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SPECIAL ISSUE: INCOME INEQUALITY IN CHINA

Inter-industry Inequality: An Important Source of the Urban Income Gap—Regression-based Decomposition*

Chen Zhao,^a Wan Guanghua^b and Lu Ming^c

^a China Center for Economic Studies, Fudan University

^b School of Public Finance and Economics, Yunnan University of Finance and Economics

^c School of Economics, Fudan University

基于回归方程的收入差距分解发现,1988年、1995年和2002年,行业间收入不平 等对中国城镇居民收入差距的贡献越来越大,而且这主要是由一些收入迅速提高的垄 断行业造成的。同时,区位、教育、所有制和职业类型以及是否有第二职业对收入差 距的贡献也在提高,是否完全就业和年龄对收入差距的贡献明显下降。因此,缩小中 国城镇收入差距,亟需打破劳动力市场进入壁垒和产品市场行业垄断。此外,减轻地 区间的劳动力流动障碍、普遍提高劳动者的受教育水平等措施也将是未来政府缩小城 镇收入差距的重要政策着力点。

关键词:行业垄断 收入差距分解 夏普里值

Regression-based decomposition of inter-industry earnings differentials shows that in 1988, 1995 and 2002, inter-industry earnings differentials made an increasing contribution to urban earnings inequality in China. The primary reason for the widening gap lay in monopoly industries. At the same time, geographical location, educational level, type of enterprise ownership, type of occupation and whether the individual had a second job also contributed to rising earnings inequality, while age and being fully employed made a decreasing contribution. Therefore, if China is to reduce the earnings gap it is imperative that we remove barriers to labor market entry and break down some monopoly industries in the product market. Additionally, reducing obstacles to the free movement of labor and

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improving workers' educational level should also be important elements of the government's strategy for reducing the urban income gap in future.

Key words: monopoly industries, decomposition of income differentials, Shapley value

I. Foreword

Inter-industry earnings differentials have been debated around the world for more than two decades. In China, there is a widespread feeling that inter-industry earnings differentials have indeed been widening, and this is seen as important indication of unjust income differences. However, people are not clear about the extent of and trends in the contribution of inter-industry earnings differentials to rising earnings inequality. This prevents us from understanding the importance for reducing the income gap of a competition policy that breaks up industrial monopolies, and renders it difficult to establish whether the current market-oriented reform will automatically reduce inter-industry earnings differentials.

Our study employs the recently developed technique of regression-based inequality decomposition to rank the factors which contribute to earnings differentials in order of importance. In a sense, such ordering is equivalent to ranking strategies or measures aimed at reducing earnings inequality. We found that in 1988, 1995 and 2002, inter-industry earnings differentials made an increasing contribution to urban earnings inequality, and the primary cause of the widening gap lay in monopoly industries. This finding can facilitate our understanding of the direction of China's market-oriented economy. With a sound market mechanism, full competition in the labor market should ensure the equalization of inter-industry earnings differentials. To be specific, as long as there are no barriers to entry for any industry in the labor market, inter-industry earnings differentials should come about only through individual differences in the workforce in different industries. In other words, if demographic characteristics are controlled, the industry factor should be of little importance in contributing to inter-industry earnings differentials. We deduce from this that as a competitive market economy develops, the industry factor's contribution to inter-industry earnings differentials should lessen, heralding fairer competition in China's market economy. However, our findings were just opposite. Even though market competition is intensifying, its impact varies with different industries. Relative to other industries, state-controlled monopoly industries are only slightly affected. This implies that China's step-by-step approach to reform is not necessarily leading to a more competitive market economy. In this sense, we may conclude that if the government fails to control rising earnings inequality among different industries, this one factor may bring about an unjust market economy in China. We strongly suggest that eliminating inter-industry earnings differentials is a prerequisite for narrowing the urban income gap.

