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The Evolution of China's Pay Inequality from 1987 to 2012

Wenjie ZHANG

Abstract: This paper provides new estimates of the evolution of pay inequality in China, overall and also by region and sector, in the period from 1987 to 2012, using the between-group component of Theil's T-statistic measured across regions and sectors. We find that China's overall pay inequality started to rise rapidly in the early 1990s and that it peaked in 2008, with the between-province component peaking as early as 2002. Since 2008, overall pay inequality has decreased, with between-province and between-sector inequality both showing steady declines. We argue that China's pay inequality during the reform period was not simply a matter of economic inequality; it was the joint product of both market and institutional forces. In this vein, we also argue that the recent decline of overall pay inequality after the 2008 global economic crisis was not a temporary phenomenon triggered by the global downturn, but a long-term outcome driven by both economic and policy factors.

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Keywords: China, regional disparities, urbanisation, pay inequality, development plans

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Introduction

China has pursued economic reform since 1978. At an advantage due to the open-door policy and the introduction of special economic zones, a handful of coastal provinces and eastern municipalities have become the biggest beneficiaries of the economic reform, while the vast interior provinces have remained relatively poor and underdeveloped. As Deng Xiaoping's favourite slogan stated, some people in China have to become rich first. But the rest do not necessarily follow. Unbalanced economic development underlies a dramatic rise in inequality in China, especially since the early 1990s. Since the 2000s, this rise has become both the focal point of public attention and a headache for the Chinese state.

Rising economic inequality in China is well documented. Many studies have concentrated on rural–urban income inequality: its formation, direction, and social and political effects (Tsui 1991; Kanbur and Zhang 1999; Gustafsson and Li 2001; Benjamin et al. 2005; Wu and Perloff 2005; Sicular et al. 2007; Luo and Zhu 2008; Gao and Riskin 2008). The well-accepted argument is that the rapidly rising trend of income inequality began in the early 1990s and was mainly attributable to the widening gap between rural and urban regions. A variety of driving forces have been highlighted, ranging from endowments of household characteristics – for instance, location of residence and education (Luo and Zhu 2008; Sicular et al. 2007) – to policy-related factors, such as economic restructuring and rural/urban reclassification (Benjamin et al. 2005), the revival of market forces (Gao and Riskin 2008), the degree of decentralisation (Kanbur and Zhang 2005; Lin 1999), and others.

Rising interprovincial inequality is another well-covered topic (Tsui 1993, 2007; Gustafsson and Li 2002; Shorrocks and Wan 2005; Fan and Sun 2008; Gries and Redlin 2009; Hao and Wei 2010; Li and Wei 2010). Galbraith, Krytynskaia, and Wang (2004) showed that much of the rise could be attributed to the relative gains of just a few provinces and municipalities, namely Guangdong, Shanghai, and Beijing. The major losers in regional (and relative) terms included the Northeast (Manchuria) and the Southwest (Sichuan). In their study on the household survey data of the Chinese Academy of Social Sciences (CASS), Gustafsson and Li (2002) also observed that between-province inequality is more substantial than intraprovince inequality at the county level. By decomposing interprovincial inequality into

“between” and “within” types, Fan and Sun (2008) revealed the spatial dynamics of China's growing inequality. Using Theil's T-statistic along with provincial GDP and population data from a number of editions of the *China Statistical Yearbook*, Akita (2003) reinforced the spatial characteristics of inequality in China during the 1990s. Applying Theil's L-index, Gustafsson, Li, Sicular, and Yue (2008) calculated inequality in three large geographical zones, Eastern, Central, and Western China, and found that the income gap between these three regions did not actually widen from 1995 to 2002, but that inequality declined within Eastern China. Furthermore, trade, government expenditure, foreign and domestic capital investments, globalisation, and marketisation, as well as human capital, have been identified as the key policy determinants of rising inequality (Kanbur and Zhang 1999; Tsui 2007; Gries and Redlin 2009).

While many studies discuss the rapid rise of China's economic inequality, very few studies suggest that inequality in China has peaked or has declined in recent years. Based upon survey data from the National Bureau of Statistics (NBS) of China, Li (2013) found that China's overall income inequality started to decrease in 2008 and that this decline has continued in both rural and urban areas. However, does this finding truly reflect China's inequality trend? If true, what other evidence exists based on different methodologies and data sources?

In this study, we aim to answer these questions by investigating China's pay inequality using the between-group components of Theil's T-statistic and wage data from official administrative yearbooks. Wage is one of the most important income sources for the Chinese population. According to the recent *Global Wage Report 2014/15*, published by the International Labour Organization (ILO), wage income accounts for the largest share of household income in China, and China's wage/income share is also the highest among emerging markets and developing countries (ILO 2014). As Gan (2013) discovered, the contribution of wage income to the overall income inequality in China is approximately 40 per cent, making it the largest contributor to the overall Gini coefficient compared to other sources of income – for instance, business income, investment income, and transfer income. The evolution of pay inequality across region/sector categories is usually a good instrument for estimating the evolution of inequality in other economic constructs, including

household income. In general, the large changes in economic inequality that usually occur at relative income levels in any economy are those between separate regions (for instance, between the North and South in China and between the West and Midwest in the United States) and between disparate sectors (for instance, between farmers and bankers, or between textile workers and petroleum engineers). While large inequalities exist within regions and within sectors, the changes in such inequalities over time tend to be comparatively small. In any event, such changes do not usually differ in type from the between-group variations; there is self-similarity at different scales. Thus the between-group measure of pay inequality tends to capture the overall evolution of the distribution. Even though pay inequality is a good indicator of overall economic inequality, it has not been very much discussed in the literature. Therefore, we seek to fill this perceived gap by providing new estimates of China's pay inequality, based upon Theil's T-statistic measured across regions and sectors. We are interested in exploring the main factors that might influence the trend of pay inequality in the context of economic development. We also investigate whether the overall decline in China's pay inequality since the 2008 crisis is a temporary phenomenon and, if it is not, whether it is a long-term outcome driven by both economic and policy factors.

Methodology and Data Source

Two main inequality indices are commonly used to assess China's economic inequality: the Gini coefficient and the generalised entropy index (Fan and Sun 2008; Hao and Wei 2009). Each index contains its own mathematical properties to explain inequality from different perspectives. For instance, the Gini coefficient is usually used to present an overview of inequality; it is also useful for facilitating the direct comparison of two populations, regardless of size. Many researchers calculated the Gini coefficient for China based upon different data sources (Khan and Riskin 1998; Ravallion and Chen 1999; Gustafsson and Li 2002; Benjamin et al. 2005; Wu and Perloff 2005; Kanbur and Zhang 2005; Chotikapanich, Rao, and Tang 2007; Wang, Smyth, and Ng 2009; Chen et al. 2010). But the major disadvantage of the Gini coefficient is that the index is difficult to decompose. So when exploring the contributions of various factors to overall in-

equality, researchers prefer to apply the technique of the generalized entropy index (the Theil index). In this study, we use the Theil index to analyse the evolution of pay inequality.

The rationale for preferring the Theil index is that, compared to other inequality indices, this index not only allows inequality to be decomposed into the sum of a “between-group” component and a “within-group” component, but it also has less stringent data requirements, which is advantageous when group data is easier to come by than individual survey data. There are two major data sources available to measure China's inequality: household survey data and grouped data (Chotikapanich, Rao, and Tang 2007). Although it would be preferable to have complete individual data to analyse trends in inequality, such data is rarely available. The existing data sets, such as the China Household Income Project (CHIP) survey, the China Health and Nutrition Survey (CHNS), and the National Bureau of Statistics (NBS) household survey, only cover several isolated years and individual provinces. Therefore, researchers are left to compromise by using aggregated data, which provides national coverage over continuous periods of time (Chotikapanich, Rao, and Tang 2007). A good data source alternative to the traditionally used household survey is the annual statistical yearbook.

The calculation of the Theil index requires two sets of data, each of which can be classified into mutually exclusive and completely exhaustive groupings. This requirement makes the annual state statistical yearbook an attractive data source. Every year, China's National Bureau of Statistics (NBS) publishes a comprehensive yearbook, which presents the country's economic and social development. The NBS yearbook chapter entitled “Employment and Wages” includes basic labour statistics, such as the number of employed persons, staff and workers, persons employed in different units, total wage bills, average wage bills, and registered unemployment rates in urban areas (NBS 2010). Wage and employment data for staff and workers was chosen for this study because it is disaggregated by economic sector and province, and has been consistently classified since 1988. In this study, the employment data refers to the total number of staff and workers at the end of each year by sector and province. The wage data comprises the total wage bills of staff and workers, also at the end of each year and by sector and province. Total wage bills are the total remuneration to all staff and workers in all formal sectors during

the reporting period. These bills include hourly paid wages, piece-rate wages, bonuses, allowances and subsidies, overtime wages, and wages paid under special circumstances. The wage bills are pre-tax and no social insurance premiums, utility bills, housing funds, or subsidies have been deducted (NBS 2012).

