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Inter-Industry Wage Differentials: An Increasingly Important Contributor to Urban China Income Inequality

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Inter-Industry Wage Differentials:

An Increasingly Important Contributor to Urban China Income Inequality

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Abstract: How significantly inter-industry wage differentials contribute to rising income inequality is an essential policy issue for transitional economies. Using regression-based inequality decomposition, this paper finds that inter-industrial wage differentials contributed increasingly to income inequality in urban China through 1988, 1995, and 2002, mainly due to rapid income growth in monopolistic industries. Factors such as region, education, ownership, occupation, and holding a second job also contribute increasingly to income inequality, while being employed the whole year and age have decreasing contributions. If China seeks to reduce urban income inequality, removing entry barriers in the labor market and breaking monopoly power in the goods market are essential policy prescriptions.

Keywords: Inter-industry wage differentials; Income inequality; Regression-based decomposition

1. Introduction

As one of the fastest-growing countries in the world, China needs to face the challenge of widening income inequality. Although many researchers have focused on interregional and urban-rural income inequality, as well as individual-level inequality, few have studied the rising inter-industrial wage differential. In this paper, we use regression-based inequality decomposition to sort various factors that influence income inequality according to their importance. Our results suggest priorities for policies that reduce income inequality. We find that inter-industry wage differentials have contributed increasingly to Chinese urban inequality during 1988, 1995, and

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2002, mainly due to the high rapid income growth in monopolistic industries. This finding is particularly important for understanding the direction of the Chinese market economy. Combating monopoly power is essential for China's next step in reforms to build a competitive and efficient market, as well as to narrow income inequality and achieve social justice.

Worldwide research into inter-industry wage differentials has continued for more than 20 years. Research in China indicates that higher salaries in monopolistic industries are regarded as "unfair" rather than "an inequality" justified by factors such as workers' higher education or job skills. Although many argue that China should pay greater attention to rising inequality among industries, there has been no measure of the magnitude of the industry factor's contribution to income inequality or to the trend of this magnitude. Therefore, we do not know how well competition-inducing policies to combat a monopoly can narrow income inequality and whether China's current marketization reform can reduce inter-industry wage differentials.

In a well-developed market system, full competition in the labor market can assure equalization of income among different industries. In other words, as long as specific industries impose no entry barriers on the labor market, inter-industry income differentials would be determined only by the individual characteristics rather than by the industries where people work. Therefore, in the process of marketization toward full competition, inter-industry factors should have decreasing contribution to income inequality, which would indicate that China is becoming a market economy with fair competition. However, we obtained the opposite finding. Although there is increasing competition in the market, the extent of competition varies across industries. The state-owned monopolistic industries have been minimally affected by reform. The legal system for antitrust activities is by no means effective, and it was especially ineffective before August 2008, when China's first Antitrust Law took effect. In the financial sector the four major state-owned banks were commercialized according to the Law of Commercial Banks in 1995, but it is hard to say as the banking sector became highly competitive. For instance, in late 1990s Urban Credit Cooperatives in cities were merged into some Urban Commercial Banks, thus increasing market power of the existing banks. The effect of competition policy in the telecommunication sector is also unsatisfactory. In 2002, China Netcom[①] was separated from China Telecom and was supposed to compete with the new China Telecom. At that time, China Netcom's market was northern China and China Telecom's was in the south. However, in February 2007 China Netcom

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and China Telecom agreed not to enter each other's markets. These instances imply that China's gradual reform is not necessarily leading to a market economy with full competition. Without narrowing inter-industry wage differentials, the current marketization reform in China may lead to an unfair market economy. The finding also indicates that controlling inter-industry wage differentials would be a conducive and important policy to reduce Chinese urban inequality.

The remainder of this paper is organized as follows. Section 2 briefly reviews literature related to inter-industrial inequality. Section 3 describes the background and facts of the Chinese labor market reform and inter-industry inequality. Section 4 reports data and income equations. Section 5 presents results of the regression-based income inequality decomposition. The final section concludes and discusses policies based on this paper.

