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Creativity and Inequality: The Dual Path of China's Urban Economy?

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ABSTRACT Utilizing Chinese data for the years of 1998, 2000, 2005, and 2008, this research traces the growth of the creative economy and the enlarging income inequality in China's urban economy. While the creative sector now makes up close to 30 percent of China's urban private employment, industry-based earnings disparity has also increased substantively. Provinces with larger creative economy also tend to have higher level of wage inequality among workers of the creative sector, the working sector, and the service sector. Several other factors, especially internal migration flow, size of manufacturing, and ownership structure in local economy, are found to be significantly linked to inequality as well.

Introduction

Recent decades witnessed the rise of a creative economy or a knowledge economy across the globe. The advancement in information and communication technology (ICT) as well as the economic restructuring from a manufacturing-based to a service-based economy in the industrialized world contributes to this trend. A creative class or high-skilled talents are argued to be the driving force of economic development in this new economy (Florida 2002). Concurrent with the growth of the high-skilled workforce is the growth on the other end of the skills spectrum—low-skilled labor. The enlarging income disparity in global cities is partly attributable to the bifurcated skill-based wage structure in urban labor markets (Sassen 2001). It is found that cities with more creative talents tend to have higher earnings inequality between high-skilled professions and low-skilled professions (Donegan and Lowe 2008).

China has registered profound economic growth in recent years, especially in urban areas. According to an Organisation for Economic Co-operation and Development (OECD) report, its average annual gross domestic product (GDP) growth was 13

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percent between 2000 and 2008, and 7.8 percent in 2009 (OECD 2010). The national economy is transforming into an urban-industrial economy and to a lesser extent, a service economy. According to Dahlman and Aubert (2001), the proportion of agriculture in employment decreased from more than 70 percent in 1978 to about one half in 1999. Two significant trends are worth noting in the rapid urbanization process and economic transition: the rise of the knowledge/creative economy and the enlarging income disparity within urban areas. On the one hand, Creative Economy Report documents the remarkable development of China's creative economy and indicates that China is shifting itself from "Made in China" to "Created in China" (UNCTAD 2008). With a share of 19 percent of total global export market, China became the biggest exporter of creative goods in 2005. China sets the goal of building an innovation-oriented economy and becoming a world science and technology power by mid-twenty-first century (The State Council 2006). In a most recent draft of 12th Five-Year Plan, China aims to transform its coastal regions from "world's factory" to a hub for research and development and high-end manufacturing and services (Xinhua 2011b). At the same time, it is observed that talents, innovation, and entrepreneurship are playing an increasingly important role in regional economic performance in China (Florida, Mellander and Qian 2012; Li and Florida 2006; Qian 2008). Li and Florida (2006) found that talents and technological innovation are highly concentrated and have an uneven geographic distribution across provinces. Using provincial data of year 2004, Qian (2008) further demonstrated that talents are concentrated in cities.

On the other hand, China is considered as one of the most unequal economies in the world. Its Gini coefficient has increased from 0.33 in 1980, to 0.45 in 2001, and 0.47 in 2009 (Sisci 2005; World Bank 2004; Xinhua 2011c). Statistics show that the top 10 percent of all the families own more than 40 percent of all assets in the society, while the bottom 10 percent own less than 2 percent (Asian Times 2005). Scholars have suggested that wage differentials along dimensions of enterprise ownership, skills, and industries help explain widening income gap (Chen, Lu and Wan 2010; Deng and Li 2009; Knight and Song 2003; Xu and Zou 2000). No study however has explicitly tested whether a more "creative" urban economy might be associated with greater sector-based income disparity in China's unique context and how such relationship varies across time and geography.

This study seeks to fill this gap by answering three interrelated questions. First of all, how did "creative" or knowledge industries grow in the overall economy across regions in China? These include, among others, finance, insurance and real estate, arts, culture, and scientific research. Second, how did earning inequality as measured by inter-sector wage distribution change over time across regions? Inequality indices will be calculated to capture the earnings differential inequality among creative sectors, working sectors, and service sectors. Last, regression analysis will be conducted on the provincial level to examine whether a more creative regional economy has an impact on inter-sector income inequality when other relevant factors are controlled for. This research makes use of data from China Statistical Yearbooks and other sources for

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1998, 2000, 2005, and 2008, and reveals significant industrial transition and socio-economic change in China's urban economy during this period. This question has important implications to sustainable urban development as understanding the economic impacts that potentially accompany an increasingly knowledge-based economy can provide insights on social protection policies for the well-being of workers in noncreative industries.

Theory and Previous Research

Creativity and inequality. Examination of the rise of the knowledge and creative economy and economic restructuring in the industrialized world is not new (Florida 2002; Glaeser, Scheinkman, and Shleifer 1995; Lucas 1988; Powell and Snellman 2004; Romer 1990; Simon 1998; Solow 1956). Powell and Snellman (2004: 201) define the knowledge economy as "production and services based on knowledge-intensive activities that contribute to an accelerated pace of technical and scientific advance, as well as rapid obsolescence." In this new economy, the major forces driving economic development are the advancement in ICT, human capital accumulation, and the concentration of talents. In a similar vein, Florida (2002, 2005a,b) described a rise of the creative class or creative economy. He points out that about one-third of the workforce in advanced industrial countries are engaged in the creative sector and this sector generates about half of total wage and salary income in the U.S. (2005b). In addition, economic development of a city is driven by 3Ts: technology, talent, and tolerance (Florida 2005b).

A disturbing trend concurrent with the rise of the creative economy and economic restructuring is broadening income inequality. There has been a growing concern over increasing income inequality in the new economy and scholars put forward different explanations for the expanding income gap (Acemoglu 1998; Berman, Bound and Machin 1998; Bound and Johnson 1992; Donegan and Lowe 2008; Florida 2005a; Galor and Moav 2000; Katz and Murphy 1992). First, technical changes tend to disproportionately increase productivity of, demand for, and reward on high-skilled labor (Berman, Bound, and Machin 1998; Bound and Johnson 1992; Galor and Moav 2000; Katz and Murphy 1992). Based on an endogenous growth model, Galor and Moav (2000) theoretically demonstrated that rapid technological progress raises the skills premium, increases the average wage of skilled workers while temporarily reducing the average wage of unskilled workers, and thus leads to increasing wage inequality. As creative industries are more likely to hire high-skilled labor, such skills premium would likely enlarge industry-based income inequality. Viewed from this perspective, the skill-biased technological change tends to push up wages in high-tech industries, relative to low-tech industries.