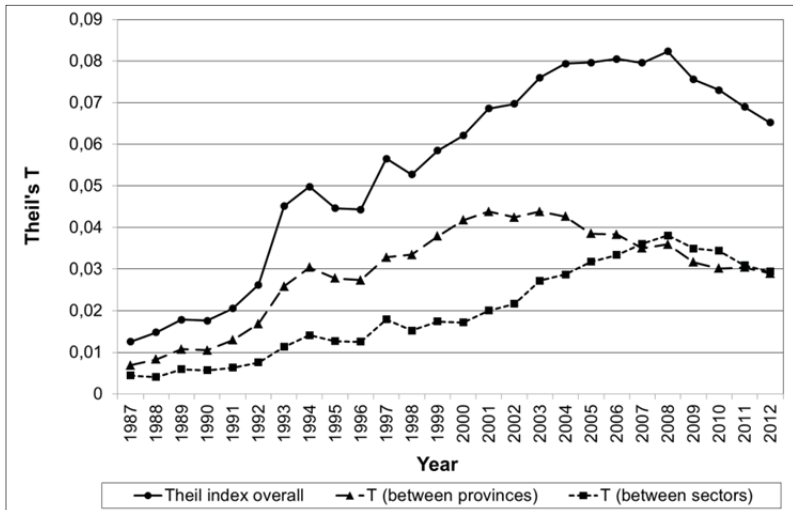
According to the editors' explanatory notes (NBS 2010), staff and workers are persons who work in and receive payment from units of state ownership, collective ownership, joint ownership, shareholding ownership, foreign ownership, and ownership by entrepreneurs from Hong Kong, Macau, and Taiwan. Persons employed in township enterprises, persons employed in private enterprises, urban self-employed persons, foreigners, and persons from Hong Kong, Macau, and Taiwan who work in urban units are not included. Informal sectors are also excluded. However, this does not significantly affect the moving pattern of inequality. The active element in the evolution of inequality tends to be captured by movements within the formal sector. This is because inequalities in the informal sector, such as among peasant farmers or urban service workers, are inclined to be comparatively small and comparatively stable. There are no peasant farmers whose incomes match those of bankers, lawyers, or doctors, and there are no household domestics with the incomes of the professionals they work for. Thus, while a measure based on the formal sector alone is necessarily incomplete, it is not misleading as far as the evolution of inequalities over time is concerned.

Another advantage of using statistical yearbooks is that yearbooks provide the most recent and standard official data on wages and employment over a continuous period of years, compared to household survey data. Payroll data is often available sooner in the yearbooks than in surveys, and the historical record is substantially more complete, so this information source complements and extends the survey record while (generally) providing independent confirmation of overall trends. Furthermore, a comparison between the results of this study and the results of those studies of measurements based on data from household surveys also provides clear evidence that the data used here is reliable enough to draw valid conclusions about the trends in China's pay inequality during the transitional period.

The Evolution of Pay Inequality in China from 1987 to 2012

We present some original estimates of the evolution of pay inequality in China from 1987 to 2012. The metric is the between-province and between-sector components of Theil's T-statistic; the underlying data is wage and employment records from the annual statistical yearbooks, for which consistent classification schemes exist (or can be constructed) going back to 1987. Figure 1 presents a broad overview of the evolution of pay inequality in China, both overall and by region and sector, from 1987 to 2012. As Figure 1 shows, pay inequality in China began rising in 1992 – not just between provinces and between sectors, but overall as well. However, in the early 2000s the behaviour of these two dimensions of inequality diverged (Galbraith, Hsu, and Zhang 2009). Inequality between provinces peaked around 2002 and declined after 2003. In contrast, inequality between sectors continued rising and reached its apex in 2008. Combining the two factors, the growth of inequality overall slowed after 2002, peaked in 2008, and then began a pronounced decline.

Figure 1. Inequality Between and Within Provinces in China, 1987–2012



Source: China Statistical Yearbooks and the author's calculations.

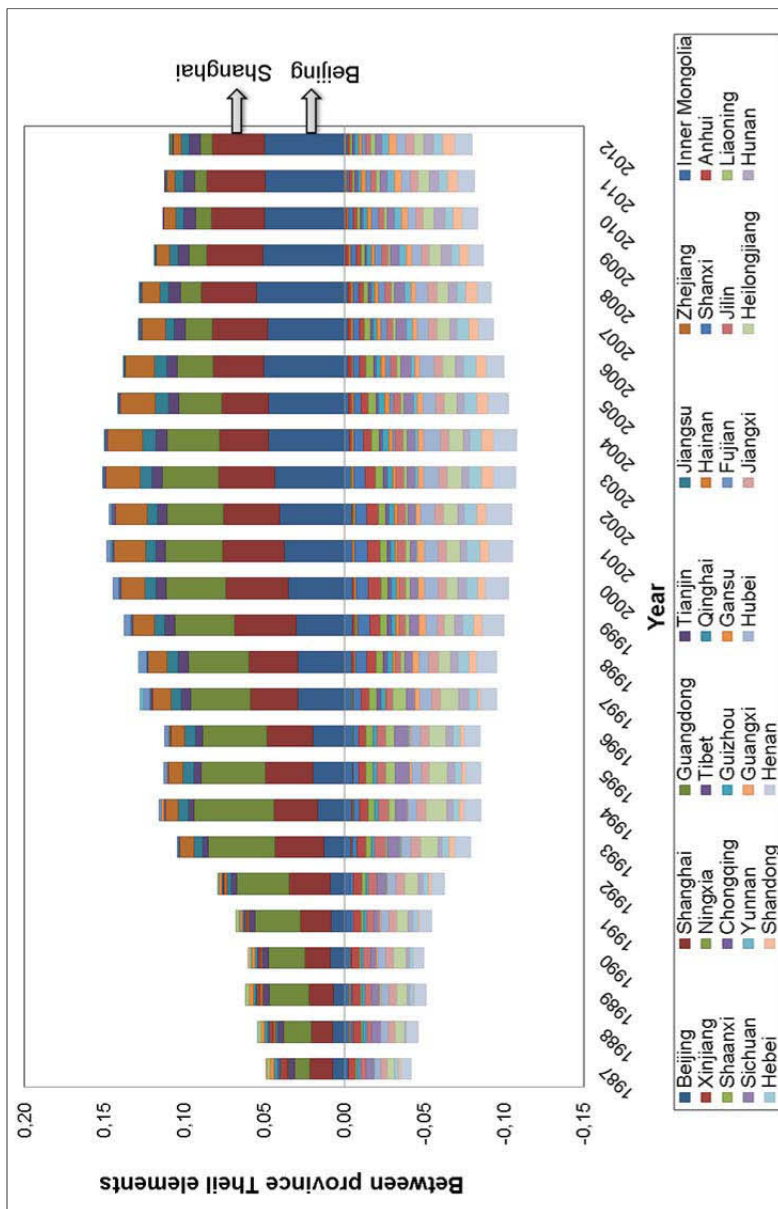
Pay Inequality Between and Within Geographical Regions

Figure 2 expresses the changing interprovincial dimensions of China's pay inequality in a stacked bar graph. Each bar represents a year, and each segment represents the contribution of a province to overall inequality in that year. Each segment reflects both the population weight of the province (measured by observed employment) and the ratio between the average provincial wage and the national average wage. Contributions greater than zero indicate provinces with mean wages above the national average. Contributions below zero indicate provinces with mean wages below the national average. The largest positive contribution (Beijing) is placed next to the zero line, while the largest negative contribution (Henan) is placed at the bottom of the bar.

As the figure shows, the rise of between-province pay inequality was largely attributable to the surge in relative wages in Guangdong, Shanghai, Beijing, Zhejiang, Jiangsu, and Tianjin, while the low wages of interior provinces, such as Henan, Heilongjiang, Hubei, Sichuan, Jiangxi, Shandong, and Hunan, did not change. The rapid development of rich provinces and municipal cities is clustered in eastern and coastal regions. These regions absorb the majority of foreign trade and receive investments both internally and externally. However, between-province inequality has declined since 2003 as Zhejiang and Jiangsu started to catch up with Guangdong, becoming new and important centres for manufacturing in China. After 2009, the decline of interprovincial inequality accelerated, due mainly to a drop-off in activity in Guangdong and Zhejiang, both of which were greatly affected by the global economic crisis.