2. What do we know about inter-industry inequality? A literature review

Since the mid-1980s, it has generally been accepted that inter-industry wage differentials are widely evident. The following research has inquired mainly into the causes of inter-industry wage differentials. The basic conclusion is that in the income equation using OLS estimation the omitted variables (such as ability) might be correlated with an industry variable, thereby leading to an over-estimated inter-industry wage differential. In recent research using siblings' data to control unobserved fixed effects, 11% to 24% of inter-industry wage differentials are correlated to unobserved factors co-owned by brothers in north Europe, while in the U.S., this percentage is up to 50%. After controlling those fixed effects by differencing siblings data, the range of inter-industry wage differentials for the U.S. and northern Europe are close (Björklund, et al., 2004). Haisken-DeNew and Schmidt (1999) used panel data in Germany and the U.S. to control fixed effects. They found that personal heterogeneity can explain almost a half of inter-industry wage differentials. Even by controlling the standard human capital, job characteristic, job identity, and geographical factors, inter-industry wage differentials in Germany and the U.S. are still large and similar. Pinheiro and Ramos's (1994) research in Brazil discovered a huge inter-industry wage differential in the labor market. Even after controlling for differences in workers' productivity and occupation characteristics, the inter-industry wage differential remains and cannot be explained by quality of work, worker's heterogeneity, discrimination, short-term excess demand in specific

① In 2008, China Netcom was merged into China Unicom.

sectors, or fluctuations in macroeconomic status and policies.

What other factors influence the inter-industry wage differential? Theoretically, reduced competition in the goods market and in the labor market are important factors explaining the inter-industry wage differential. Monopoly power enables enterprises to obtain monopoly profits, which allow employers to pay higher wages. Non-competitiveness of labor markets is another condition contributing to inter-industry wage differentials. If there are no entry barriers in the labor market, employers need not pay wages above the market-clearing equilibrium. Krueger and Summers (1988) found that inter-industry wage differentials exist even after controlling measurable and immeasurable labor quality, working conditions, excess welfare, short-term demand shock, unionization threats, bargaining power of labor union, an enterprise's scale, etc. They also found that higher wages were related to lower labor-turnover in an industry, which demonstrates that high-wage industries obtain some rent from non-competitiveness. Katz and Summers (1989) also believed workers receive rents in high-wage industries. These rents might appear because some industries are willing to pay above-market wages to achieve higher productivity. This mechanism is called "an efficiency wage." Evidence provided by Chen and Edin (2006) supports the efficiency wage hypothesis. Similarly, Gittleman and Wolff (1993) found that inter-industry wage differentials are positively correlated to an industry's productivity growth rate, output growth rate, capital intensity, and export orientation. Arbache (2001) used comparable and measurable productivity characteristics to explain wage differentials. He finds no evidence to support the compensatory wage, but he does find the existence of an efficient wage mechanism in manufacturing industries.

The inter-industry wage differential is widening in transitional economies like China and Russia and is stable in developed economies. In China, Shi (2007) reported the trend of widening inter-industry wage differentials. The ranking of industry wages changed dramatically in the 1980s and stabilized after the mid-1990s. In Russia, the relative change of the inter-industry average wage was the main reason for the widening income gap (Lukyanova, 2006). In other countries, empirical research shows that inter-industry wage differentials in the U.S. widen after the 1970s, mainly because of the widening wage differential between the primary and secondary sectors (Davidson and Reich, 1988). Using panel data from the 14 OECD countries for the period 1970-85, Gittleman and Wolff (1993) found that rankings of inter-industry wages were stable. They found

that inter-industry wage differentials in the U.S. were generally widening, but the trend in other countries is unclear. Haisken-DeNew and Schmidt (1999) found that inter-industry wage differentials for Germany and the U.S. were stable during the 13 years they studied. Between 1984 and 1998, a period of dramatic structural change in Brazil, the wage structure there was relatively stable (Arbache, 2001; Arbache, Dickerson, and Green, 2004). Using historical data for the U.S., Krueger and Summers (1987) found that the correlation coefficient of relative wages for nine main industries was 0.62 during the period 1900–1984, while correlation for the years between 1970 and 1984 was 0.91.

Among the literature we have surveyed there is little research using decomposition methods to determine various factors' contribution (including an industry factor) to income inequality and the trend of the contribution. Pinheiro and Ramos (1994) used the decomposition method to study Brazil's data. After controlling for other variables, they found that the contribution of labor market segmentation to income inequality is between 7% and 11%. In this paper, we use Chinese data to show the contribution of inter-industry wage differentials to income inequality and to document how the contribution changes over time. We will provide new empirical evidence of inter-industry wage differentials in China as it undergoes economic transition. Knight and Song (2003) decomposed Chinese urban residents' income inequality, but they did not consider the contribution of inter-industry inequality. Gustafsson and Li (2001) decomposed income inequality according to income sources, but the method they use cannot identify the contribution of basic determinants of income to income inequality. To our knowledge, only the recent paper by Deng and Li (2009) decomposed urban inequality and derived the contributions of each factor over time. Their decomposition results indicate that the effects of gender and membership in the Communist Party of China on earnings inequality have changed little. While work experience had a reduced effect on earnings inequality, the effects of education and occupation have increased. The contributions of ownership status and industry to earnings inequality have increased. Regional effects have been the largest recent contributor to earnings inequality. Unlike the work of Deng and Li (2009), where the industry factor is a minor result in their study, our focus is how inter-industry wage differentials contribute to income inequality and how the contribution changes over time in China. We also will provide evidence indicating that relatively rising earnings in several industries dominated by state-owned-enterprises mainly explains why the contribution of industry to

inequality increases over time. In model specification, our income-generating function also differs slightly from Deng and Li (2009). Our approach includes more explanatory variables, such as dummies for holding a second job and being employed the whole year, to capture the structural change of the labor market and to alleviate potential missing-variable-bias.