This study is organized as follows. The second part comprises a brief literature review; the third reviews the background and facts of China's labor market reform and inter-industry earnings differentials; the fourth presents the data and the earnings equation; the fifth presents the findings of our decomposition analysis of the earnings gap; and the last sets out conclusions and policy implications.

II. Literature Review

The question of the extent to which inter-industry earnings differentials contribute to earnings inequality in China's cities and towns has never been satisfactorily answered in the existing literature. Knight and Song decomposed the income gap among urban residents but failed to take into account the contribution of the industry factor.¹ Similarly, Gustafsson and Li decomposed the income gap into its constituent elements. However, this method was not capable of ascertaining the contribution of the basic determinants of earnings to the income gap.²

A comparison of our research on inter-industry earnings differentials with that conducted internationally³ shows that studying the contribution of inter-industry earnings differentials to rising earnings inequality is important from both the theoretical and the policy perspective. Since the mid-1980s, inter-industry earnings differentials have become a widely acknowledged fact. Subsequent research focused primarily on the source of these differentials. Their basic conclusion was that in earnings equations estimated using the OLS technique, missing variables such as individual ability might be related to the industry variable, and so inter-industry earnings differentials might be overestimated. Research on Brazil found a huge inter-industry wage differential in the labor market. Even after controlling for worker productivity and job characteristics, inter-industry earnings differentials remained and could not be explained by differences in job quality, workers' heterogeneity, discriminatory practices, short-run excess demand in specific sectors or changes in macroeconomic and policy settings.⁴ Gittleman and Wolff found that inter-industry earnings differentials were positively related to an industry's productivity growth, output growth, capital intensity and export orientation.⁵

What other factors, then, affect inter-industry earnings differentials? Theoretically, they could well be explained by the commodity market in which enterprises operate and a non-competitive labor market. A monopoly position in the commodity market enables an enterprise to reap excess profits, and these are a major explanation for inter-industry earnings differentials. Another important factor is a non-competitive labor market. Krueger

¹ J. Knight and L. Song, "Increasing Urban Earnings Inequality in China: Extent, Elements and Evaluation," pp. 597-619.

² B. Gustafsson and S. Li, "The Anatomy of Rising Earnings Inequality in Urban China," pp. 118-135.

³ Similar international research sometimes uses the term "wage," sometimes "earnings." We use "earnings," which may include non-wage income such as bonuses.

⁴ A.C. Pinheiro and L. Ramos, "Inter-industry Earnings Differentials and Earnings Inequality in Brazil," pp. 79-111.

⁵ M. Gittleman and E.N. Wolff, "International Comparisons of Inter-industry Earnings Differentials," pp. 295-312.

and Summers found that even after controlling for measured and unmeasured variables like labor quality, working conditions, fringe benefits, short-term demand shocks, the threat of unionization, union bargaining power, firm size and other factors, there was still a substantial dispersion in earnings across industries. They also found less labor turnover in higher paid industries. These findings suggest that workers in high-wage industries received non-competitive rents.⁶ These rents may indicate that some enterprises were willing to provide wages that were higher than the going rate in return for higher productivity, in what has been called an "efficiency wage." Chen and Edin provided evidence to support the hypothesis of an efficiency wage. ⁷Arbache analyzed inter-industry earnings differentials using comparable and measurable productivity characteristics, but failed to find any evidence for a compensated wage. However, he did find that there was an efficiency wage mechanism in manufacturing. The biggest empirical problem associated with the efficiency wage mechanism is that the higher "productivity" we see in industries with higher wages may just reflect the fact that monopoly industries have a higher per capita output (or profit). ⁸