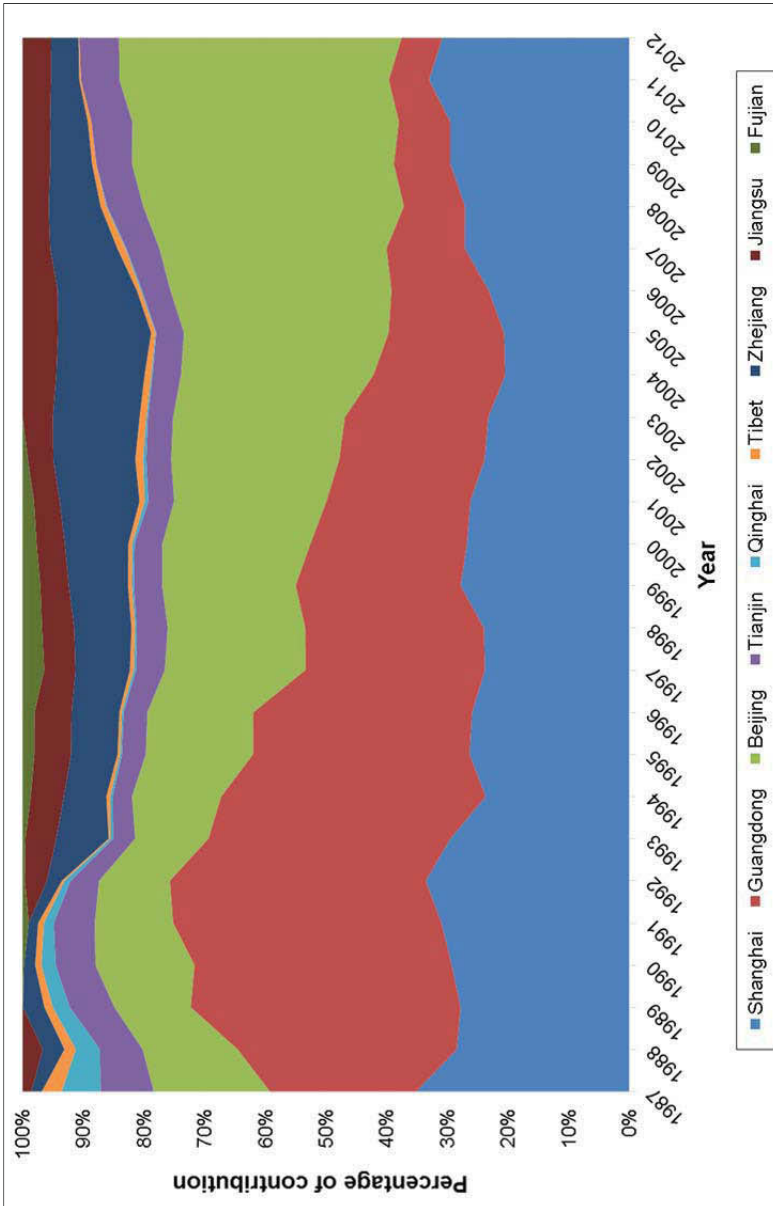
Figure 3 confirms our observation by providing a clear chart of the per cent contribution of each province with average pay that is higher than the national average. As displayed in Figure 3, the contribution of Shanghai is relatively stable over the entire period. In contrast, Guangdong has switched places with Beijing. During the 1980s both rose rapidly; however, the behaviour of these two provinces has diverged since the mid-1990s. Guangdong's contribution has gradually declined, while Beijing's has started to outshine all the other provinces.

Figure 2. Contribution of Provinces to Interprovincial Inequality in China, 1987–2012



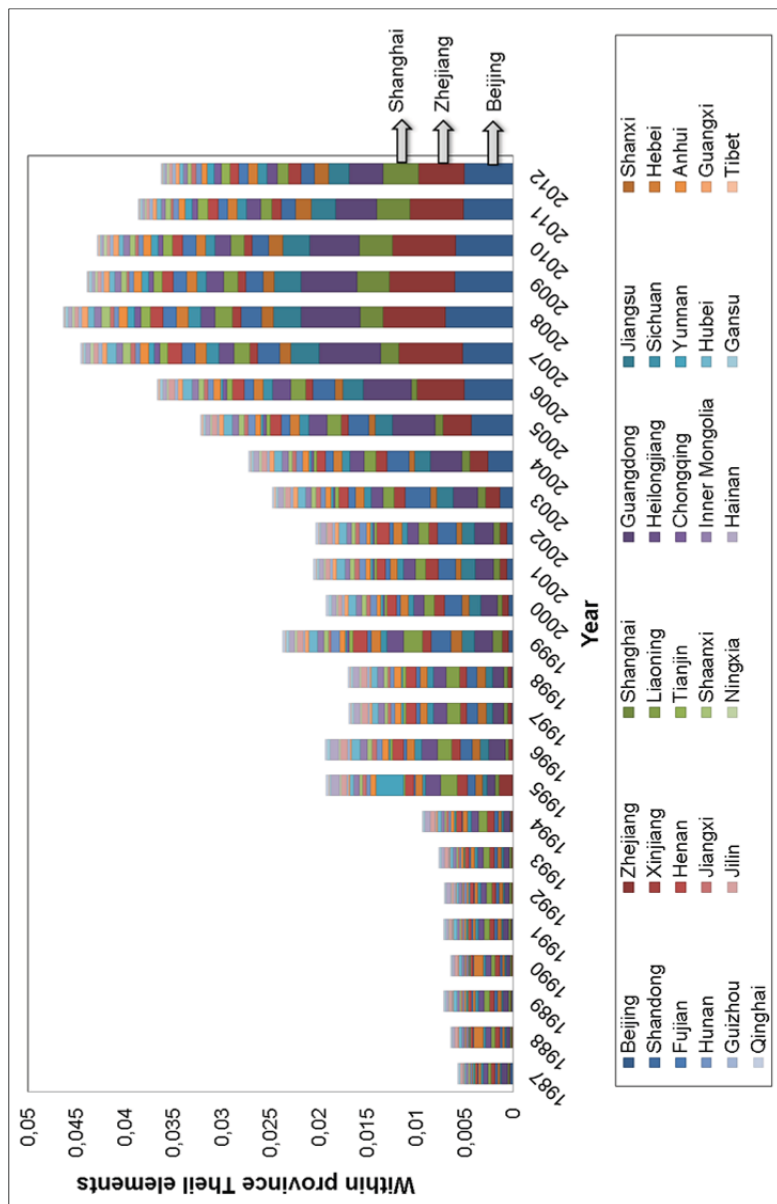
Source: China Statistical Yearbooks and the author's calculations.

Figure 3. Provincial Contribution to Between-Province Inequality for Selected Rich Provinces, 1987–2012



Source: China Statistical Yearbooks and the author's calculations.

Figure 4. Contribution of Provinces to Within-Province Inequality, 1987–2012



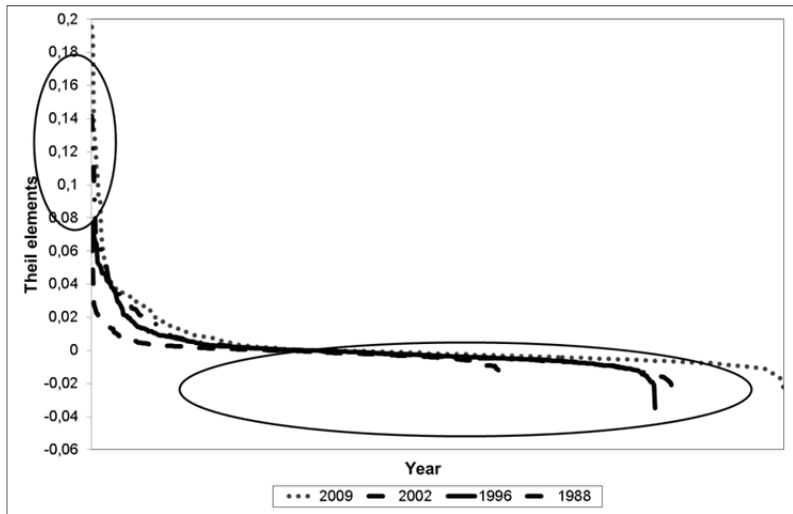
Source: China Statistical Yearbooks and the author's calculations.