Second, scholars also argue that structural changes tend to enlarge wage inequalities. Kuznets (1955) argued that income inequality is subject to the sectoral structure of an economy. Though Kuznets primarily referred to structural change from an agricultural economy to an industrial one, his theories can apply to the emergence of new industries

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or new economy as well. The recent widening of income gap in developed countries is partly due to the emergence of the IT economy (Ikemoto and Uehara 2000). Economic restructuring generates large numbers of both high-wage and low-wage jobs, but erodes the share of manufacturing workers, who are generally in the middle of the wage distribution (Sassen 2001). Sassen indicated that such structural dynamics could benefit workers at both the low end and high end of the income spectrum though the income gap between the two has broadened substantively, especially in global cities (2001). Florida (2005a) stated that increasing income inequality is an unpleasant by-product of the shift toward a creative economy. He found a strong positive relationship between a region's creativity and inequality and suggested that the creative centers are also among the most unequal places. He attributes this trend to the consumption habits of the creative class. The creative class or high-skilled workforce tends to consume low-end services instead of doing the work themselves and the growth of the high-skilled workforce is accompanied by the growth on the other end of the skills spectrum—low-skilled labor. Empirically, Donegan and Lowe (2008) reported that the concentration of the creative class in U.S. metropolitan areas significantly widens the income gap between high-skilled professionals and low-skilled workers after controlling for other relevant variables.

The case of China. China has registered profound economic growth in recent decades and has expressed its objectives of transforming and upgrading its economic structure. According to Wu (2007), in the period of 1995–2004, more than 62 percent of newly generated jobs in China were in the service sector. The share of service sector GDP in overall GDP increased from 34.3 percent to 40.7 percent between 1995 and 2004 (Wu 2007). In the newly released 12th Five-Year Plan (2011–2015), China aims to achieve a 4 percentage point increase in the service sector value-added output of GDP, from 43 percent in 2010 to 47 percent in 2015 (Xinhua 2011a). In these discussions, the broad category of service sector is compared with the agriculture sector and the manufacturing sector, and includes the creative economy that is the concern of this paper as well. As expressed in the Medium- and Long-Term Plan of Science and Technology Strategic Development (2006–2020), building an innovation-oriented country is a major strategy for the future development of China (The State Council 2006).

Accompanying its economic transformation, China has become one of the most unequal economies in the world. Numerous studies have identified a series of explanations for the expanding income gap. Research utilizing individual-level data echoed the evidence of enlarged wage inequality in the rising knowledge economy in developed countries, which rewards skills and human capital (Fleisher and Wang 2004; Knight and Song 2003; Park et al. 2003). Fleisher and Wang (2004) examined the marginal product of labor and wages for production workers and technical, administrative, and staff (TAS) workers and found that "the wage gap" (marginal product minus wages) tends to be greater for TAS workers than for production workers. Using annual urban household survey data for six provinces from 1988 to 1999, Park et al. (2003) demonstrated that the wages of the rich and the well-educated rose rapidly and

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that the rise in returns to unobservable skills can explain much of the increase in overall inequality during this period. Based on Chinese Household Income Project Survey data of 1988 and 1995, Knight and Song (2003) conducted a decomposition analysis of China's urban wage structure and pointed out that returns to education and occupation-specific skills have increased from 1988 to 1995. Skilled workers were substantively better remunerated while unskilled workers' wage barely rose. Evidence is not clear using industry-based income measures.

Although similar patterns regarding the rise of creative economy are observed in China, no study has explicitly linked the rise of the creative economy in China to income inequality. Some argue that talents, innovation, and entrepreneurship are playing increasingly important roles in regional economic performance in China (Florida, Mellander, and Qian 2012; Li and Florida 2006; Qian 2008). Given each urban area's different rate of transition into the creative economy, their creativity-induced inequality can be expected to vary as well.

Several other factors based on the unique Chinese context are argued to have played a role in potentially explaining regional variation in inequality. These factors include the size of the manufacturing sector, representation of state-owned enterprises (SOEs), the magnitude of internal migration, as well as foreign trade in the local economy. As an important industry in this transition, manufacturing's overall impact on wage inequality is not clear in China's case. Unlike the developed countries, manufacturing workers in China are paid on average a minimum wage level. As estimated by Banister (2005a), the average hourly compensation of manufacturing production workers in both urban and rural China was $0.57 in 2002, approximately only 3 percent of that in the U.S. and many other developed countries. According to him, China has gradually upgraded its manufacturing and gained competitiveness in some semiskilled manufacturing industries in addition to its traditional competitiveness in low-end labor-intensive manufacturing industries (Banister 2005a). With such upgrading, the distribution of manufacturing earnings has widened. However, the low-end unskilled workers have not gained much because of large-scale rural–urban migration and overseas buyers' intense efforts of seeking low-cost labor (Banister 2005a).

The enterprise reform or privatization progress is argued to be an important contributor to widening income inequality as well (Chen, Demurger, and Fournier 2005; Chen, Lu and Wan 2010; Putterman 1992; Xing and Li 2011). In terms of the impacts of enterprise reform and wage inequality, there are two contrasting arguments. First, privatization broke the formerly egalitarian wage determination system and enlarged wage inequality. During the planned economy, all urban workers were employees of state-owned or collective-owned enterprises, and their income was equalized under a national scale for wages for state employees (Chen, Demurger, and Fournier 2005). Since the 1990s, especially after 1996, the SOEs began the privatization process and large-scale labor relocation took place, which generated extensive unemployment. Accompanying the privatization process, wage determination mechanisms changed and rewarded skills, which is associated with increasing inequality (Xing and Li 2011).