In terms of trends, there is a widespread sense that inter-industry earnings differentials expand in a transitional economy such as China. Empirical studies show that since the 1970s, US inter-industry earnings differentials have witnessed continued expansion, principally in the primary and secondary sectors of the economy.⁹ Using panel data on inter-industry earnings differentials for 14 OECD countries for the period 1970 to 1985, Gittleman and Wolff found that the ranking of inter-industry wages was stable. They also found that apart from the US, where the inter-industry wage differential seemed to be expanding, there was no clear tendency with regard to other countries.¹⁰ In Brazil, the wage structure was quite stable even during the period from 1984 to 1998 when structural adjustment was in full swing.¹¹ Krueger and Summers examined historical data for the period between 1900 and 1984 and found that the correlation coefficient of estimated industry earnings in nine major industries was 0.62 for that period and 0.91 for the period between 1970 and 1984.¹²

In the existing literature, we have found relatively few studies that use the decomposition method to analyze the contribution of different factors, including the industry factor, to earnings inequality and even fewer that analyze changing trends in different factors' contribution. Pinheiro and Ramos used the decomposition method to analyze Brazilian

⁶ A. Krueger and L. Summers, "Efficiency Wages and the Inter-industry Wage Structure," pp. 259-293.

⁷ P. Chen and P. Edin, "Efficiency Wages and Industry Earnings Differentials: A Comparison across Methods of Pay," pp. 617-631.

⁸ J.S. Arbache, "Earnings Differentials in Brazil: Theory and Evidence," pp. 109-130.

⁹ C. Davidson and M. Reich, "Income Inequality: An Inter-industry Analysis," pp. 263-286.

¹⁰ M. Gittleman and E.N. Wolff, "International Comparisons of Inter-industry Earnings Differentials," pp. 295-312.

¹¹ J.S. Arbache, "Earnings Differentials in Brazil: Theory and Evidence," pp. 109-130.

¹² A. Krueger and L. Summers, "Efficiency Wages and the Inter-industry Wage Structure," pp. 259-293.

data and found that after controlling for other variables, the contribution of labor market segmentation to earnings inequality was between 7 percent and 11 percent.¹³ Another important study was conducted by Deng Quheng and Li Shi,¹⁴ who carried out decomposition on the income gap in China. However, inter-industry earnings differentials were not the primary focus of their study. By comparison, this study reveal the changing contribution of inter-industry earnings differentials to earnings inequality and also examines the impact of particular monopoly industries on inter-industry earnings differentials, thus providing empirical evidence from transitional China for related research.

III. China's Labor Market Reform and Inter-industry Earnings Differentials: Background and Facts

Among the different constituents of the Chinese income gap, that affecting urban residents is of growing importance. The income gap among rural residents is growing, as is the urban income gap and that for the country as a whole. Although the urban income gap is not as wide as that in rural areas, the distance between the two is narrowing. In 2001, the Gini coefficient for rural areas was 0.3648 and that for the whole country was 0.4473, while the urban Gini coefficient was 0.3232.¹⁵ Other research examined data from 1988, 1995 and 2002. It found that earnings inequality widened rapidly between 1988 and 1995 but did not show much change between 1995 and 2002. The national Gini coefficient changed from 0.469 to 0.468 and the urban Gini coefficient fell from 0.339 to 0.322. In fact, a major reason for the "stable" trend in earnings inequality was that the fact that there was some income convergence among China's eastern provinces.¹⁶

Nonetheless, in the course of urban reform, some factors did aggravate the income gap. Prior to reform and opening-up, practically the entire urban labor force was employed by state-owned or collective enterprises. Their income derived almost entirely from the wages they received for their labor and wage levels were dictated by the planned economy. Under the influence of the idea of "Equal pay for equal work," the effect on wages of all factors (including education and sex) except for rank and seniority were artificially maintained at a very low level. Among factors determining wages, seniority played a greater role than productivity (education).¹⁷ Since wage gradations were uniformly set by the government departments in charge of labor, inter-industry and inter-firm differences had basically no

¹³ A.C. Pinheiro and L. Ramos, "Inter-industry Earnings Differentials and Earnings Inequality in Brazil," pp. 79-111.