The rise of Beijing is not surprising. First, as the capital of China, Beijing was given more opportunities to attract resources that would be advantageous to its development. In particular, after Beijing won the right in 2001 to host the 2008 Olympic Games, the total number of workers and staff in manufacturing and construction rose remarkably from 2001 to 2003. Second, wages in the financial and real estate sectors have skyrocketed in Beijing from 2001 to the present, further widening the wage gap between the capital city and other locales. Third, Beijing has more jobs in high-wage sectors, including IT, social services, utilities, scientific research, and education. By contrast, the contribution of Guangdong has shrunk dramatically since 2004. The decline of Guangdong is also not accidental. As one of the first special economic zones in China established in 1980, Guangdong has attracted huge amounts of foreign investment and capital to support its economic development. Guangdong was known as the country's hub of manufacturing for export in the 1980s. The average pay in Guangdong Province was much higher than the national average. However, with the rapid rise of Shanghai, Jiangsu, and Zhejiang in the 1990s, Guangdong has gradually lost its advantage in manufacturing, and the mean wage in Guangdong has also become less attractive. The decline of Guangdong and the rise of other provinces in the early 2000s have halted the tendency of growth in between-province pay inequality, as observed in Figure 1.

However, not everyone gains in richer provinces and municipal cities. The pay gap within rich provinces is also dramatic. Figure 4 presents the contribution of each province to overall within-province pay inequality. Within-province inequality is measured as the pay difference between sectors within a province. As displayed in Figure 4, most provinces had similar levels of within-province pay inequality before the 2000s, indicating that the pay between sectors within most provinces was not dramatically different. However, since 1999, the situation has changed remarkably, with five provinces standing out: these are Zhejiang, Beijing, Guangdong, Shanghai, and Jiangsu. During the 1990s, the total contributions to within-province pay inequality of these five regions were relatively small: fluctuating between 14 and 18 per cent; however, within just a decade from 1999 onwards, the total contributions of these five regions had jumped from 22 to 56 per cent. This phenomenon implies that the wage difference between economic sectors in these rapidly developing regions is much

higher than that in the rest of China. Thus, not every economic sector gains in those richer provinces, and those working in underdeveloped economic sectors remain poor even in rich regions.

Figure 5. Contribution to Inequality (Sector-Province Cells) in 1988, 1996, 2002, and 2009



Source: *China Statistical Yearbooks* and the author's calculations.

The sector-province Theil element is the smallest unit in our analysis; it represents the contribution of each sector, within each province, to pay inequality measured at the national scale. Figure 5 presents these elements ranked by size for the years 1988, 1996, 2002, and 2009. Most sector-province cells contribute almost nothing to inequality, either because they are very small or because their pay is close to the national average. Thus, most of these Theil elements cluster around the 0 line and compose the horizontal portion of each curve, as shown in Figure 5. The figure also illustrates the importance of extreme cases, whose Theil elements are placed next to the y-axis and compose the vertical portion of each curve. Only a few sectors (within a few provinces) drive the overall index. It is important to note that China has reclassified its industrial sector categorisations twice: first in 1994 and then again in 2004. These changes of industrial classification do not add new sectors, but regroup the original industries

into more detailed classifications based upon global standards. Therefore, the analysis is still comparable, even though the length of each curve is different.

Tables 1 and 2 further explore these sector-province Theil elements by exemplifying the contribution of sector-province to overall inequality, again in the single years of 2009, 2002, 1996, and 1988. Positive numbers mean that the average wage in this cell is higher than the national average, while negative numbers stand for a lower mean wage. In each table, the top 10 contributors and the bottom 10 contributors are both listed. It is interesting to note that the pulling forces from above and below have changed significantly over two decades. In 1988 the farming sector in Hebei Province was the biggest contributor to overall pay inequality, implying that the difference between the pay of people employed in the farming sector in Hebei Province and the pay of people employed in the farming sector of other provinces was at its largest in 1988. Correspondingly, the biggest losers were people working in the farming sector in Heilongjiang Province. As reform deepened, the top 10 contributors became less diversified than they were in the 1980s.

Table 1. Province-Sector Contribution to Overall Pay Inequality (1996 vs. 1988)

			1996			1988
1	Guangdong	Banking & insurance	0.0762	Hebei	Farming	0.0686
2	Shanghai	Banking & insurance	0.0731	Guangdong	Real estate	0.0478
3	Guangdong	Social welfare	0.0688	Guangdong	Wholesale & retail trade	0.0278
4	Shanghai	Others	0.0656	Shanxi	Real estate	0.0251
5	Beijing	Social welfare	0.0646	Xinjing	Mining	0.0224
6	Shanghai	Wholesale & retail trade	0.0531	Guangdong	Finance	0.0220
7	Guangdong	Real estate	0.0522	Beijing	Real estate	0.0203
8	Guangdong	Wholesale & retail trade	0.0510	Guangdong	Transportation	0.0202

			1996			1988
9	Beijing	Banking & insurance	0.0493	Shanghai	Transportation	0.0193
10	Shanghai	Social welfare	0.0466	Shanghai	Wholesale & retail trade	0.0184
471	Heilongjiang	Banking & insurance	-0.0147	Guizhou	Real estate	-0.0092
472	Sichuan	Utilities	-0.0153	Heilongjiang	Real estate	-0.0092
473	Sichuan	Transportation	-0.0155	Heilongjiang	Wholesale & retail trade	-0.0092
474	Henan	Others	-0.0166	Hubei	Farming	-0.0094
475	Heilongjiang	Social welfare	-0.0176	Sichuan	Farming	-0.0095
476	Henan	Wholesale & retail trade	-0.0188	Guizhou	Education	-0.0096
477	Liaoning	Banking & insurance	-0.0191	Guizhou	Transportation	-0.0111
478	Shandong	Others	-0.0193	Henan	Healthcare	-0.0112
479	Heilongjiang	Farming	-0.0209	Henan	Wholesale & retail trade	-0.0123
480	Heilongjiang	Others	-0.0347	Heilongjiang	Farming	-0.0186

Source: *China Statistical Yearbooks* and the author's calculations.

In 1996 the biggest winners were workers and staff in the banking and insurance sectors in Guangdong. Furthermore, Guangdong Province and Shanghai each had four places within the top 10. The other two were taken by Beijing. This situation changed in 2002, however, when Beijing outshone all other provinces and municipal cities. In 2009, while Beijing took eight places within the top 10 sectors with the highest average wage, Guangdong fell from the top ranks. Taking a look at those in the bottom positions, we see that the poor are still poor. People living in Henan and Heilongjiang, two interior and traditionally agricultural provinces, became no better off, even when the economies of other provinces took off. In addition, this observation confirms one of our hypotheses that not every eco-

conomic sector gains in the richer provinces. The dramatic rise of Beijing and Shanghai may be attributed only to the rapid development of a handful of sectors, such as the high-tech-related sectors, financial sectors, and service sectors.

Table 2. Province-Sector Contribution to Overall Wage Inequality (2009 vs. 2002)

			2009			2002
1	Beijing	IT & computer science	0.1954	Beijing	Other	0.1418
2	Beijing	Leasing & business services	0.1878	Beijing	Social welfare	0.1281
3	Beijing	Wholesale & retail trade	0.1287	Beijing	Scientific research	0.1046
4	Beijing	Culture, sports, & entertainment	0.1272	Beijing	Wholesale & retail trade	0.0719
5	Beijing	Financial intermediation	0.1085	Beijing	Real estate	0.0683
6	Beijing	Scientific research	0.1056	Beijing	Banking & insurance	0.0678
7	Heilongjiang	Financial intermediation	0.0927	Shanghai	Banking & insurance	0.0631
8	Shanghai	Financial intermediation	0.0927	Shanghai	Wholesale & retail trade	0.0617
9	Beijing	Real estate	0.0711	Shandong	Excavation	0.0606
10	Beijing	Hotels & restaurants	0.0648	Guangdong	Real estate	0.0595
580	Zhejiang	Leasing & business services	-0.0138	Henan	Real estate	-0.0161
581	Henan	Culture, sports, & entertainment	-0.0142	Shandong	Wholesale & retail trade	-0.0162

			2009			2002
582	Henan	Financial intermediation	-0.0142	Hubei	Farming	-0.0164
583	Shandong	Financial intermediation	-0.0147	Henan	Construction	-0.0170
584	Hebei	Financial intermediation	-0.0155	Shandong	Manufacturing	-0.0175
585	Henan	Public management & social organisations	-0.0156	Henan	Healthcare	-0.0179
586	Tianjin	Services to household & other services	-0.0164	Henan	Education	-0.0188
587	Shandong	Wholesale & retail trade	-0.0178	Henan	Government	-0.0196
588	Henan	Wholesale & retail trade	-0.0202	Henan	Wholesale & retail trade	-0.0215
589	Liaoning	Farming, forestry, animal husbandry, & fishery	-0.0222	Heilongjiang	Excavation	-0.0302