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Second, remaining SOEs are still protected and allowed to offer wage premiums above market level (Putterman 1992). Some researchers argue that the extent of competition differs across industries. Certain state-owned monopolistic industries have been rarely affected by marketization, including financial industries and telecommunication industries. The status of monopoly increased the wage premium in these industries, which helped enlarge inter-industry wage dispersion, a critical component of urban income inequality (Chen, Lu and Wan 2010).

Internal migration is another important contributor to widening urban income inequality. With its *Hukou* system established in 1958, China has been regulating its population mobility. Since the 1980s, such restrictions have been lifted because of increased agricultural productivity and growing demand of cheap labor in cities (Chan 1996). The rural–urban migration became a remarkable phenomenon in the mid-1990s (Davis 1992). In 1997, the central government launched a profound reform of the *Hukou* system. Some provinces abolished the rural/urban distinction in 2001–2002 (Wang 2004), which made it easier for rural migrants to get a local *Hukou* in some cities and towns. Massive rural–urban migration accelerated competition in the urban labor market. Such intensification of competition was particularly manifested in industries with lower barriers to entry (Chen, Lu and Wan 2010). Rural–urban migration increased the pool of less skilled workers employed in industries with low-entry barriers and decreased their wages, relative to those sectors requiring high-skilled workers.

Other researchers point to the openness of the local economy as playing an important role in increasing inequality. A study by Xu and Zou (2000) found a positive relationship between increasing receptivity of foreign trade and urban income inequality from 1985 to 1995. They attributed this positive relationship to the disproportionate profit the rich and the powerful garnered from international trade. Increasing openness may bring about technological change, which could increase inequality (Xing and Li 2011). Xing and Li (2011) also argued that greater openness will attract more companies to enter the market, thus increasing competition and decreasing total revenue and wage level at low-productivity firms.

However, no study has explicitly examined the association between the ongoing economic restructuring and rise of the creative economy in China and industry-based income inequalities. This paper further traces its change over the last decade across regions and tests whether the more rapid transition into creative economy in certain areas also brings about greater earnings disparity among workers in different industries when other relevant factors are controlled for. This inquiry contributes to the existing knowledge on China's economic transformation and labor market dynamics, as well as broadens the debate on the creative economy to incorporate industrializing countries.

Data and Methodology

Data. The basic objective of this paper is to document the growth of China's creative economy and skill-based income inequality, as well as to explore their

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interrelationship. The literature presented in the last section provides a clear framework for evaluating the relationship between creativity and inequality. The overall research strategy of this study is as follows. First, all sectors of employment are classified into the creative sector, working sector, and service sector. Second, several inequality measures are adopted to trace the wage inequality among these employment sectors over time. Last, regression models are constructed to explore any association between creativity and income inequality.

We constructed a panel data set covering observation years of 1998, 2000, 2005, and 2008 for 31 provinces in China. The primary data of employment and wage refers to on-post staff and workers in urban units, which are readily available in China's Statistical Yearbooks for 31 provinces. "Urban units" cover most types of ownership and excludes urban self-employed. The reported wage refers to "total remuneration payment including wages, salaries and other payments, to the staff and workers" (National Statistics Bureau [NSB 1999]). Since 1998, only wages of fully employed or on-post staff and workers are reported. We selected 1998 as the starting year and 2008 as the ending year to trace a decade of change. In the recent decade, because of rapid socio-economic change, the Bureau of Statistics made major changes in ways of industrial classification. To make the industries as consistent as possible, we classified industries into three sectors, i.e., creative sector, working sector, and service sector. We also chose two interim years of 2000 and 2005 in order to follow the changes more closely.

Most of our data come from China Statistical Yearbooks provided by NSB (1999, 2001, 2006, 2009), which is the most consistent data resource in China. While it is ideal to use a data set on the city instead of province level, many of our key variables are unavailable at the city level across the selected time span. For example, statistics on the number of employees per industry, as well as average wage per industry, are only found on the province level. In order to better capture urban employment, we exclude primarily rural industries, including agriculture, forestry, animal husbandry, fishing, and mining, in our analysis. We also restrict our analysis to private sector employment by excluding public sector employment, i.e., public management and social organizations.

Creative sector and inequality. We classified employment in different industries into creative, working, and service sectors based on characteristics of each industry. While the industrial classification in China varies from that of the U.S., we defined the creative sectors in China with reference to Florida's definition in the U.S. context (Florida 2005b). According to Florida (2005b: 3), workers employed in creative sectors are those engaged in "science and engineering, research and development, and the technology-based industries, in arts, music, culture, and aesthetic and design work, or in the knowledge-based professions of health care, finance, and law." In China's case, it includes financial intermediation and insurance, real estate activities, education, culture and arts, radio, film and television, scientific research, and polytechnical services for year 1998 and 2000. For 2005 and 2008, it includes financial intermediation, real estate, leasing and business services, education, culture, sports and entertainment,

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scientific research, technical services, and geological prospecting, information transmission, computer service, and software. While education is not within the range of industries delineated by Florida, we include it because it is grouped with culture and arts before 2002 in the Chinese Statistical Yearbook data. Detailed listing of industries is provided in Table 1.

We used three different measures of income inequality. First, we calculated a Theil's T index, which is proper to compare income across groups, in order to capture

TABLE 1. INDUSTRIAL CLASSIFICATION IN CHINA, 1998–2008.

	Year 1998 and 2000	Year 2005 and 2008
Creative sector	Financial intermediation and insurance	Financial intermediation
	Real estate activities	Real estate
		Leasing and business services
	Education, culture and art, radio, film, and television	Education
		Culture, sports, and entertainment
	Scientific research and polytechnical services	Scientific research, technical services, and geological prospecting
		Information transmission, computer service, and software
Working sector	Manufacturing	Manufacturing
	Electricity, gas, and water production and supply	Production and supply of electricity, gas, and water
	Construction	Construction
	Transport, storage, and communications	Transport, storage, and post
Service sector	Geological prospecting and water conservancy	Management of water conservance, environment, and public facilities
	Wholesale and retail trade and catering services	Wholesale and retail trade
		Hotel and catering services
	Social services	Services to households and other services
	Health care, sporting, and social welfare	Health, social securities, and social welfare

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inequality among the creative, working, and service sectors. As individual-level data are not available in our analysis, we calculated the between group component of Theil's T statistic, which can be used as a lower bound for the index in the population. Second, we derived a ratio between industries with the highest and lowest average wage. Third, as a robustness check, we also calculated a Theil's T among all industries to examine the overall wage dispersion patterns. All three measures are tested as dependent variables in regression models.