¹⁴ Q. Deng and S. Li, "What Lies behind Rising Earnings Inequality in Urban China? Regressionbased Decompositions," pp. 598-623.

¹⁵ M. Ravallion and S. Chen, "China's (Uneven) Progress against Poverty," pp. 1-42.

¹⁶ Li Shi et al., eds., Research on Income Distribution in China III.

¹⁷ B. Gustafsson, S. Li, L. Nivorozhkina and K. Katz, "Rubles and Yuan: Wage Functions for Urban Russia and China at the End of the 1980s," pp. 1-17.

impact on employees' earnings. Since reform and opening up, the most significant change in terms of wage and income determinants has been the rise in the rate of return to schooling and the enlargement of inter-industry earnings differentials. Marketization allowed the rate of return to human capital, previously distorted by the planned economy, to start rising. Existing research has already demonstrated that with the deepening of China's reform and opening up, returns to schooling have shown a steady increase.¹⁸ If there is a high degree of variation in workers' educational level, the rise in the rate of return to schooling may well lead to a widening of the income gap.

We now look at the gap in average wages between different industries. The two indicators in Figure 1 display the average wage gap for ten or more industries since 1978 as shown in *China Statistical Yearbook* (中国统计年鉴). The first indicator is the ratio between the highest and the lowest average wage level in these industries. We found that the ratio climbed from 1.66 in 1978 to 2.26 in 1997 and then to 4.75 in 2006. The other indicator is the Gini coefficient for wages for all industries. We categorized employees in the same industry as a group in the same wage bracket and used the number of people of this industry as the intragroup number of people to compute the Gini coefficient. The Gini coefficient calculated this way also showed an upward trend from 0.05 in 1978 to 0.1 in 1997, followed by a rapid rise to 0.19 in 2006.¹⁹



Figure 1 Average Inter-industry Earnings Differential in China (1978-2006)

^{1978 1980 1982 1984 1986 1988 1990 1992 1994 1996 1998 2000 2002 2004 2006} Year Source: According to data in *China Statistical Yearbook* of indicated years.

¹⁸ J. Zhang, Y. Zhao, A. Park and X. Song, "Economic Returns to Schooling in Urban China, 1988 to 2001," pp. 730-752.

¹⁹ We did not take into consideration intra-industry wage differentials, so the Gini coefficient calculated in this way is smaller than the actual value. But its evolution still reflects the widening inter-industry wage differentials.

The reason we take 1997 as the dividing line between two periods for our comparison of changing inter-industry earnings differentials is because 1996 was a watershed in terms of labor market reform. Prior to 1996, reform had been a moderate process. The most evident adjustment was to the structure of people's incomes, as the share of wages in total earnings decreased steadily. The 1980s move to decentralize power and transfer profits downwards gave enterprises greater power to determine employees' wage levels and bonus rates, so that differences in enterprise performance were reflected in different wage levels. The incentive systems instituted by enterprises effectively boosted the morale of employees, but at the same time made the difference in returns between one industry or firm and another into a source of differential earnings for employees. On the basis of data obtained from surveys of China's SOEs in 1981 and 1987, Meng Xin et al. found that inter-industry earnings differentials changed and became more prominent. They believed the reason for this was that enterprises had implemented profit-related bonus schemes following the reform of the employment system.²⁰ In 1996, Shanghai started a project to redeploy surplus SOE labor to other posts via the intermediary of reemployment service centers for laid-off workers. Thereafter, China's labor market reforms intensified and the employment structure was subject to drastic readjustment. The labor participation rate fell while the unemployment rate climbed rapidly. After 1997, the average earnings of employed workers saw a substantial increase. In other words, structural adjustment to employment stocks meant that increased SOE earnings went mainly to those who remained there. A few of the laid-off surplus workers found other jobs, while the rest became unemployed or withdrew from the labor market. After 1996, the widening urban income gap was directly related to structural adjustment in the labor market.²¹ It is worth noting that China's labor market reforms started with loss-making SOEs. Policy at the time allowed SOEs that had run at a loss for two consecutive years to reduce their surplus labor by downsizing. Obviously, most of the loss-making SOEs were concentrated in the competitive sector. Labor market competition existed mainly on the margins, as most monopolies, such as public utilities, postal services, telecommunications and finance, were shielded from market competition and received less of a shock. Furthermore, in the 1980s, although the labor market had become more flexible, the flow of labor between rural and urban areas and within cities was not as noticeable.²² Since the mid-1990s, the massive influx of migrant workers from the countryside has intensified competition in the urban labor market. However, this competition has been concentrated in industries with a low entry threshold. The intensification of labor market competition has had different effects on different industries, making it an important source of inter-industry earnings differentials.