3. Chinese labor market reform and inter-industry inequality: background and fact

Among components of overall income inequality in china, urban residents' income inequality is becoming increasingly significant. Income inequality of rural and urban residents and overall income disparity are widening. Urban residents' inequality is smaller than rural residents', but the difference between these two inequalities is decreasing. In 2001, the rural Gini coefficient was 36.48, the urban Gini coefficient was 32.32, and the national overall Gini coefficient was 44.73 (Ravallion and Chen, 2007). Other research analyzing data of 1988, 1995, and 2002 found income inequality widening rapidly between 1998 and 1995, but it changed little from 1995 to 2002. The overall Gini coefficient changed from 46.9 to 46.8, while the urban Gini coefficient declined from 33.9 to 32.2. In fact, the stable trend of overall income inequality is mainly due to income convergence in eastern provinces (Gustafsson, Li, and Sicular, 2008).

Some factors in the process of urban reform increase income inequality. Before reform and opening-up, all urban Chinese workers were employed by state-owned or collective-owned enterprises; and all their income came from wages, which were solely decided by the planning system. Except for factors such as position and age, the value system of "equal pay for equal work" controlled returns on other factors, such as education and gender, at a low level. For the determination of wages, working age was more important than productivity (education) (Gustafsson *et al*., 2001). Since wage levels were set by the labor administration department, generally speaking, the profit differential across industries and enterprises did not produce a difference in wages for employees.

Since the reform and opening-up, the greatest change in the determination of wage and income is the increase of education returns and the widening inter-industry wage differential. Marketization reform raised the return on human capital, which was previously distorted under the planning system. Much empirical research has found that along with China's reform and

opening-up, the returns to education rose continuously (to name a few: Zhang *et al.*, 2005; Li and Heckman, 2004; Li and Ding, 2003). Education has an increasing influence on income inequality (Gustafsson, Li and Sicular, 2008). For example, according to empirical evidence from Shanghai, the commercial center of China, education has the greatest contribution to income inequality (Tian and Lu, 2007).

Let us look at the widening inter-industry wage differentials, Figure 1 shows wage inequality among more than 10 industries since 1978 according to two indexes. The simplest index is the ratio of the highest to the lowest industry average wage. From 1978 to 1997, this index rose from 1.66 to 2.26, and then rapidly rose to 4.75 until 2006. The other index is the Gini coefficient of all industries' wages. We take all employees from the same industry as a group earning the same wage and use the number of employees from this industry as the size of the group to calculate the Gini coefficient. The result calculated in this way also shows a rising trend. The Gini coefficient was 0.05 in 1978, 0.1 in 1997, and rose rapidly to 0.19 until 2006[①].

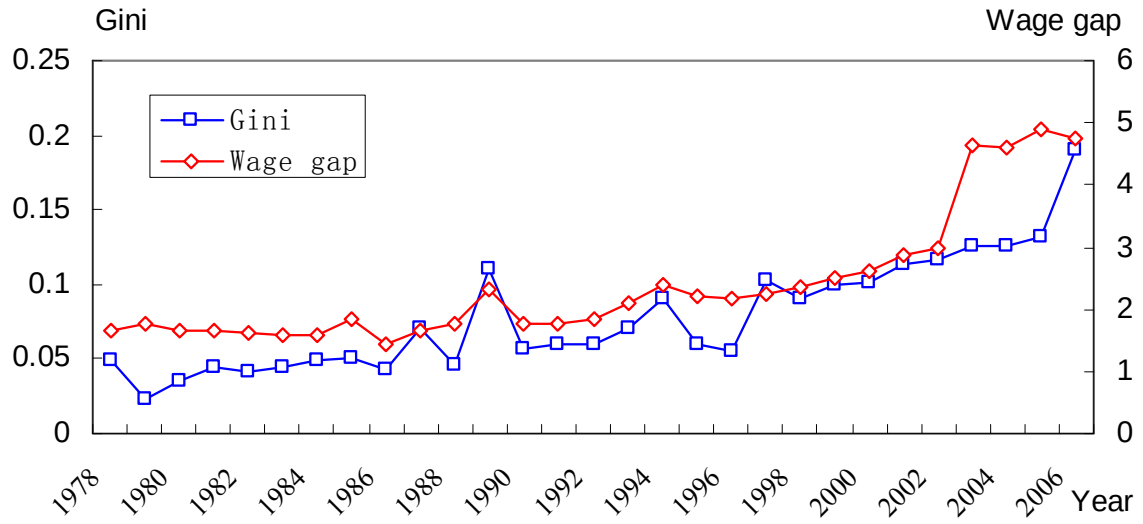

Fig. 1: China's inter-industry wage differential (1978–2006)