The Theil's T index (T) for the population consists of two components, the between-group component (T'_g) and the within-group component (T^w_g).

$$T = T'_g + T^w_g$$

The between-group component can be algebraically expressed as

$$T'_g = \sum_{i=1}^{m} \left\{ \left(\frac{p_i}{P} \right) * \left(\frac{y_i}{\mu} \right) * \ln \left(\frac{y_i}{\mu} \right) \right\} \quad (1)$$

where i indexes the group, p_i is the population of group i, P is the total population, y_i is the average income in group i, and μ is the average income across the entire population. A higher Theil's T value denotes a greater income inequality across groups. The first Theil's T is between-sector while the second is between industry. Since we classified all industries into three sectors, i.e., creative sector, working sector, and service sector, the Theil's T for three sectors is expected to be lower than the Theil's T for all industries.

Model and variables. We estimated ordinary least squares models that regress the inequality measures on share of the creative sector in a province, as well as other relevant variables. The model is expressed as

$$Inequality_{it} = \alpha_i + \beta \times CreativeSector_{it} + \gamma X_{it} + \varepsilon_{it} \quad (2)$$

where i denotes year, t stands for province, and X_{it} is a series of explanatory variables employed in our analysis. These include the following:

Creativity measures the percentage of workforce employed in the creative sector in the local economy and is included to test the creativity hypothesis. It is hypothesized that the more creative the local economy, the more likely it will experience larger income gap among urban workers. As elaborated in the previous section, the magnitude of manufacturing employment, high-tech output, foreign trade, SOEs employment, and internal migration might all have an effect on the inter-sector income disparity in the regional economy. All these factors are entered as independent control variables.

Manufacturing measures the percentage of workforce employed in manufacturing industries. Although it is desirable to unbundle manufacturing industries according to produced products, such data are not available at the local level. We simply use the overall manufacturing employment in the model. Evidence from Western countries

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indicates that the share of middle-income manufacturing jobs helps compress income inequality. Evidence based on China's context is not clear. High tech is calculated as the ratio of gross output of high-tech industries in gross regional industrial product. It captures the effect of technical change on inequality. Migration is measured by the percentage of the local population without official registration (*hukou*) in each region. Those without a *hukou* are mostly migrants from other jurisdictions. The share of population without local *hukou* is a proxy of migration dynamics in each province. The effect of migration is expected to be positively related to inequality as migrants are likely to increase the supply of low-skilled labor and contribute to competition of industries with low-entry barriers, while exerting little influence on industries with high-entry barriers, and thus enlarge inter-industry wage dispersion. Trade is calculated as the ratio of total value of imports and exports in gross regional product. International trade is argued to disproportionately profit the rich and the powerful and favor high-productivity firms in an increasingly competitive market. It is hypothesized that a more open economy will broaden the income gap.

SOE is defined as the share of state-owned enterprise employment in total provincial urban employment. It is introduced to investigate the effects of enterprise reform on urban inequality. Evidence is ambiguous on the direction of such effect as higher concentration of SOE employment can help compress the income gap with stable middle-class jobs but it can also enlarge the gap since SOE employees enjoyed a wage premium that is protected against competition. Descriptions of these variables as well as their corresponding data sources are presented in Appendix A.

As there are four time points in our panel data set, three-time dummies representing years of 2000, 2005, and 2008, are included to control for any year-specific fixed effects. Descriptive statistics of the independent variables by year are shown in Table 2. The ratio of gross output of high-tech industries to gross regional industrial product increased steadily from 19.7 percent in 1998 to 28.1 percent in 2005 and remained constant since then. The same pattern is observed for the ratio of imports and exports to gross regional product as a measure of openness of economy. During the same period, the share of employment in SOEs decreased sharply from 69 percent to 53 percent as a result of privatization reform. Share of migrants peaked around 2000 at 13 percent but slowly declined afterwards, probably because of increasingly loose policies to grant *hukou* to migrants.

Table 3 presents the correlation matrix for all selected variables, which provides evidence on their association. Indices of creativity, migration, trade, high tech, and trade all have significant positive association with three inequality measures, while SOE employment has a significant negative association. The relationship between manufacturing and local inequality is subtle as it is only negatively correlated with the wage gap measure at the 0.1 level.

When we take a closer look at the association between creativity and other measures, we found several interesting results. First, the creativity measure is the only variable that is positively correlated with share of SOE employment, which indicates

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TABLE 2. DESCRIPTIVE STATISTICS OF VARIABLES.

Variables	1998		2000		2005		2008	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Theil's T (three sectors)	0.0039	0.0025	0.3868	0.2561	0.9537	0.9535	1.2042	1.0937
Wage ratio (highest to lowest)	2.1178	0.3636	2.1458	0.3407	2.9813	0.5910	3.3767	1.1268
Theil's T (all industries)	1.9712	1.0496	2.0713	1.1463	3.1416	1.6366	3.7616	1.9919
Creativity	0.2150	0.0369	0.2393	0.0428	0.3120	0.0631	0.3214	0.0713
Manufacturing	0.3551	0.0753	0.3326	0.0808	0.3133	0.1034	0.3067	0.1102
Migration	0.0602	0.0318	0.1352	0.0777	0.1290	0.0916	0.0990	0.0946
Trade	0.2236	0.3019	0.2643	0.3544	0.3727	0.4870	0.3597	0.4486
High-tech industries	0.1971	0.1992	0.2364	0.2522	0.2810	0.3298	0.2712	0.3354
State-owned enterprises	0.6903	0.0893	0.6771	0.1051	0.5678	0.1442	0.5298	0.1535
	$N = 31$		$N = 31$		$N = 31$		$N = 31$	

Source: Authors' calculation of China Statistics Yearbook data.