²⁰ X. Meng and M.P. Kidd, "Labor Market Reform and the Changing Structure of Wage Determination in China's State Sector during the 1980s," pp. 403-421.

²¹ X. Meng, R. Gregory and Y. Wang, "Poverty, Inequality, and Growth in Urban China, 1986-2000," pp. 710-729.

D. Davis, "Job Mobility in Post-Mao Cities: Increases on the Margins," pp. 1062-1085.

In the analysis below, we can clearly see the contribution of inter-industry earnings differentials to earnings inequality as well as changing trends in this area. At the same time, we can also see that some state-owned monopoly industries have set an unfortunate precedent in terms of the contribution of industry factors to widening inter-industry earnings differentials.

IV. Data and Earnings Equation

The data used in this study derive from relevant information in the Chinese Household Income Project Survey (CHIPs) conducted by the Institute of Economics, Chinese Academy of Social Sciences, and the National Bureau of Statistics of China. The 1988 urban survey covered Beijing, Shanxi, Liaoning, Jiangsu, Anhui, Henan, Hubei, Guangdong, Yunnan and Gansu. The 1995 survey built on this and further included Sichuan. The 2002 survey further included Chongqing, recently brought under direct central administration.

Our study involves two steps. We first estimate a semi-logarithmic earnings equation, then, on this basis, decompose the earnings differentials.

Our estimated earnings equation is as follows:

 $\ln W_{it} = \beta_t X_{it} + \varepsilon_{it}$ (1)

In this equation, "W" represents the individual's income for a year's work, including wages, bonuses, price support, income in kind and earnings from a second job. The subscript "i" represents an individual and "t" represents the year (t=1988, 1995, 2002). "X" represents a vector made up of a group of explanatory variables. In accordance with the approach of previous research, our explanatory variables included having a second job, being fully employed, sex, age, age squared, and a set of dummy variables such as party membership, ethnic background, education, type of ownership of enterprise, type of occupation and city. " β_t " is a vector made up of the coefficients to be estimated.

To ensure cross-province and inter-temporal income comparability, we used the crossregional price indexes and provincial-level urban consumer price indexes constructed by Brandt and Holz to deflate the earnings data.²³ Table 1, which reports the Gini coefficient of earnings differentials, provides us with a number of conclusions. Firstly, the earnings differential is indeed widening. Secondly, a calculation based on deflated income data gives a smaller gap.²⁴ It should be noted that our estimates of urban earnings differentials differ from the findings of Li Shi *et al.* This is because our definition of income does not include unearned income and our income data has been spatially deflated and deflated in terms of cross-regional purchasing power. Additionally, in computing the earnings differentials we used only samples effective in our analysis.²⁵

²³ L. Brandt and C.A. Holz, "Spatial Price Differences in China: Estimates and Implications," pp. 43-86.

²⁴ This is because monetary purchasing power is normally stronger in low-income areas.

²⁵ Li Shi et al. eds., Research on Income Distribution in China III.