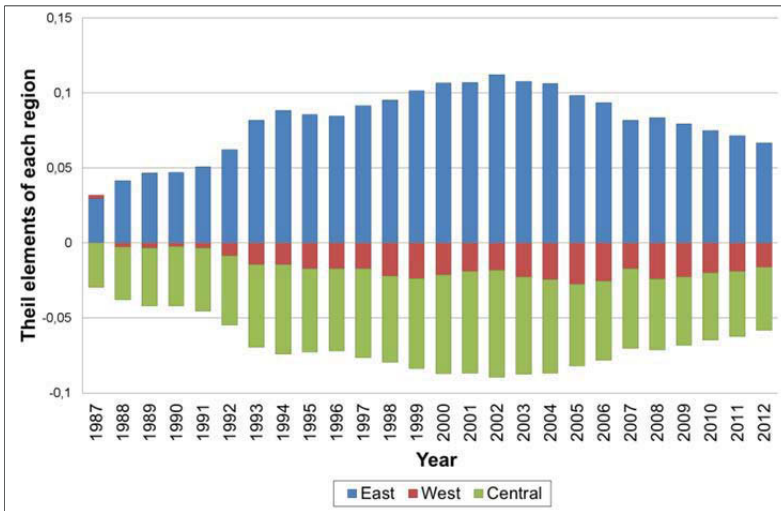
Source: *China Statistical Yearbooks* and the author's calculations.

Pay Inequality Between and Within Larger Geographical Units

China can be roughly divided into three large geographical zones: Eastern, Central and Western China. Eastern China includes nine provinces and three municipal cities: Liaoning, Beijing, Tianjin, Hebei, Shandong, Jiangsu, Shanghai, Zhejiang, Fujian, Guangdong, Guangxi, and Hainan. The western region includes Xinjiang, Qinghai, Gansu, Ningxia, Shaanxi, Sichuan, Chongqing Municipality, Guizhou, Yunnan, and Tibet. The central region consists of Heilongjiang, Jilin, Inner Mongolia, Shanxi, Henan, Anhui, Hubei, Hunan, and Jiangxi.

On the basis of this division, the Theil index for each region was recalculated, along with the measure of each region’s contribution to overall inequality. The result is a new picture of pay inequality across China. Figure 6 presents the contributions of Eastern, Western, and Central China to overall pay inequality from 1987 to 2012. It is evident that the average pay in the eastern regions is much higher than that in the rest of China.

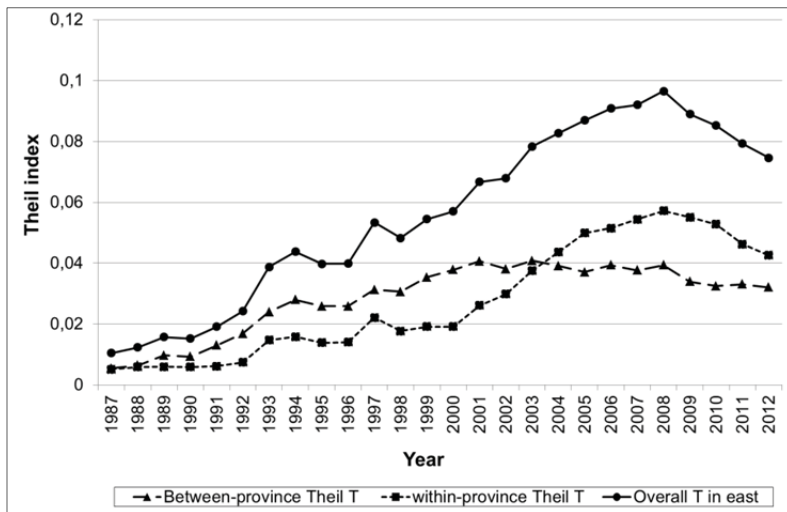
Figure 6. Contribution of Eastern, Western, and Central China to Overall Inequality, 1987–2012



Source: *China Statistical Yearbooks* and the author’s calculations.

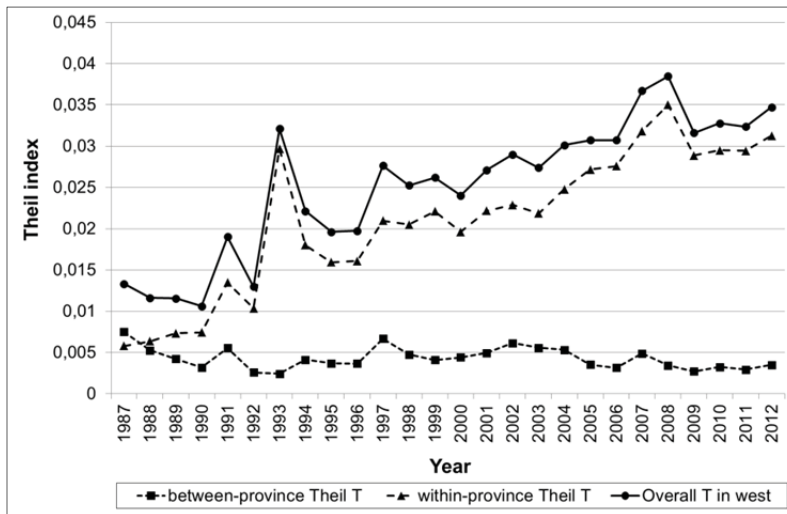
Figures 7, 8, and 9 present the profiles of pay inequality in these three large geographical units. As Figure 7 shows, the pattern of wage difference among eastern provinces and municipalities follows the same trajectory as national pay inequality, within which between-province inequality is a larger contributor than within-province inequality. However, as seen in Figures 8 and 9, this pattern did not occur in western and central regions. Within Western and Central China, the variation between provinces is very small, but the wage differences within provinces are substantial. This observation implies that there is no obvious difference in average pay between poor provinces. The poor provinces remain poor, but they are also internally unequal.

Figure 7. Inequality among Eastern Provinces and Municipalities, 1987–2012



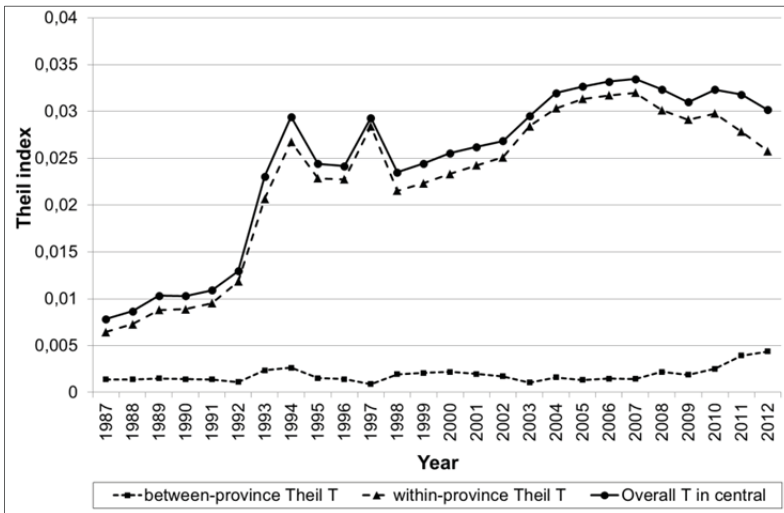
Source: *China Statistical Yearbooks* and the author's calculations.

Figure 8. Inequality among Western Provinces and Municipalities, 1987–2012



Source: *China Statistical Yearbooks* and the author's calculations.

Figure 9. Inequality among Central Provinces, 1987–2012



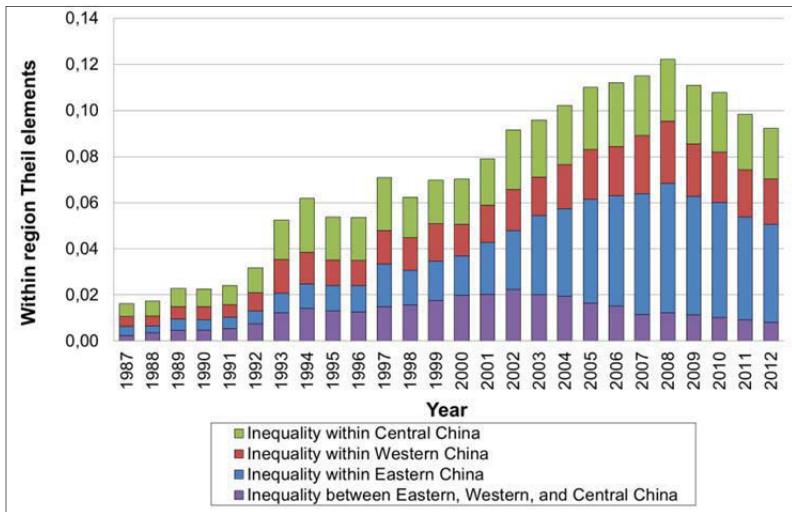
Source: China Statistical Yearbooks and the author's calculations.