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TABLE 3. CORRELATION MATRIX OF VARIABLES (1998–2008).

		1	2	3	4	5	6	7	8	9
1	Theil's T (three sectors)	1.000								
2	Wage ratio	0.691***	1.000							
3	Theil's T (all industries)	0.817***	0.829***	1.000						
4	Creative sector	0.253**	0.466***	0.299***	1.000					
5	Manufacturing	0.055	−0.157*	−0.104	−0.792***	1.000				
6	Migration	0.443***	0.392***	0.368***	−0.082	0.221**	1.000			
7	Trade	0.425***	0.398***	0.348***	−0.131	0.345***	0.838***	1.000		
8	High-tech industries	0.396***	0.412***	0.338***	−0.088	0.282***	0.770***	0.910***	1.000	
9	State-owned enterprises	−0.546***	−0.431***	−0.390***	0.166*	−0.537***	−0.551***	−0.649***	−0.540***	1.000

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Source: Authors' calculation of China Statistics Yearbook data.

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that the creative sectors remain dominated by SOEs. These findings are consistent with the fact that the finance sector is still state dominant (Yue, Li, and Sicular 2010) and public research institutes have been playing a more important role than the private sector in China's innovation system (Wu 2007). Acknowledging this fact, the nation tends to merge some state-owned research institutes into incumbent industrial enterprises or university-affiliated enterprises (Wu 2007). Second, local creativity is significantly negatively correlated with manufacturing activities, which might indicate that the creative sectors are not complementing manufacturing activities. Third, creativity is not significantly related with migration, which echoed the finding that with higher entry barriers, these sectors do not absorb migrant workers (Yue, Li, and Sicular 2010). Last, nonassociation between creativity and high-tech industry development might indicate that scientific research is not utilized into industrial output.

The share of manufacturing is strongly associated with migration, trade, and high-tech industries. These findings indicate that manufacturing industries are attracting migrant workers; localities with strong manufacturing base are more open to trade; manufacturing industries tend to coexist with concentration of high-tech industries.

Findings

Growth of the creative employment. The growth of the creative sector in China between 1998 and 2008 is documented in Table 4. The size of the creative sector grew steadily from 20 million to over 27 million during this period, now accounting for 29.2 percent of the total urban private employment as compared with 20.3 percent 10 years ago. This figure is already fairly close to Florida's estimate of the creative share in industrialized economies, at about a third. In comparison, the share of the working sector remained relatively stable at around 55 percent over the years while the service sector shrunk from 23.1 percent to 15.3 percent. It is evident that the creative economy, or knowledge economy, experienced rapid growth in China.

Because of concerns about the change in classification methods, we also selected and compared consistent industries, which are representative of the three sectors in 4 years. We selected finance, as well as leasing and business service, to represent the creative sector; manufacturing and construction to represent the working sector; and wholesale, retail trade, hotel, and catering services to represent the service sector. Share of employment in the finance industry increases steadily from 3.0 percent in 1998 to 3.5 percent in 2008. Especially between 2005 and 2008, the number of employees increased from 2.95 million to 3.26 million, which was a 11.6 percent increase. At the same time, share of the employment in leasing and business service increased from 2.3 percent to 2.6 percent from 2005 to 2008 and the number of employees increased 24.3 percent in this period.

Manufacturing is the single largest industry in the national economy. The number of employees and its share of total employment decreased from 1998 to 2005, and increased from 2005 to 2008. The decrease in manufacturing employment might be due

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TABLE 4. NUMBER OF EMPLOYEES (IN 10,000) AND SHARE BY SECTOR IN CHINA, 1998–2008.

	1998		2000		2005		2008	
	Number	Share	Number	Share	Number	Share	Number	Share
Creative sector	2009	20.3%	2050	22.8%	2518	28.9%	2725	29.2%
Finance	301	3.0%	294	3.3%	295	3.4%	326	3.5%
Leasing and business service	—	—	—	—	199	2.3%	247	2.6%
Working sector	5597	56.6%	4924	54.8%	4824	55.3%	5180	55.5%
Manufacturing	3769	38.1%	3240	36.0%	3097	35.5%	3329	35.7%
Construction	846	8.5%	744	8.3%	854	9.8%	971	10.4%
Service sector	2291	23.1%	2019	22.5%	1384	15.9%	1431	15.3%
Wholesale and retail trade, hotel, and catering	1256	12.7%	977	10.9%	675	7.7%	665	7.1%
Total employment	9897	100%	8994	100%	8725	100%	9336	100%

Note: Total employment refers to total urban private employment.
Source: Authors' calculation of China Statistics Yearbook data.

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to shedding of surplus workers in inefficient state-owned factories and advancement in labor productivity (Banister 2005b). Although the overall trend in share of manufacturing employment was decreasing, its growth varies across regions (See Appendix B). Among 31 provinces, only five provinces experienced growth in manufacturing employment in the period between 1998 and 2008, including Jiangsu, Zhejiang, Fujian, Shandong, and Guangdong, all of which are located on the east coast. These findings suggest the uneven distribution of manufacturing across provinces and its spatial concentration along the coastal region. Construction employment experienced a robust growth since 2000. The share of construction employment increased from 8.3 percent to 10.4 percent, with a 30.5 percent increase in the number of employees, which reflects the booming housing market and infrastructure construction in China.

Another interesting finding from the employment data is the declining magnitude and share of employment in low-end service industries, represented by wholesale and retail trade, and hotel and catering services. These findings are not consistent with the evidence of economic restructuring in the U.S. that low-end service employment increase with the rise of creative economy. In China, the low-end services declined at the same time when we observe an increase in the creative sector. One possible explanation could be that the booming manufacturing industries in the coastal provinces and low-skilled construction industries absorbed most rural migrant workers, which should provide a growth engine for low-end service industries.