Data source: *China Statistical Yearbook* (various years), Chinese Statistics Press, and the authors' calculation.

① Because of neglecting wage differential within the same industry, the Gini coefficient calculated here is smaller than the real value of Gini coefficient for all employees.

We mark 1997 as the dividing line to compare the change of inter-industry wage differentials because 1996 was the watershed year for labor market reform. Before 1996, reform in the labor market was relatively moderate. The obvious adjustment at that time was that wages had dropped continuously as a share of total income (Lu and Jiang, 2008). The decentralization reform in the 1980s gave enterprises more power in deciding wages and bonuses. Enterprise revenue differentials were reflected in the income inequality. Incentive scheme reform promoted enterprise efficiency significantly (Groves *et al.*, 1994). However, at the same time, it made the revenue differential among industries and enterprises contribute to the differential in employees' wages. Using survey data of state-owned enterprise in 1981 and 1987, Meng and Kidd (1997) found that the inter-industry wage differentials among Chinese state-owned enterprises had become more remarkable since 1987. They believe the main reason is that after the reform of the employment system, enterprises implemented profit-linked bonuses (Meng and Kidd, 1997). In 1996, with the re-employment service center as an intermediary, Shanghai began to lay off redundant workers in state-owned enterprises. After that, labor market reform accelerated, employment structure adjusted rapidly, and the labor force participation rate decreased sharply (Lu and Jiang, 2008). The widening of urban income inequality after 1996 resulted from labor market restructuring (Meng, Gregory, and Wang，2005). It is noteworthy that labor market reform after 1996 began in money-losing enterprises, which were mostly in the competitive sector. Policies at that time allowed state-owned enterprises with two years of losses to cut redundant employment through lay-offs and repositioning. However, competition in the labor market exists marginally. Monopoly sectors such as public utilities, post and communication, and finance were less influenced by the labor market competition. According to Figure 2, as a whole, employment in sectors with lower wages decreased more in 1996–1998, while employment increased in higher-wage sectors[①]. This phenomenon is similar to the lower employment turnover in higher-wage industries in the U.S. (Krueger and Summers, 1988). Moreover, during the 1980s, although the labor market became more flexible, the labor flow both between urban and rural areas and among cities was not remarkable (Davis, 1992). After the mid-1990s, large scale rural-urban migrants intensified competition in the urban labor market, but this marginal increase in competition was concentrated

[①] The outlier in the left of Figure 2 is "other industry," which has higher employment increasing rate. If omitting this point, wage and employment change still have positive relationship and the fitting degree rises to 0.34.

only in industries with fewer labor market entry barriers. The influence of increasing competition is different for various industries; that is the main reason for the widening inter-industry wage differentials.

In the following two sections, we will see the contribution of the inter-industry wage differential to income inequality and its changes over time. In addition, we will see that the increasing contribution of the inter-industry wage differential to inequality results primarily from several state-owned monopolistic industries.

Fig. 2: Income and employment change in 1996–98

4. Data and income equation

Data used in our research are from the Chinese Household Income Project Survey (CHIPS) conducted by the Chinese Academy of Social Science and the National Bureau of Statistics. CHIPS data are collected randomly following a strict sampling process, are nationally representative, and are widely used in research. In our data, the 1988 urban survey covers 10 provinces including Beijing, Shanxi, Liaoning, Jiangsu, Anhui, Henan, Hubei, Guangdong, Yunnan, and Gansu. The 1995 data include one additional province, Sichuan. The 2002 data cover the same provinces as 1995 plus the new municipality, Chongqing.