Figure 10 shows that the variation within the three different regions is increasing, particularly in the eastern region. This may be due to the fact that the eastern area contains both the richest communities – Beijing and Shanghai – and some of the poorest provinces, such as Liaoning, where many ill-performing state-owned enterprises are concentrated. Moreover, the gap in inequality between the three regions clearly narrows after 2002. This could be due to several factors: first, rich provinces like Guangdong gradually started to lose their preminent position as the country's economic drivers and export hubs when some other eastern, coastal provinces and municipal cities (for instance, Zhejiang, Jiangsu, Shanghai, and Beijing) rapidly caught up; and second, the government's development strategies focusing on the vast hinterland also started to take effect in terms of narrowing the between-region gap.

In 2001, the Chinese government embarked on its Great Western Development Strategy (西部大开发, *xibu dakaiifa*), covering six provinces (Gansu, Guizhou, Qinghai, Shaanxi, Sichuan, and Yunnan), five autonomous regions (Guangxi, Inner Mongolia, Ningxia, Tibet, and Xinjiang), and one municipal city (Chongqing). This programme aimed to boost economic development in the vast interior regions, on

the one hand, and to narrow the gap between eastern and western regions, on the other. In 2004 the government announced another campaign, the Rise of Central China Plan (中部崛起计划, *zhongbu jueqi jihua*), which aims to accelerate the development of the central provinces of Shanxi, Henan, Anhui, Hubei, Hunan, and Jiangxi. After a decade of development, the positive effects of these two initiatives are evident. Between-province wage inequality started to decline two years after the initiation of the Great Western Development Strategy; it has continued to decline since 2003, as displayed in Figures 1 and 10. Furthermore, a large number of labour migrants chose Central and Western China as their destination instead of the eastern coastal region. This greatly reduced the potential instability of the eastern region, which had previously received a large influx of migrant workers and had been showing signs of saturation and diminished absorption ability.

Figure 10. Income-Weighted Between-Sector Inequality within and between Regions, 1987–2012



Source: *China Statistical Yearbooks* and the author's calculations.

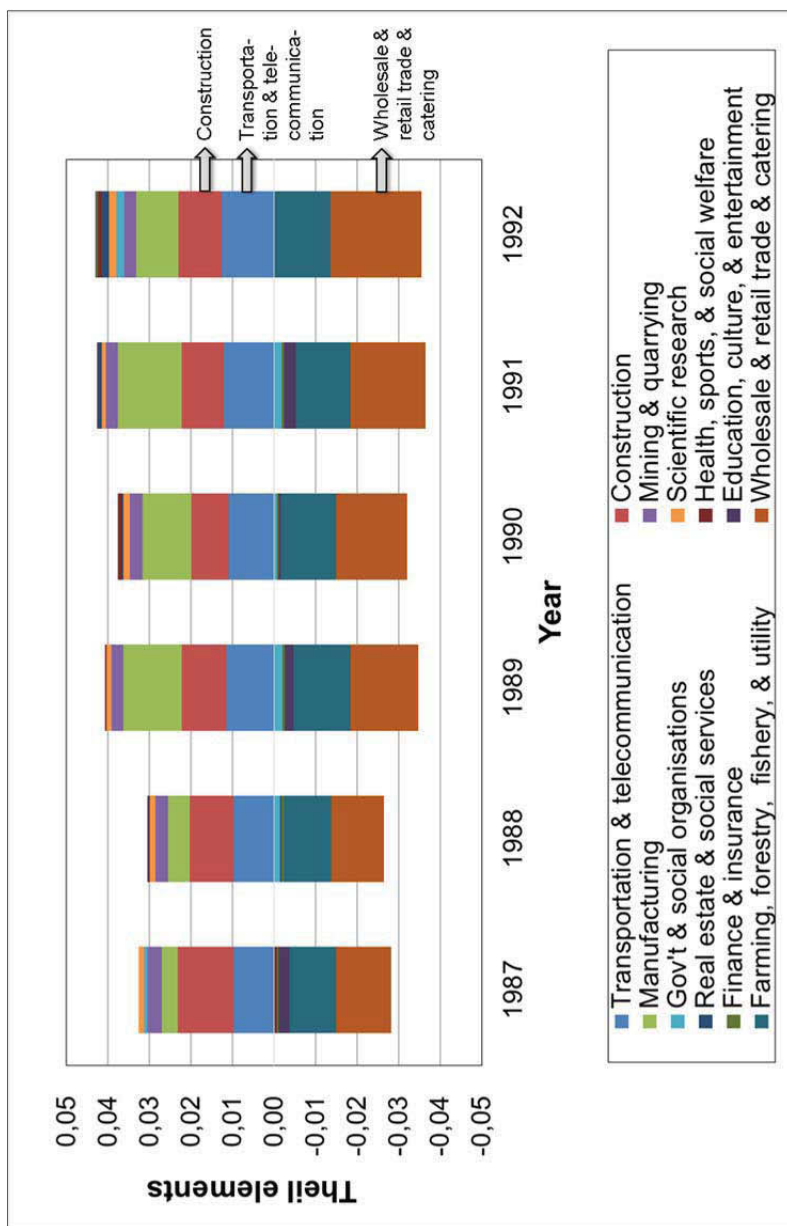
Pay Inequality Between and Within Sectors

As indicated in Figure 1, between-sector pay inequality rose rapidly and peaked in 2008. The rapid increase in this type of pay inequality reflects a significant structural change in the Chinese economy during the transitional period. Figures 11, 12, and 13 display the contributions of each economic sector to the overall intersectoral inequality from 1987 to 2012. As shown in Figure 11, from 1987 to 1992, sectors like transportation and telecommunication, construction, manufacturing, mining, and quarrying enjoyed relatively high wages and were thus the big winners of the earlier economic reforms. In particular, the manufacturing sector saw the highest surge in average pay. The prosperity of manufacturing was largely spurred by the Chinese government's export-led development strategy at the beginning of market-oriented economic reform.

However, during the 1990s, the originally high-wage industries (e.g. manufacturing, construction) gradually lost their advantage and were soon replaced by other newly rising industries, including banking and insurance, utilities, government and social organisations, and scientific research. Since the early 1990s, these new high-wage sectors have begun to drive up intersectoral pay inequality, as Figure 12 shows.