Wage inequality. The average annual wages for all urban workers and for the creative sector, the working sector, and the service sector, respectively, for 4 years of observation are presented in Table 5. Nominal income increased substantively over the past 10 years for all urban workers in China, though the growth rate varies across sectors. Creative workers not only have the highest wages across all groups in all years, their wage growth rate is also the highest among all. The wages of China's working class were in the middle of the creative sector and the service sector, and closely resembled the overall average in 1998 and 2000. However, their wage growth slowed down from 2005 and was surpassed by that of the service class. If we refer back to the increase of construction employment, we might infer that increase of low-wage construction employment drew the overall average wage of working sector down. In the U.S. context, manufacturing workers were traditionally perceived as a major component of the middle class. However, in China, the average wage of manufacturing is lower than overall average wage.

The three inequality measures clearly demonstrate the enlarging income inequality across these sectors during the 10-year time period. The degree of disparity across all three sectors is measured by Theil's T index. In 1998, the Theil's T was as low as 0.002, meaning that three average wages deviated little from the overall average. It rose steadily over the past 10 years and arrived at 1.494 in 2008. In 1998, the wage of highest-earning industry (financial intermediation and insurance) was 2.118 times of the lowest-earning industry (wholesale and retail trade, and catering services). By 2008, the figure increased to 3.377. In other words, the wage of the creative class grew

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TABLE 5. AVERAGE WAGE BY SECTOR AND WAGE INEQUALITY IN CHINA, 1998–2008.

	1998	2000	2005	2008
Annual wage (yuan)				
Average	7,624.2	9,580.5	18,430.9	29,128.2
Creative sector	8,304.0	10,527.8	22,379.5	37,108.7
Finance	10,633.0	13,478.0	32,228.0	61,841.0
Leasing and business service	—	—	20,992.0	31,735.0
Working sector	7,638.3	9,458.5	16,744.7	25,520.4
Manufacturing	7,064.0	8,750.0	15,757.0	24,192.0
Construction	7,456.0	8,735.0	14,338.0	21,527.0
Service sector	6,993.5	8,915.9	17,124.3	26,992.1
Wholesale and retail trade, hotel, and catering	5,865.0	7,190.0	14,899.5	23,915.8
Inequality				
Theil's T (three sectors)	0.004	0.387	0.954	1.204
Wage ratio (highest to lowest)	2.118	2.146	2.981	3.377
Theil's T (all industries)	1.971	2.071	3.142	3.762

Note: Yearly wage not adjusted for inflation.
Source: Authors' calculation of China Statistics Yearbook data.

faster than the other two sectors. The between-industry Theil's T was 1.971 in 1998, which was higher than the between-sector Theil's T because of larger variance between all industries. This index also increased to 3.762 in 2008. All these suggest that skill-based or industry-based earning disparity enlarged substantively in urban China in recent years.

Model results. Beyond national statistics on creativity and inequality, regression analysis is conducted to test whether they are closely related on the provincial level, i.e., do more creative local economies have greater income inequality? Table 6 demonstrates the results of regression analysis of wage inequality on creativity and other relevant variables and provides evidence on the extent to which each factor contributes to inequality. As it is a 4-year pooled sample of 31 provinces in China, the total sample size is 124. Three sets of regression models utilizing different inequality measures as the dependent variable are estimated. In each set of regressions, we estimated three models. The first one includes all independent variables, the second includes all independent variables plus time dummies to control for any year-specific fixed effects, and the third one includes all independent variables, time dummies, and province

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TABLE 6. REGRESSION RESULTS ON INEQUALITY INDEX IN CHINA, 1998–2008.

	Theil's T (three sectors)			Wage ratio			Theil's T (all industries)		
	Model I	Model II	Model III	Model I	Model II	Model III	Model I	Model II	Model III
Intercept	0.339	0.242	−4.652***	1.812	1.342	2.553	5.101**	4.296 *	0.943
Creative sector	5.291***	2.920	8.587***	6.995***	4.107*	8.946***	5.322	1.995	11.832**
Manufacturing	1.133	0.725	15.865***	0.363	0.231	5.330*	−3.452	−3.360	18.728***
Migration	2.772**	3.306 *	3.692**	1.425	4.625***	3.142	3.554	8.471**	9.590**
Trade	−0.443	−0.435	0.259	−0.378	−0.751*	0.476	−0.570	−1.168	1.076
High-tech industries	0.400	0.451	−1.763**	0.919*	1.004**	−0.785	0.995	1.093	−3.098*
State-owned enterprises	−2.869***	−1.903**	−3.099**	−2.335***	−0.721	−6.492***	−5.080***	−2.934	−11.077***
Time fixed effects	N	Y	Y	N	Y	Y	N	Y	Y
Province fixed effects	N	N	Y	N	N	Y	N	N	Y
N	124	124	124	124	124	124	124	124	124
Adj-R^2	0.427	0.427	0.757	0.511	0.562	0.658	0.297	0.318	0.674

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Source: Authors' calculation of China Statistics Yearbook data.

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dummies to control for both year-specific and province-specific fixed effects. We want to emphasize that our results are better interpreted as correlation instead of causality.

The results from these six models tell a relatively consistent story, though the magnitudes of effects vary across different models. The models using both time dummies and province dummies have the highest explanatory power based on adjusted R^2 value no matter which dependent variable is used, indicating large provincial variations in China. Most of the independent variables show expected signs in line with theory and our hypothesis. Creativity has a significant and positive effect on inequality: A 1 percent increase in a region's share of the creative sector employment will increase the inequality index by 0.09 to 0.12. This finding is consistent with findings in the U.S. context (Donegan and Lowe 2008) and is attributable to a number of possible explanations. As argued by Sassen, economic restructuring generates large numbers of both high-wage and low-wage jobs and brings about a bifurcated wage structure (2001).

Aside from the creativity argument, the impact of manufacturing employment on inequality is positive and significant, especially in models controlling for both time and geographic fixed effects. The finding suggests that provinces with a higher concentration of manufacturing employment tend to have larger magnitude of income inequality. Unlike developed countries like the U.S., the manufacturing workers in China are not considered as middle class because of the low wage they earn. Low-end manufacturing remains a major job provider for unskilled migrant workers.