Our research has two steps. First, we need to estimate a semi-log income-generating equation, and then we decompose income inequality based on this equation. The income-generating equation we estimate can be written as: $\ln W_{it} = \beta_t' X_{it} + \varepsilon_{it}$, where W is the individual's annual earnings (including wage, bonus, price subsidy, income in kind, and secondary

job income), i denotes the individual, t denotes year (t = 1988, 1995, and 2002), and X is a vector of the explanatory variables. Following existing literature, explanatory variables for income include age and its square, years of schooling, dummies for holding a second job, being employed the whole year, gender, party membership, minority groups, ownership types, and occupation classifications. We also controlled the city dummy. β_t is a vector of parameters to be estimated. In order to make the income data comparable across region and time, we need to deflate income data. Brandt and Holz (2006) provided the interregional price index in 1990, which indicates the purchasing power of the RMB among different regions. Using this interregional price index in 1990 and the provincial level urban consumer price index, we obtain the price deflator for 1988, 1995, and 2002. By doing so, the deflated income becomes comparable not only across time but across regions. Table 1 reports the Gini coefficients of income inequality. We can conclude that: First, income inequality is widening; Second, income inequality is relatively small when measured using deflated income data[①]. The urban income inequality estimation we report is different from the results of Gustafsson, Li, and Sicular (2008) because our income definition does not include unearned income, and it is deflated by the interregional deflation indexes. Moreover, when we compute income inequality, we only use the samples to estimate the income-generating function.

Table 1: Gini coefficients of China urban income inequality

	1988	1995	2002
Deflated income	0.232	0.291	0.343
Original data	0.246	0.310	0.362
Difference (%)	6.034	6.529	5.539

[①] This is because of the higher purchasing power in lower income area. Ravallion and Chen (2007) found that income inequality is reduced when considering interregional purchasing power parity.

Table 2: Income-generating functions of different years

	1988	1995	2002
Socio- economic characteristics			
Second job (yes = 1)	0.058**	0.362***	0.150***
Being employed the whole year (yes = 1)	0.643***	0.455***	0.444***
Gender (male = 1)	0.079***	0.152***	0.122***
Age	0.084***	0.160***	0.055***
Age square	−0.001***	−0.002***	−0.0006***
Minority group (yes = 1)	0.024	−0.013	−0.036
Industry			
Farm, forest, husbandry and fishery	0.014	0.039	0.011
Mining and exploration industry	0.065***	0.020	−0.0007
Geological prospecting, irrigation administration	−0.028		0.116
Electricity, gas and water supply facilities, architecture			0.317***
Construction	0.001	−0.051	0.070**
Transportation, storage, post office and communication	0.001	0.047*	0.163***
Wholesale, retail and food services	−0.004	−0.028	−0.027
Real-estate	−0.069***	−0.022	0.203***
Social services	−0.186***		−0.091***
Health, sports and social welfare	0.016	0.036	0.050
Education, culture and arts, mass media and entertainment	0.0001	0.068***	0.067
Scientific research and professional services	−0.017	0.064	0.110
Finance and insurance	0.003	0.196***	0.210***
Government agents, party organisations and social groups	−0.038***	0.014	0.084
Other industries	−0.018	−0.259***	0.047
City dummy	yes	yes	yes
Constant	6.529***	4.861***	7.088***

Number of Observation	17568	10933	6121
Adj-R^2	0.473	0.336	0.383

Note: (1) The classification of industries is consistent with CHIPS questionnaire, which is a little different from the classification of China Statistical Yearbook. (2)Control variables include dummies for party membership, education level, ownership type, occupation type, city dummies, etc. Because of space limitations, we do not report coefficients of party membership and education level. (3) *, **, and *** denote significance at 1%、5% and 10% level, respectively. To save space, standard error is not reported.

5. Regression-based decomposition of income inequality

In this section, we analyze how different variables contribute to income inequality using a regression-based decomposition framework developed by Shorrocks (1999), focusing on the contribution of industry variables and its change across time. The idea of this method is to calculate a sample average value of an argument (such as *X*) in the income determination function, then substitute *X* by its average, predict income data, and compute the inequality index of this predicted income. This new inequality index does not include the influence of "*X*." *X*'s contribution to income inequality is measured by the difference between this new index, and the income inequality computed before X is replaced by its average. Above is a brief introduction of the decomposition method in this paper. A more-detailed introduction can be found in Wan (2004) or Wan and Zhou (2005).

Because we choose a semi-log model in the income-generating function, we will get erroneous results if we use the logarithm of income as the dependent variable to do decomposition; therefore, we take the exponent while writing the income-generating equation for decomposition.

$$y = \exp(\hat{a}_0) \bullet \exp(\hat{a}_1 X_1 + \hat{a}_2 X_2 + \cdots + \hat{a}_k X_k) \bullet \exp(\hat{u})$$

In the above equation $\exp(\hat{a}_0)$ is a scalar. When we compute indices of income inequality, the scalar can be omitted from the equation without influencing the results (Wan, 2002). Considering the influence of residual $\hat{u}$, we employ a popular method that can be used by any index to measure inequality. We take the difference between the inequality index of original income y and the inequality index when assuming $\hat{u} = 0$ as residual $\hat{u}$'s contribution to the actual income inequality. In the ideal status, the residual is 0, and total income inequality can be

explained 100% by variables in the income-generating function that fits the data perfectly. Generally, however, the residual is seldom 0, so the analysis of residual influence is necessary. In Table 3, we adopt the ratio of the residual's contribution to total income inequality as the proportion explained by the residual. The rest reflects the income inequality contributed by the explanatory variables in the model (Wan，2002). According to this principle, our model can explain approximately 81%, 78%, and 67%, respectively, of total income inequality.

