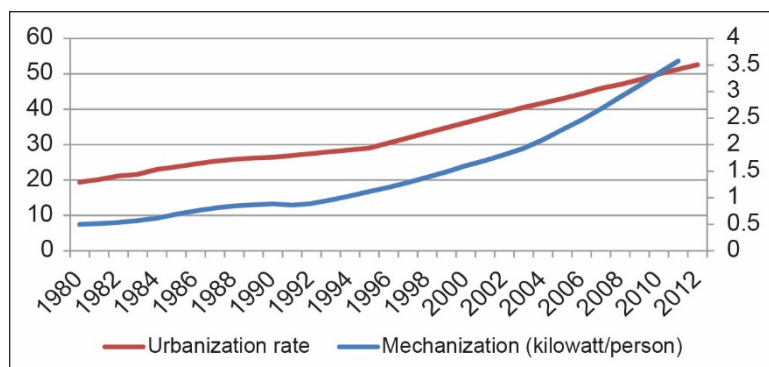
Figure 20: Total Power Output and Rural Migrant Workers



Notes: Y-axis on the left represents total power output of farm machinery and Y-axis on the right represents rural migrant workers. Rural migrant workers refers to labor with rural *hukou*, working out of rural communities.

Source: The data of total power output of farm machinery is from the Database of the National Bureau of Statistics, <http://www.gov.cn/shuju/>. The data from 1985 to 2005 is from Lu (2013b); the data from 2006 to 2012 is from *Peasant Worker Report* of the National Bureau of Statistics. <http://finance.people.com.cn/n/2013/0527/c1004-21624982.html>; http://www.stats.gov.cn/tjsj/tjgb/nypcgb/qgnypcgb/200802/t20080227_30465.html

Figure 21: Mechanization and Urbanization



Source: Y-axis on the left represents the urbanization rate and Y-axis on the right represents mechanization.

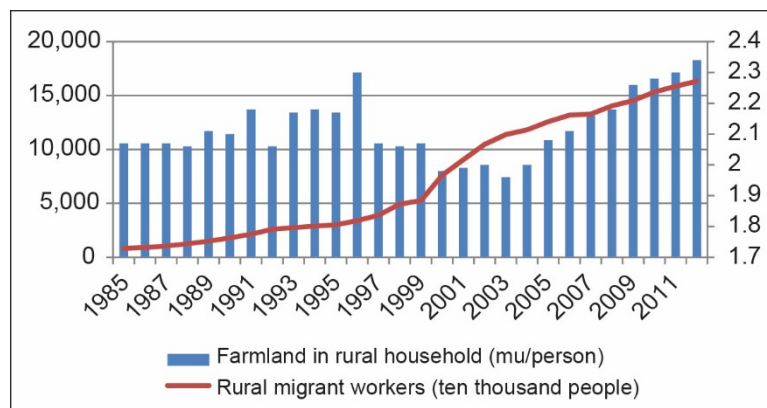
Mechanization is represented by the ratio of total power output of farm machinery to rural laborers. Urbanization is denoted by the ratio of urban permanent residents to total permanent residents. The data is from the Database of the National Bureau of Statistics, <http://www.gov.cn/shuju/>

5.3.3 Farmland in Rural Households

The agricultural production scale is closely related to the number of farmlands in rural households. Since 1982, the Household Contract Responsibility System has been used to reform collective land management, spurring an increase in farmland for

rural households. After 2003, the number of farmlands received a second boost due to the rising numbers of rural migrant workers. As a result, this concentration of farmland provides the space needed for large-scale agricultural operations.

Figure 22: Rural Farmland and Rural-to-Urban Migration



Notes: Y-axis on the left represents rural migrant workers and Y-axis on the right represents farmland in rural households. Farmland in rural households is denoted by cultivated land per capita in rural households.

Source: The data is from the Database of the National Bureau of Statistics, <http://www.gov.cn/shuju/> Rural migrant workers refers to labor with rural *hukou*, working out of rural communities. The data from 1985 to 2005 is from Lu (2013b); the data from 2006 to 2012 is from *Peasant Worker Report* of the National Bureau of Statistics, <http://finance.people.com.cn/n/2013/0527/c1004-21624982.html>; http://www.stats.gov.cn/tjsj/tjgb/nypcgb/qgnypcgb/200802/t20080227_30465.html

6. CONCLUSIONS

This paper examines how urbanization enhances economic growth. Through agglomeration effects, employment opportunities and income levels can largely increase. In addition, the mechanisms of sharing, matching, and learning are much stronger in cities, especially large cities, which results in more exchange of information, greater knowledge spillover, and greater human capital externalities than in the countryside.

Although urbanization in the PRC has been fast, when taking a close look at urbanization levels, speed of urbanization, and regional variations, we see that it lags behind that of many developing countries at similar stages of development, let alone developed countries. An examination of regional variations reveals that the urbanization level and speed was higher in the eastern area on average at the city level 2000 to 2010. Another characteristic of the PRC's growth is that urbanization lags behind industrialization, similar to countries like India. Institutional barriers to rural-to-urban and interregional migration, such as the *hukou* system, have reduced the ability of urban growth to absorb rural labor. If these institutions can be reformed, urbanization in the PRC still has the potential to develop within a more efficient, equitable, and sustainable pattern.

As for rural development, urbanization has propelled agricultural productivity and will continue to push agricultural productivity in future. Also, rural incomes and consumption levels have been boosted by urbanization. Moreover, agricultural productivity is driven to a large extent by capital accumulation. The degree of capital deepening has been growing in the agricultural sector, mainly because urbanization results in an increase of rural migrant workers in other non-agricultural industries. Another vital source of capital investment is remittance. Agricultural organizations, urbanization, and outflow of migrant workers make large-scale production and

organization possible. Agricultural mechanization is the driving force behind the substitution of labor and concentration of farmland provides the space for large-scale agricultural operations.

In general, urbanization in the PRC has taken advantage of agglomeration effects and has brought the benefits of economic growth to both urban and rural areas. However, some problems of urbanization, including below-average urbanization levels and urbanization lagging behind industrialization, need to be solved through institutional reforms to achieve sustainable development.

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