Migration is proved to be significantly positively related to inequality, which echoes the theoretical argument that inflow of rural migrants increases the supply of low-skilled labor and drags the average industrial wage down while exerting little effect on those industries with higher entry barriers. The impact of trade on inequality is positive in models controlling time and geographic fixed effects but not significant. The coefficient of high-tech ratio is negative in fixed effects models. The SOE employment has a significant negative association with income inequality. Privatization reform in China gave rise to large-scale labor relocation and resulted in extensive unemployment. High presence of SOEs in a local economy tends to compress the income gap by providing relatively stable and homogeneous wages to their workers.

Conclusion and Discussion

This paper applies a well-debated framework, namely, the dual trajectories of creativity and inequality, to the unique context of China's urban economy. While both the knowledge economy and income inequality in China have attracted academic and policy attention recently, no study has systematically traced their growth over time and tested their interrelationship. As China establishes its long-term goal of building an innovation-oriented knowledge economy into the future, it is imperative to examine the growth pattern of its creative sector and to explore the possible social consequences of such development.

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The results from this analysis clearly demonstrate the rapid expansion of the creative economy in urban China. Employed in the knowledge-intensive and innovation-intensive industries, these workers now make up 29 percent of all urban private workforces. This figure closely resembles the comparable statistics obtained in the U.S. and other OECD countries. In terms of earnings, the wage rate of the creative sector is not only higher than other works in all years, but also grows at a faster rate. In 2008, the average wage rate of the creative sector is 1.45 times of the average working sector wage and 1.37 times of the average service sector wage. The rise of the creative economy coupled with their higher wage rate would mean that they will make increasingly important contributions to total earned income in the urban economy.

Three measures are used to gauge the degree of disparity across wages in these three sectors: Theil's T index for the three broad categories, wage ratio between the highest-earning industry and lowest-earning industry, and Theil's T index for all sectors identified. All three indices rose substantively during the time period between 1998 and 2008. We further tested the hypothesis that the rise in the creative economy will bring about greater income inequality in urban areas (Florida 2002; Sassen 2001). Similar to results established in the U.S. context (Donegan and Lowe 2008), evidence from China also lends support to the argument that income inequality is a by-product of increasingly creative economy. The several theoretical frameworks surveyed earlier all have their validity in explaining the Chinese case. Economic restructuring in China generates large numbers of high-wage and low-wage jobs and forms a bifurcated wage structure. Marketization and technological changes also increase demand for and reward of highly educated and highly skilled workers. The consumption habits of these creative workers also create the demand for low-skilled labor to engage in low-end services. All these elements contribute to an enlarging skill-based and sector-based income gap.

While creativity is positively linked to inequality, other important factors are also evident in our results. Apparently, earnings inequality in China is a more complicated issue than what the creativity argument alone could possibly explain. While the presence of high technology and trade has subtle effects on wage inequality in urban China, the three most important factors are manufacturing employment, population mobility, and ownership type. A locality with a larger share of manufacturing employment tends to have a higher income inequality because of the low wage manufacturing workers earn. Internal migration is found to be positively linked to inequality by increasing the supply of low-skilled labor and intensifying competition among industries with low-entry barriers. The concentration of SOE employment tends to narrow the income gap by offering relatively homogeneous wage rates. Those regional economies with deeper marketization and privatization might thus experience greater income inequality.

As China continues its stride toward a knowledge economy, it needs to be mindful of the social consequences that might accompany this process. Regions with high degrees of creativity, manufacturing activity, privatization, and population migration

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are more prone to the income polarization between the high skilled and the low skilled and earnings disparity across different industries. It thus poses an important policy challenge for policy makers to be concerned with the socio-economic well-being of the less privileged segment of the workforce in an increasingly creative and knowledge economy. Policies need to be in place to address income disparity and associated issues that accompany rapid economic growth.

While this study provides a first look at the dual paths of creativity and inequality in China's urban development, it is constrained by data limitations in numerous ways. First of all, provincial data are used because of the unavailability of key statistics on the city level. Though efforts were made to exclude rural and public employment in order to proxy for urban private employment, it is less ideal than accurate city level data. Second, it is an open question how official data capture the real income of urban workers, and if bias exists, how it varies across different industries. Third, our sector classification is limited by how the statistical yearbook data group various industries together. All these issues point to directions that warrant further research.

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Appendix A Description of Variables and Data Sources

Variables	Description	Source
Inequality index	Theil's T index.	China Statistical Yearbooks, 1998, 2000, 2005, 2008
Creative sector	The percentage of urban private employment in the creative sector	China Statistical Yearbooks, 1998, 2000, 2005, 2008
Manufacturing	The percentage of urban private employment in manufacturing	China Statistical Yearbooks, 1998, 2000, 2005, 2008
Migration	The percentage of population without official local registration status (hukou)	China Statistical Yearbooks, 1998, 2005, 2008 and 2000 census
Trade	The ratio of total value of imports and exports trade to gross regional product	China Statistical Yearbooks, 1998, 2000, 2005, 2008
High-tech industries	The ratio of gross output of high-tech industries to gross regional industrial product	China Statistical Yearbooks and China Statistics Yearbook on High Technology Industry 1998, 2000, 2005, 2008
State-owned enterprises	The percentage of urban employment in state-owned enterprises (SOE)	China Statistical Yearbooks, 1998, 2000, 2005, 2008

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Appendix B Descriptive Statistics by Provinces, 1998 and 2008