Table 3: China urban income Gini and the proportion explained

	1988	1995	2002
Gini coefficient computed by original income data	0.232	0.291	0.343
Gini coefficient computed by predicted income data	0.189	0.227	0.228
Proportion explained by residual (%)	18.534	22.129	33.448
Proportion explained by model (%)	81.466	77.871	66.552

Because there is some difference in industrial classification in these three years, we cannot directly compare income inequality decomposition results of different years. So we first focus on the decomposition results for 2002. Because the regression-based decomposition method we use can be applied to different inequality indices, we use data in 2002 to decompose four different indices of income inequality. Table 4 reveals an issue that arises when using different indexes: although the factors employed in each index are the same, their contributions to income inequality differ in each index. This is because each index applies a different weighting to income groups from the poorest to the richest. Notwithstanding this variation among indexes, however, each factor's rank in contributing to income inequality does not change.

The most important contributor to income inequality is the city dummy variable, which represents different regional factors such as geography, institution and culture, etc. This variable's contribution to income inequality ranges from 31.984% to 37.02%. The great contribution of region dummies to urban residents' income inequality reflects the persistent barriers to Chinese labor mobility that are noted by Davis (1992). Based on Gini decomposition results, the second level contains four factors: occupation, ownership, education, and industry, each contributing

approximately 10% to income inequality. Contribution factors at the third level are age, being employed the whole year, and gender, which have contributed between 5% and 6.8%. Contributions of holding a second job and party membership are 3.321% and 3.982%, respectively. The contribution of the minority group dummy is trivial. In fact, in our income-generating function, membership in a minority group is also an insignificant factor, which means that China does not have discrimination against minority groups.

Table 4: Decomposition of income inequality for 2002 (industry is of original category)

	Gini	%	GE(0)	%	GE (1)	%	CV	%
Second job	0.009	3.982	0.002	2.749	0.002	2.787	0.005	2.811
Being employed the whole year	0.015	6.613	0.008	9.253	0.007	7.926	0.012	6.828
Gender	0.011	5.004	0.004	4.287	0.004	4.203	0.007	4.112
Age and its square	0.016	6.803	0.005	6.151	0.005	5.595	0.009	5.034
Party membership	0.008	3.321	0.003	3.060	0.003	3.104	0.006	3.176
Minority group	0.000	0.074	0.000	−0.019	0.000	−0.016	0.000	−0.017
Education	0.024	10.373	0.009	10.118	0.009	10.656	0.020	11.296
Ownership	0.024	10.630	0.008	9.753	0.008	9.665	0.017	9.547
Occupation	0.025	11.148	0.009	10.910	0.009	10.799	0.019	10.771
Industry	0.023	10.067	0.008	9.186	0.008	9.332	0.017	9.422
City dummy	0.073	31.984	0.029	34.551	0.030	35.948	0.067	37.020
total	0.228	100.000	0.085	100.000	0.084	100.000	0.180	100.000

What importance does the variable “Industry” have in contributing to income inequality? If we decompose income inequality and estimate the income equation entirely according to industrial categories based on original data, this factor contributes increasingly to income

inequality, from 1.03% in 1988 to 3.02% in 1995, then 10.07% in 2002. Its rising contribution from 1995 to 2002 is dramatic. To accommodate for the official re-classification of industries in three different years, we combine some industries to make industry dummies comparable across time. For instance, we combined the exploration and mining industries for 1988 and 2002. Also for these two years, we combined the category "social service" with "public health, sports, and social welfare," which also merges the categories "electric, gas, and water suppliers" for 2002. After doing so, we establish 13 industries, including "other," which fall into categories that are comparable across several years.