	1988	1995	2002
Spatially deflated/deflated for cross-regional purchasing power	0.232	0.291	0.343
Raw data	0.246	0.310	0.362
Differential (%)	6.034	6.529	5.539

Table 1 Gini Coefficients of Urban Earnings Differentials

Table 2 displays results of the wage determination model for each industry. In each regression equation, we controlled those variables normally controlled in earnings equations. Due to limitations of space, we do not present the coefficients for the dummy variables such as party membership, education, type of enterprise ownership, type of occupation or city. Leaving aside the industry variable, the coefficients of the other variables were consistent with the findings of existing work. Moreover, this regression model has achieved a high degree of goodness of fit. It is especially worth mentioning that the effect on earnings of having a second job first rose and then fell over the three years. However, the decomposition results (see Table 5 and Table 6) reveal that the contribution to earnings differentials of a second job has continued to increase. This reflects the fact that relying on the regression coefficients of the earnings equation alone cannot comprehensively reflect the impact of these variables on earnings differentials. In this sense, using regression equations to decompose income inequality etc. is especially necessary.

From Table 2, we can see that after controlling for other variables, inter-industry earnings differentials still exist. Taking manufacturing industry as reference group,²⁶ we see that in 1988 and 1995, clear earnings differentials existed between four industries on one hand and manufacturing on the other, with each of the four being different. In 2002, earnings differentials existed between six industries and manufacturing. These findings suggest that there was a sharp change in industry wage structure between 1988 and 1995, after which inter-industry earnings differentials became more noticeable. However, the relative structural change was not great. Among these industries, the coefficients of two large industries, namely communications, transport, postal services and telecommunications and finance & insurance, changed from not being statistically significant to being significant between 1988 and 1995. Moreover, their coefficient values also increased. Between 1995 and 2002, the coefficients of these two industries remained positive and their coefficient values increased

As the reference group for the dummy variable could be the lower (or higher) income group, changing the reference group is equivalent to increasing (or decreasing) part of the earnings of the sample in each group. This affects their amount relative to overall income through the coefficient of the dummy variable. On the basis of our definition of the measurement indicator for the earnings differentials, changing the dummy variable's reference group could affect the decomposition results. To minimize the impact of the choice of dummy variables on the conclusions of this study, the safest way is to make the group with the largest sample or that with mid-level earnings into the reference group. In this study, manufacturing is both the group with the largest sample and also a group with mid-level earnings, so it is logical to make manufacturing the reference group.

168 Social Sciences in China

further on the basis of the 1995 level. In 2002, the two industries had average wage levels that were respectively 16.3 percent and 21.0 percent higher than the wage level in manufacturing.

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Year	1988		1995		2002	
Social and Economic Characteristics						
Second job	0.058	**	0.362	***	0.150	***
Fully employed	0.643	***	0.455	***	0.444	***
Sex	0.079	***	0.152	***	0.122	***
Age	0.084	***	0.160	***	0.055	***
Age squared	-0.001	***	-0.002	***	-0.0006	***
Ethnic minority	0.024		-0.013		-0.036	
<u>Industries</u>						
Agriculture, forestry, animal husbandry, aquaculture	0.014		0.039		0.011	
Mining/geological prospecting	0.065	***	0.020		-0.0007	
Geological prospecting/prospecting and water system management	-0.028				0.116	
Production and supply of electric power, gas and water					0.317	***
Construction	0.001		-0.051		0.070	**
Communications, transport, postal services and telecommunications	0.001		0.047	*	0.163	***
Commerce	-0.004		-0.028		-0.027	
Real estate	-0.069	***	-0.022		0.203	***
Social services	-0.186	***			-0.091	***
Public health, sports & social welfare	0.016		0.036		0.050	
Education, culture & arts	0.0001		0.068	***	0.067	
Scientific research & technological services	-0.017		0.064		0.110	
Finance & insurance	0.003		0.196	***	0.210	***
Government agencies, CPC organizations & non-government organizations	-0.038	***	0.014		0.084	
Other industries	-0.018		-0.259	***	0.047	
Constant	6.529	***	4.861	***	7.088	***
Observed value	17568		10933		6121	
Adjusted R ²	0.473		0.336		0.383	

Table 2 Estimates of Inter-industry Earnings Differentials

Note: ***, **, * indicate statistical significance at the .01, .05 and .1 level. Due to limitations of space, we do not report the standard error of the coefficients.