Province	tt98	tt08	ratio98	ratio08	tt(2)98	tt(2)08	creativity98	creativity08	manu98	manu08	mig98	mig08	trade98	trade08	hightech98	hightech08	soe98	soe08
Beijing	0.003	3.418	1.933	7.203	0.861	9.575	22.4%	44.1%	27.6%	19.6%	15.9%	43.7%	1.06	1.70	0.83	1.39	68.4%	29.3%
Tianjin	0.001	1.004	1.774	4.138	1.133	4.645	16.6%	23.7%	44.7%	43.1%	9.0%	6.4%	0.64	0.83	0.65	0.57	59.7%	39.4%
Hebei	0.002	0.870	2.317	2.964	2.059	3.471	21.2%	33.3%	38.5%	31.0%	5.4%	5.2%	0.08	0.17	0.07	0.07	73.0%	62.9%
Shanxi	0.011	1.038	2.696	2.980	3.659	3.088	19.9%	33.3%	36.9%	28.5%	6.7%	7.2%	0.06	0.14	0.03	0.05	69.0%	63.7%
Inner Mongolia	0.005	0.508	2.496	2.563	3.085	2.790	22.8%	35.2%	31.9%	23.8%	8.0%	13.2%	0.06	0.07	0.03	0.05	68.0%	60.2%
Liaoning	0.002	0.842	1.883	2.982	1.421	2.439	15.8%	26.8%	43.3%	37.6%	6.4%	9.5%	0.27	0.37	0.14	0.19	64.6%	52.0%
Jilin	0.003	0.680	2.093	2.333	1.461	1.663	20.3%	34.2%	37.7%	29.4%	3.9%	7.1%	0.09	0.14	0.16	0.16	70.8%	58.5%
Heilongjiang	0.004	0.962	2.023	2.448	2.597	2.123	17.4%	28.7%	35.3%	28.3%	6.3%	9.8%	0.06	0.19	0.08	0.07	69.4%	62.9%
Shanghai	0.003	2.516	1.966	6.703	0.885	5.912	15.6%	29.5%	44.1%	41.7%	14.3%	32.5%	0.68	1.59	0.41	1.06	61.7%	35.3%
Jiangsu	0.005	1.723	2.043	3.009	1.598	3.951	17.4%	23.1%	44.5%	50.7%	7.4%	11.5%	0.30	0.88	0.25	0.78	58.3%	31.9%
Zhejiang	0.003	5.182	1.819	4.195	1.495	9.412	18.6%	18.9%	37.6%	48.8%	5.5%	17.8%	0.24	0.68	0.15	0.26	51.9%	21.5%
Anhui	0.005	0.482	1.909	2.742	1.305	1.659	20.8%	34.8%	36.6%	26.8%	3.8%	5.3%	0.07	0.16	0.07	0.10	63.8%	55.2%
Fujian	0.001	1.916	1.836	3.723	1.042	4.544	20.6%	20.0%	45.2%	54.9%	10.1%	18.1%	0.45	0.54	0.27	0.43	49.4%	27.1%
Jiangxi	0.003	0.345	1.997	2.319	1.650	2.219	22.9%	32.1%	37.0%	32.5%	6.3%	5.3%	0.06	0.14	0.22	0.20	73.4%	60.0%
Shandong	0.007	1.565	2.282	2.765	2.638	3.229	19.5%	23.1%	45.0%	47.6%	5.8%	5.1%	0.20	0.36	0.09	0.25	65.6%	38.2%
Henan	0.004	0.640	2.044	2.377	2.178	1.857	20.1%	31.1%	37.0%	28.1%	2.2%	2.9%	0.03	0.07	0.07	0.09	60.5%	49.4%
Hubei	0.005	0.450	2.024	2.792	1.580	1.693	19.1%	27.6%	38.9%	29.8%	7.3%	5.3%	0.08	0.13	0.15	0.19	71.5%	54.5%
Hunan	0.001	0.703	1.809	2.337	1.378	1.834	24.5%	31.7%	33.8%	26.2%	4.3%	3.8%	0.05	0.08	0.08	0.12	75.2%	51.3%
Guangdong	0.001	2.573	1.737	4.059	1.479	6.872	18.5%	25.2%	39.8%	46.7%	8.0%	29.3%	1.26	1.29	0.52	0.97	51.5%	31.1%
Guangxi	0.003	0.378	1.978	3.611	1.937	2.856	26.9%	37.0%	31.9%	25.1%	2.7%	4.3%	0.10	0.13	0.07	0.09	74.1%	62.0%
Hainan	0.004	0.905	2.281	3.521	3.072	4.814	28.9%	39.1%	19.4%	14.5%	5.4%	9.2%	0.33	0.21	0.32	0.16	73.9%	56.8%
Chongqing	0.002	0.841	2.137	3.773	1.121	3.617	21.0%	28.4%	38.7%	27.5%	4.8%	8.4%	0.06	0.11	0.12	0.11	69.1%	45.0%
Sichuan	0.002	0.879	2.077	2.954	1.547	3.532	22.7%	28.9%	35.3%	28.3%	4.6%	4.4%	0.05	0.12	0.31	0.28	67.2%	52.2%
Guizhou	0.008	0.175	2.105	4.049	1.740	3.992	24.6%	38.2%	33.4%	23.7%	2.7%	5.5%	0.06	0.07	0.21	0.18	76.1%	66.8%
Yunnan	0.001	0.219	1.525	3.373	0.516	3.405	26.1%	34.9%	29.0%	24.0%	4.4%	5.7%	0.07	0.12	0.04	0.06	78.6%	54.1%
Tibet	0.011	2.336	3.207	3.542	3.880	4.860	31.1%	52.8%	10.4%	6.7%	3.0%	0.7%	0.11	0.13	0.11	0.20	85.8%	91.3%
Shaanxi	0.005	1.940	2.305	3.396	2.684	4.095	22.4%	32.4%	38.3%	32.1%	4.7%	5.8%	0.12	0.08	0.50	0.20	77.1%	66.8%
Gansu	0.006	0.287	2.303	2.259	1.750	2.305	20.3%	36.8%	38.3%	26.2%	1.7%	2.5%	0.04	0.13	0.04	0.05	76.7%	71.4%
Qinghai	0.006	1.171	3.078	3.170	5.565	3.604	20.1%	36.3%	30.2%	23.0%	4.7%	7.9%	0.04	0.05	0.03	0.03	83.8%	68.1%
Ningxia	0.001	0.620	2.191	3.815	2.373	4.382	22.5%	34.3%	33.7%	26.7%	3.3%	8.2%	0.08	0.11	0.06	0.05	73.0%	60.6%
Xinjiang	0.001	0.161	1.786	2.586	1.418	2.175	25.8%	40.7%	26.8%	18.2%	7.8%	5.4%	0.11	0.37	0.02	0.01	78.9%	62.9%

Source: Authors' calculation of China Statistics Yearbook data.

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