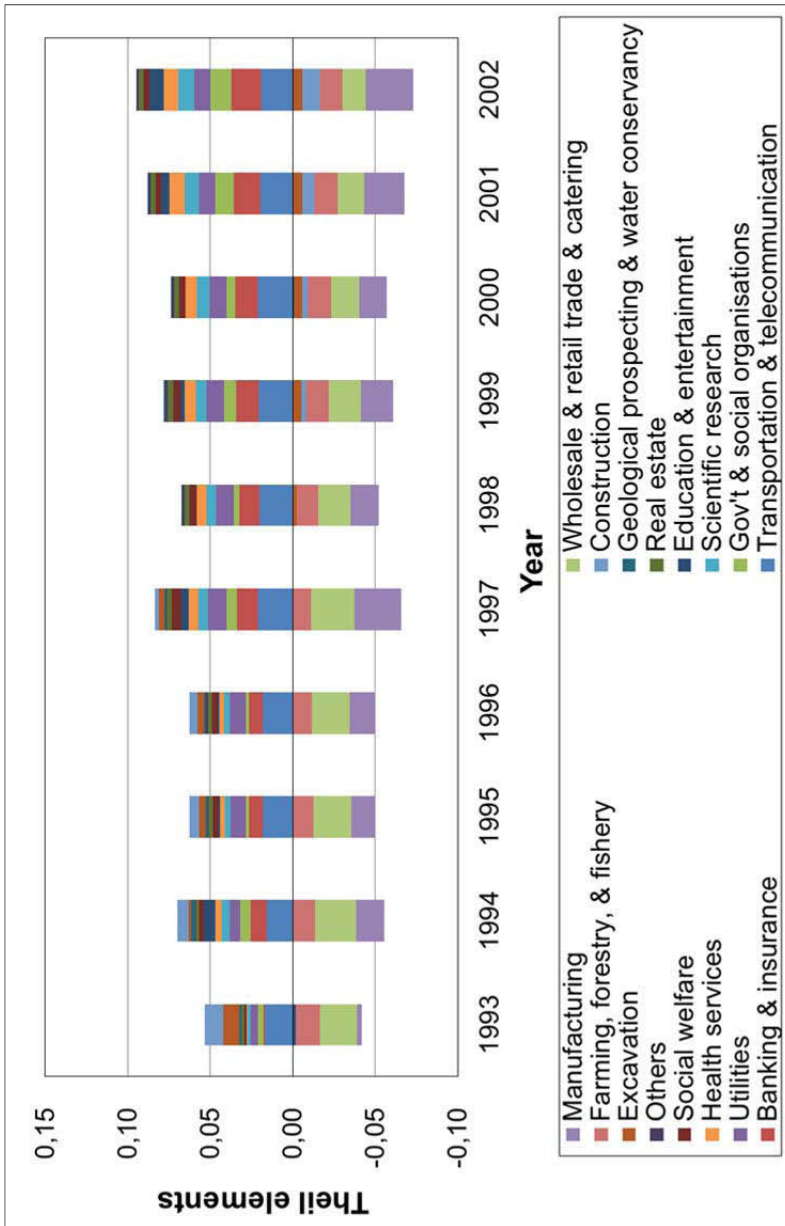
The rise of intersectoral pay inequality was a by-product of a period of profound economic restructuring in China, which was characterised by the financial boom and property prosperity of the 1990s. Since the beginning of that decade, the government has promoted a series of important reforms in the financial sector, such as the launch of two stock markets (Shenzhen and Shanghai), trading in government bonds in the secondary market, the mushrooming of shareholding companies, and the cleaning up of massively non-performing loans to state-owned enterprises (SOEs). These reforms fundamentally restructured the country's financial system and stimulated a credit boom which further enlarged the wage gap between the financial and other economic sectors. In the meantime, the urban housing system also underwent fundamental changes. The revision of the Constitution of the People's Republic of China in 1988 to allow for land transactions eventually triggered the privatisation of housing nationwide. Starting from 1994, reforms, including the sale of public sector housing, the provision of affordable housing, and the establishment of the Housing Provident Fund scheme, took place throughout urban China. By 1998 China had gradually transformed itself from

Figure 11. Theil Elements for Various Sectors in China from 1987–1992



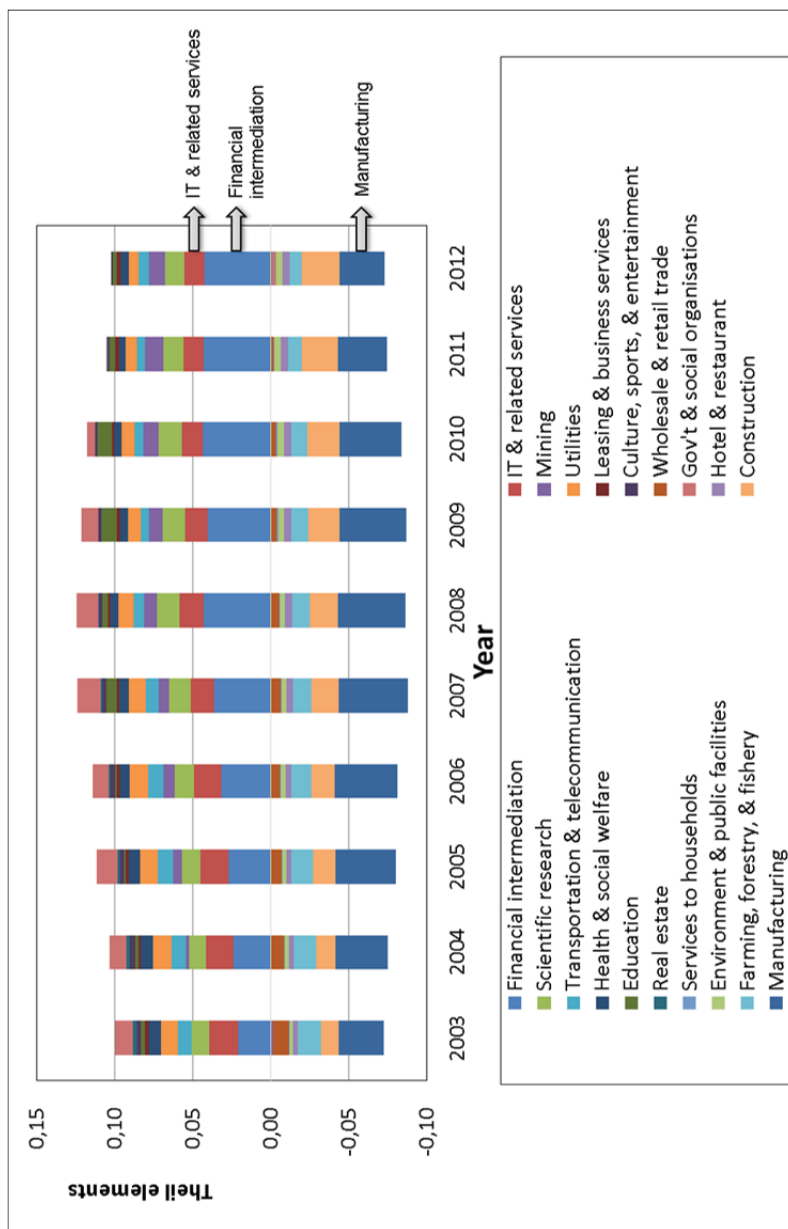
Source: China Statistical Yearbooks and the author's calculations.

Figure 12. Theil Elements for Sectors in China from 1993–2002



Source: China Statistical Yearbooks and the author's calculations.

Figure 13. Theil Elements for Sectors in China from 2003–2012



Source: *China Statistical Yearbooks* and the author's calculations.

a welfare housing system to a market housing system. These remarkable changes in the real estate sector greatly raised average rates of pay in the housing and related sectors. As presented in Table 3, nine economic sectors, including banking and insurance, real estate, education, healthcare, and utilities, experienced remarkable growth in terms of relative wage and employment share during the period from 1993 to 2002. Of these sectors, the banking and insurance sector and the real estate sector achieved the most rapid growth in both areas.

Table 3. Compositional Change in the Relative Wage and Employment Share of Selected Economic Sectors (1993–2002)

	Change in Relative Wage (%)	Change in Employment Share (%)
High-Wage Sectors		
Banking & insurance	141.62	68.94
Real estate	127.27	129.55
Education & entertainment	91.80	76.97
Healthcare & sports	89.08	62.50
Social welfare	89.08	37.86
Utilities	81.12	73.08
Scientific research	70.54	27.68
Gov't & social organisation	53.85	44.09
Transportation & telecommunication	6.675	4.50
Low-Wage Sectors		
Wholesale, retail trade, & food services	-43.86	-42.64
Excavation	-34.35	-18.30
Manufacturing	-33.06	-25.25
Construction	-31.97	-8.38
Farming, forestry, & fishery	-37.91	-7.73
Geological prospecting & water conservancy	-18.35	-6.19

Source: *China Statistical Yearbooks* and the author's calculations.

Conversely, most low-wage sectors underwent a dramatic drop in their average pay rates, due to the restructuring and privatisation of state-owned and urban, collective-owned factories in the cities (Banister 2005). Sectors like manufacturing and construction, which had been high-wage sectors in previous periods, turned into low-wage

sectors, triggering an exodus of workers from these sectors. These compositional changes in wage and employment in both high-wage and low-wage sectors reflect not only a deep structural change in the Chinese economy with tertiary sectors playing an increasingly important role, but also the enlarging between-sector wage gap during the 1990s.

At the start of the 2000s, the financial sectors (banking, insurance, and financial intermediation) remained the biggest beneficiaries of economic development, followed by other high-wage sectors such as IT, government agencies, utilities, and scientific research. From 2003 to 2007, these sectors all rapidly expanded and saw increases in rates of average pay. By contrast, low-wage sectors, such as agriculture and fishery, wholesale and retail trade, hotels and restaurants, and manufacturing, saw reductions in their rates of average pay and, consequently, saw severe losses in their working populations (see Table 4).

Table 4. Compositional Change in the Relative Wage and Employment Share of Selected Economic Sectors (2003–2007)

	Change in Relative Wage (%)	Change in Employment Share (%)
High-Wage Sectors		
Financial intermediation	21.87	-0.37
Leasing & business services	12.05	21.88
Real estate	11.02	28.16
Scientific research	6.65	1.02
Gov't & social organisations	3.75	0.91
IT & related services	3.56	21.21
Education	0.37	12.98
Low-Wage Sectors		
Agriculture, forestry, & fishery	-30.14	-23.06
Wholesale & retail trade	-21.43	-25.53
Hotel & restaurants	-13.45	-1.32
Environment & public facilities	-10.45	1.28
Services to households	-7.32	0.00
Manufacturing	-0.12	6.37

Source: *China Statistical Yearbooks* and the author's calculations.