V. Results of Decomposition of Inter-industry Earnings Differentials

In this section, we apply the regression-based decomposition framework to analyze the contribution of each variable in the earnings determining equation to inter-industry earnings differentials. The logic of this method is to take the sample mean of the independent variable X in the earnings function and substitute the sample mean and the actual value of other variables into the earnings equation. In this way, it is easy to get the value of earnings as well as the index of inequality corresponding to the earnings. When this is done, the index no longer includes the effects of X. The disparity between the index and the earnings differentials calculated from the actual data measures the contribution of X to income inequality.²⁷

We have chosen to use the semi-log model in the earnings equation. Therefore, if, in conducting the decomposition, we continue to treat the logarithm of earnings as the dependent variable for decomposition, the distribution of the earnings variable would be distorted. We therefore use the index e on both sides of the earnings equation in our decomposition.

 $y = \exp(\hat{a}_0) \cdot \exp(\hat{a}_1 X_1 + \hat{a}_2 X_2 + \dots + \hat{a}_k X_k) \cdot \exp(\hat{u})$ (2)

In the second function, $\exp(\hat{a}_0)$ is a constant term as multiplier. As we know, a reasonable earnings differentials index (such as the Gini coefficient mentioned here) should not change when multiplied by a constant term (equivalent to having everyone's earnings increase or decrease simultaneously by a certain multiple). Therefore, when we use the relevant indexes of earnings differentials, we can remove the constant term from the above equation without affecting the findings in any respect. For the effect of the residual \hat{u} , we adopted a commonly used technique which can be used with any indexes that measure inequality. We take the difference between the inequality indicator (or gap) y and the actual inequality indicator when \hat{u} is assumed to be zero, as the effect of the residual \hat{u} on actual earnings inequality. Once we have ascertained the effect of \hat{u} , the gap between total earnings differentials and the earnings differentials brought about by the residual term is the impact of the independent variables in the determining equation. Therefore, the effect of the residual can be expressed as the part of the earnings differential that cannot be explained by the variables in this equation. In Table 3, we use the ratio of the impacts of residual terms and the total earnings differentials to indicate the unexplained part of the earnings differential, while the value of 1 minus this ratio stands for the unexplained part, which reflects the degree of explanatory power of all the variables in the model in relation to the earnings differential.²⁸ On this principle, we find that the model explains 81 percent, 78 percent and 67 percent of the total earnings differentials in 1988, 1995

²⁷ The information above is a brief introduction to the decomposition method applied here. In the actual decomposition process, even though we use the sample mean of the independent variable X, the value of the other variables may either be the actual value or the mean. In such cases, the contribution of X would be different. In the final analysis, we argue that the contribution of X should be the mean of multiple computations. For a full elaboration of this issue, see: G. Wan and Z. Zhou, "Income Inequality in Rural China: Regression-based Decomposition Using Household Data," pp. 107-120.

²⁸ See G. Wan, "Regression-based Inequality Decomposition: Pitfalls and a Solution Procedure."

and 2002 respectively.

Table 3 The Gini Coefficient of Urban Earnings Differentials in China and the Model's Explanatory Power

Year	1988	1995	2002
Gini coefficients calculated from raw data	0.232	0.291	0.343
Gini coefficients calculated from estimated data	0.189	0.227	0.228
Degree to which residual explains earnings differentials (%)	18.534	22.129	33.448
Degree to which model explains earnings differentials (%)	81.466	77.871	66.552

As the classification of industries was slightly different in each year, we cannot directly compare the decomposition results of earnings differentials for the three years. Therefore, we will first look at the results of the decomposition of earnings differentials for 2002. Since the regression-based decomposition technique used in this study can be applied to measuring many different types of earnings differentials, we use earnings data for 2002 to decompose four different indexes: the Gini coefficient; the Theil index, indicated by GE (0); the generalized entropy measure when c equals 1, as indicated by GE (1); and the coefficient of variation (CV). The decomposition results are presented in Table 4.