In Table 5, we report 11 factors contributing to income inequality in all three years. It shows the following trends: (1) The industry factor's contribution to income inequality grows. For 2002, we combine the category "electricity, gas, and water production and supply" that has higher income, with "social services" that has lower income, and with "public health, sports, and social welfare," which has insignificantly higher income compared to manufacturing. Therefore, the contribution of industrial category to income inequality is lower, but it still produces a greater contribution to income inequality than in 1995. (2) The location factor, represented by the urban dummy, has a growing contribution to income inequality. In 1988, the location factor contributed 14% to income inequality, ranking in first place, but its contribution had increased to 30% in 1995, becoming the most important contributor to income inequality. It could explain one-third of total income inequality in 2002. The regional variable's rising contribution to income inequality can be explained by barriers to labor-flow for low-skilled labors among cities, but relatively free mobility for high-skilled laborers. (3) Education has an apparently increasing contribution to income inequality. Now that reform permits higher wages for education and training, its increasing contribution is not surprising. (4) Ownership and occupation also contribute increasingly to income inequality, although occupation's contribution increases faster. This may be explained by intense restructuring in forms of ownership and occupation. (5) Being employed the whole year has an apparently decreasing contribution to income inequality. For 1998, this factor explains up to one-third of income inequality, which was caused by a large number of surplus workers in enterprises. In our 1988 sample, 9.47% of people were not employed the whole year. But in 1995, this factor's contribution had decreased dramatically to 7.4%. In that year, only 7.86% of people were not employed the whole year. In 2002, this factor's contribution dropped to 6.7%. (6) Age

also has an understandably decreasing contribution. Older workers were paid more under traditional working system, so it had a great contribution from 1988 to 1995. But in 2002, after rapid labor market reform beginning in 1996, age's importance has dropped, while other factors of productivity have influenced income more. (7) Holding a second job has an apparently increasing contribution to income inequality. In 1995 its contribution to income inequality was more than three times greater than in 1988, and in 2002 its contribution was 7.5 times greater than in 1995.

Table 5: Income inequality (Gini) decomposition (industries combined)

	1988		1995		2002	
	Gini	%	Gini	%	Gini	%
Second job	0.000	0.147	0.001	0.558	0.009	4.178
Being employed the whole year	0.061	32.501	0.017	7.422	0.015	6.733
Gender	0.009	4.603	0.014	6.245	0.012	5.363
Age (and its square)	0.053	27.868	0.051	22.378	0.016	7.116
Party membership	0.006	3.252	0.010	4.383	0.007	3.219
Minority group	0.000	0.114	0.000	0.049	0.000	0.081
Education	0.004	1.939	0.019	8.410	0.025	11.122
Ownership	0.018	9.475	0.023	9.967	0.028	12.250
Occupation	0.011	5.641	0.018	7.735	0.028	12.623
Industry	0.001	0.406	0.007	3.019	0.011	5.086
City dummy	0.027	14.055	0.068	29.834	0.072	32.229
Total	0.189	100.000	0.227	100.000	0.225	100.000

According to regression results of Table 2, the coefficients of two industries—"transportation, storage, post office, and communication" and "finance and insurance"—change from insignificant to increasingly significant. Coefficients of these two industry categories also increase. We suspect that these two industries increase the industry variable's contribution to income inequality rapidly. Galbraith, *et al.,* (2004) note that in Russia

and China industries having the strongest monopoly power gained relatively during economic restructuring. In both countries, the financial sector gained the most, while the agricultural sector lost the most. Therefore, in the following step we exclude these two industries, which have the highest income. In conclusions presented in Table 6, the contribution of factors other than industry changes little, but industry contribution has greatly decreased. For 2002, industry leaves the second layer of factors in terms of their contribution. Its contribution to income inequality ranks 9th of 11 factors and dropped by 0.13% from 1995 to 2002. Therefore, we can conclude that two industries—"transportation, storage, post office and communication" and "finance and insurance"—have become the important elements in widening urban residents' income inequality, while the income of these two industries is relatively rising. Due to data limitation, we lack more detailed categories of industries. However, the two industries excluded from the analysis include state-owned sub-industries with monopoly powers.

Table 6: Income inequality (Gini) decomposition (industries combined, and two highest income industries excluded)

	1988		1995		2002	
	Gini	%	Gini	%	Gini	%
Second job	0.000	0.137	0.001	0.627	0.010	4.430
Being employed the whole year	0.060	31.892	0.017	7.511	0.016	7.177
Gender	0.009	4.656	0.015	6.457	0.013	5.621
Age (and its square)	0.052	27.634	0.048	21.367	0.015	6.868
Party membership	0.006	3.383	0.010	4.382	0.008	3.526
Minority group	0.000	0.136	0.000	0.091	0.000	0.173
Education	0.004	2.090	0.018	8.149	0.023	10.194
Ownership	0.018	9.570	0.023	10.230	0.028	12.695
Occupation	0.010	5.547	0.018	8.073	0.031	13.712
Industry	0.001	0.424	0.005	2.421	0.005	2.292