It is clear from Figure 13 that the major increase in between-sector pay inequality before the 2008 global crisis was attributable only to the growth of two sectors: financial intermediation and IT. Furthermore, the rise in between-sector pay inequality has been halted since 2008. While finance still remained the top contributor to between-sector pay inequality, the contributing roles of other high-wage sectors, such as government agencies, social organisations, and real estate, had reached their pinnacles and were no longer as strong.

As presented in Table 5, after 2008, almost half of the total high-wage sectors, including but not limited to utilities, transportation and telecommunication, education, culture and entertainment, and mining, underwent a period of wage reduction and depopulation. Furthermore, sectors like real estate and government-related sectors transitioned from being high-wage in 2008 to becoming low-wage sectors by 2012. By contrast, low-wage sectors – for instance, construction, wholesale and retail trade, and hotels and restaurants – gained momentum in both pay and employment numbers. The diverging fortunes of the high-wage and low-wage sectors were mainly due to the dual impact of the global economic crisis and the Chinese state's introduction of a CNY 4 trillion stimulus package immediately after the crisis. On one side, the 2008 crisis hit China's most prosperous sectors and regions hard, leading directly to the withering of hitherto high-flying sectors; while, on the other side, the government promulgated a sweeping stimulus plan to minimise the negative impact of the global financial crisis, providing funds for infrastructure projects and housing development, which significantly drove up employment and pay rates in related economic sectors like construction. Furthermore, through the introduction of government subsidies and support, the low-wage sectors recovered from the crisis more rapidly than the high-wage sectors. Therefore, it can be observed in Table 5 that some low-wage sectors even enjoyed a relative wage gain and employment expansion during the downturn. Thus, the increased rates of pay in low-wage sectors and comparable employment growth, accompanied by the relative shrinkage of high-wage sectors, contributed to the steady reduction of intersector inequality after the 2008 crisis.

Table 5. Compositional Change in the Relative Wage and Employment Share of Selected Economic Sectors (2008–2012)

	Change in Relative Wage (%)	Change in Employment Share (%)
High-Wage Sectors		
Financial intermediation	11.67	22.20
IT & related services	4.56	1.46
Health & social welfare	2.05	1.38
Utilities	-18.35	-12.27
Culture & entertainment	-14.69	-12.58
Transportation & telecommunication	-11.91	-13.41
Education	-16.07	-16.18
Leasing & business services	-6.21	1.92
Mining	-5.17	-9.26
Scientific research	-1.66	4.06
	Change in Relative Wage (%)	Change in Employment Share (%)
Low-Wage Sectors		
Construction	63.65	56.44
Wholesale & retail trade	25.51	10.46
Hotels & restaurants	13.62	12.45
Manufacturing	2.95	-3.25
Gov't & social organisation	-20.50	-9.82
Real estate	26.11	31.76

Source: *China Statistical Yearbooks* and the author's calculations.

Conclusion

This paper provides a new investigation of China's pay inequality from 1987 to 2012, using Theil's T-statistic grouped by province and sector. We observed that pay inequality in China started to rise in the early 1990s and increased rapidly until 2008, when it peaked and subsequently fell. After some provinces caught up with the early leaders in the early 2000s, the interprovince wage gap has been narrowing since 2002. However, the wage difference between sectors continued to grow up until 2008. Since 2009, however, overall inequality has steadily decreased and both between-province inequality and be-

tween-sector inequality have shown a tendency to decline. The decline of overall inequality following the 2008 economic crisis could be attributed to numerous factors. One hypothesis is that the global financial crisis hit China's most developed regions and sectors particularly hard, resulting in the narrowing of the wage gap between those richer provinces and sectors, and the rest of the economy. But, is this the only force at work?

China's pay inequality is not simply a matter of economic inequality. It is the joint product of market and institutional forces, and its changing pattern has been strongly influenced by both economic and policy factors. Economic factors, such as trade, foreign and domestic capital investments, and marketisation, are without any doubt the major forces. However, government-initiated development plans, state-dominated urbanisation strategies, and the preferential treatment of certain industries have also had a significant impact on the upward and downward trends in China's pay inequality.

For instance, China's provincial pay inequality and regional disparity have been largely influenced by the country's urbanisation strategies. Industrialisation usually induces urbanisation by generating more job opportunities that attract people to move to cities in the early stages of economic reform. Stimulated by economic development, the process of urbanisation is the natural outcome of industrialisation. However, in China, this process could never have occurred without the influence of institutional forces. The *hukou* household registration system was one of the main hurdles to this type of industrialisation-induced urbanisation, since it greatly restricted the free flow of populations and labour forces across the country. As the government gradually lifted the *hukou* system, the country saw its first wave of large-scale urbanisation in the mid-1980s. Combined with opening-up policies that favoured a handful of eastern, coastal provinces and sectors, this urbanisation trend led further to the formation of several of China's earliest megalopolises: the Greater Beijing area, Greater Shanghai, and the Greater Guangzhou area. The rapid growth of these supersized urban centres has, in turn, enlarged the wage gap both between regions and within regions. In 2001 the Chinese government initiated its Great Western Development Strategy, resulting in the establishment of megalopolises surrounding the cities of Chongqing, Chengdu, Kunming, and Lanzhou. Three years later, the Rise of Central China Plan was promulgated, triggering urbanisa-

tion in Central China. While simultaneously boosting economic development in the vast interior regions, these types of strategy and development plans have a tremendous impact on narrowing the gaps in equality between eastern and western-central regions. Therefore, our findings indicate that both between-province wage inequality and between-region inequality began to fall after the introduction of these programmes.

In addition, sectoral inequality is also heavily affected by the government's development strategies and policies. Since the late 1980s, China entered a new phase of economic reforms that mainly focused on industrial restructuring and the overhauling of the financial sectors. Thus, we observed significant changes in rates of pay and employment among economic sectors, from that period onwards, and this completely changed the overall picture of sectoral pay inequality in China. Between-sector inequality surged in the early 1990s, with early leaders like manufacturing and construction being gradually replaced by a few newly rising high-wage sectors like financial intermediation, real estate, and the IT-related industries. This upward trend had ceased by 2008, however, as a result of both the global economic crisis and the state's ensuing stimulus package that favoured the many low-wage economic sectors. This situation contributed to narrowing the wage gap between sectors.

Recently, the strategy of accelerating megatrend urbanisation in underdeveloped regions has been repackaged by Chinese policymakers as one of main policy tools to combat inequality. In March 2014, the government unveiled its landmark urbanisation plan for 2014 to 2020, which aims to decrease inequality by better integrating migrant workers into cities and spreading urbanisation out into less-developed regions of the country. This new urbanisation plan leads us to rethink the evolution of China's pay inequality and, in particular, the recent tendency for it to decline: is the decline in pay inequality a temporary phenomenon triggered only by the global crisis? Our findings suggest that interprovincial pay inequality had already declined a decade ago due to state-initiated development plans. Since then, the overall growth of pay inequality had in fact gradually slowed down and remained relatively stable until it finally began to fall in 2009, as the global collapse compounded the interprovincial decline. According to our findings, we argue that pay inequality's tendency to decline after the 2008 economic crisis was not merely a reaction to the global

economic situation, but more a long-term outcome driven by both economic and policy factors in China over the past three decades. As the net result of the various state urbanisation strategies, development plans, and the deepening of economic reform, overall pay inequality in China may continue to drop as the Chinese economy as a whole strives to catch up with the standards of development and pay levels that were set initially in only a very small part of this vast country.

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Contents

Marginalisation and State Intervention in China

Introduction

- Armin MÜLLER
The Margins and the Marginalised: Social Policy,
Labour Migration, and Ethnic Identity in
Contemporary China 3

Research Articles

- Tao LIU and Li SUN
Urban Social Assistance in China: Transnational
Diffusion and National Interpretation 29
- Armin MÜLLER
Hukou and Health Insurance Coverage for Migrant
Workers 53
- Rumin LUO
The Emergence of Informal Institutions among Inter-
nal Migrants in Urban China 83
- Matthias STEPAN and LU Quan
The Establishment of China's New Type Rural Social
Insurance Pension: A Process Perspective 113
- Ute WALLENBÖCK
Marginalisation at China's Multi-Ethnic Frontier: The
Mongols of Henan Mongolian Autonomous County in
Qinghai Province 149

Research Article

- **Wenjie ZHANG**
**The Evolution of China's Pay Inequality from 1987
to 2012** **183**

Contributors **219**