City dummy	0.027	14.529	0.070	30.691	0.074	33.313
Total	0.188	100.000	0.227	100.000	0.223	100.000

6. Conclusions and policy implications

This paper primarily explores inter-industry wage differentials by examining the contribution that industry variables make to urban residents' income inequality and how the contribution changes over time. We find that, concerning the process of widening urban residents' income inequality, inter-industry wage differentials also expand. Among all factors that widen inequality in our model, the importance of inter-industry wage differential is increasing. During the period 1995–2002, the increasing contribution of inter-industry wage differential was mainly attributable to the monopolistic industries of "transportation, storage, post office and communication" and "finance and insurance." This suggests that in the marketization process, some industries benefit more, and more intense competition in the labor market does not affect every industry equally. In addition, we found that region, education, ownership, occupation, and holding a second job also contribute increasingly to income inequality, while the factors like age and being employed the whole year have a decreasing contribution.

The main policy implication of this paper is clear: if China wants to control urban income inequality, removing entry barriers in the labor market and breaking monopoly power in the goods market are essential. China needs to build a fairly competitive market economy to control income inequality. According to results of 2002, urban residents' income inequality would decease 5%–10% if China could remove inter-industrial wage differentials. In fact, just removing several industries' unreasonably high wage can make the industrial factor much less important in urban income inequality. Of course, in order to reduce urban income inequality, the policy for regional and educational equality is also important. The high inter-regional income inequality reflects the situation that workers cannot freely move across regions because of institutional barriers induced by the household registration (*Hukou*) system. Therefore, the main policy for reducing regional income inequality should be to eliminate barriers to labor mobility, not the present policy of inter-regional financial transfers. Higher income through higher education is an inevitable result of marketization reform. Therefore, reducing income inequality can better be achieved by equalizing

educational opportunity than by artificially suppressing wages of the educated. When inter-regional labor migration becomes much freer in the future, income inequality will be greater, despite increased returns on education, if rural residents receive insufficient education before they enter the cities.

The empirical results of this paper suggest that many current market reforms are not producing a more fair and competitive economy. Widening inter-industrial inequality reflects injustice in the labor market, which induces increasingly greater dissatisfaction in the population. Having provided evidence of inter-industrial inequality, we now need to provide evidence explaining its causes. In a companion paper, we will present evidence indicating who receives the opportunity to enter highly paid industries.

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Appendix：The highest income and lowest income industry (1978–2006)

Year	Highest Income (*yuan*)	Highest Income Industry	Lowest Income (*yuan*)	Lowest Income Industry	Ratio
1978	809	Geological	486	Agriculture	1.66
1979	885	Geological	503	Health etc.	1.76
1980	1029	Geological	626	Agriculture	1.64
1981	1058	Geological	645	Agriculture	1.64
1982	1088	Geological	668	Agriculture	1.63
1983	1110	Geological	701	Agriculture	1.58
1984	1237	Geological	786	Agriculture	1.57
1985	1690	Geological	911	Agriculture	1.86
1986	1543	Transport	1075	Agriculture	1.44
1987	1942	Transport	1162	Agriculture	1.67
1988	2298	Geological	1311	Agriculture	1.75
1989	3288	Construction	1417	Agriculture	2.32
1990	2718	Mining	1541	Agriculture	1.76
1991	2942	Mining	1652	Agriculture	1.78
1992	3392	Electricity etc.	1828	Agriculture	1.86
1993	4320	Real estate	2042	Agriculture	2.12
1994	6712	Finance	2819	Agriculture	2.38
1995	7843	Electricity etc.	3522	Agriculture	2.23
1996	8816	Electricity etc.	4050	Agriculture	2.18
1997	9734	Finance	4311	Agriculture	2.26
1998	10633	Finance	4528	Agriculture	2.35
1999	12046	Finance	4832	Agriculture	2.49
2000	13620	Science	5184	Agriculture	2.63
2001	16437	Science	5741	Agriculture	2.86
2002	19135	Finance	6398	Agriculture	2.99

2003	32244	Information	6969	Agriculture	4.63
2004	34988	Information	7611	Agriculture	4.60
2005	40558	Information	8309	Agriculture	4.88
2006	44763	Information	9430	Agriculture	4.75

Note: The classification of industry is from China Statistical Yearbook, various years. For abbreviation, Geological = Geological prospecting and exploration; Agriculture = Agriculture, forestry, animal husbandry and fishery; Transport = Transport, storage, and post; Health = Health care, sports & social welfare; Electricity etc. = Production and distribution of electricity, gas and water; Information = Information transmission, transportation, computer service and software; Science = Scientific research and technical services.