As Table 4 indicates, among the four indexes of earnings differentials, each of the given factors made a different contribution to earnings differentials in 2002. This was because the measurement indicators focused on different aspects of the groups with different levels of earnings. However, we can see that although different indexes were applied, the ranking of the contribution of each factor to earnings differentials showed almost no change. Way in front were the factors of regional geography, system, cultural level, etc. represented by the dummy variable of city, falling in the range of 31.98 to 37.02 percent. The size of the contribution of regional location to earnings differentials for the urban population reflects the fact that barriers to labor mobility still exist in China, consistent with Davis's findings.²⁹ In the Gini decomposition results, the second tier of contributors to earnings differentials remained occupation, enterprise ownership, education and industry, which contributed around 10 percent to earnings differentials. The third tier contained the variables of age, whether fully employed, and sex, accounting for around 5 to 6.8 percent. Having a second job and being a CPC member accounted for only 3.98 percent and 3.32 percent of earnings differentials respectively. Membership of an ethnic minority made a negligible contribution. When the other three indexes besides Gini were decomposed, the ethnic minority variable seemed as though it might even play a weak role in reducing earnings differentials. In fact, in our earnings equation, membership of an ethnic minority was not statistically significant. This shows that there is indeed no discrimination against ethnic minorities in China.

²⁹ D. Davis, "Job Mobility in Post-Mao Cities: Increases on the Margins," pp. 1062-1085.

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	Gini	%	GE (0)	%	GE (1)	%	CV	%
Second job	0.009	3.982	0.002	2.749	0.002	2.787	0.005	2.811
Fully employed	0.015	6.613	0.008	9.253	0.007	7.926	0.012	6.828
Sex	0.011	5.004	0.004	4.287	0.004	4.203	0.007	4.112
Age	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
Ethnic minority	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
Enterprise 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
Industries	0.023	10.067	0.008	9.186	0.008	9.332	0.017	9.422
City (dummy variable)	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

Table 4 Decomposition of Earnings Differentials for 2002 (with industries in original classification)

What, then, is the contribution of the industry factor to earnings differentials?³⁰ If we estimate the earnings equation according to the classification of industries in the raw data and then use this to decompose the earnings differentials, we find that the contribution of the industry factor increased steadily. Specifically, the contribution of the industry factor to earnings differentials increased from 1.03 percent in 1988 to 3.02 percent in 1995 and then climbed to 10.07 percent in 2002. Importantly, the rate of increase was greatest between 1995 and 2002. Given that the classification of industries was slightly different in 1988, 1995 and 2002, we merged some industries in a reasonable way. We combined extractive industries and geological prospecting (in Table 2) for 1988 and 2002. In a similar vein, we also incorporated social services into public health, sports and social welfare industry for 1988 and 2002. Into this industry we further incorporated the production and supply of water, gas and power services of 2002. This treatment enabled us to make the industries comparable across different years, with 13 industries for each year (including the type of "other industry").

In Table 5, we present the contributions of 11 factors to earnings differentials in the three years of 1988, 1995 and 2002. Table 5 shows some clear trends, (1) The contribution of the industry factor to earnings differentials continued to increase. This is because for 2002, we combined power, gas and water supply services, where earnings were obviously higher than those of manufacturing, with the social service industry, where earnings were obviously lower than those of manufacturing, and then incorporated both into public health, sports

³⁰ As the Gini coefficient is most widely used and possesses all the characteristics of income gap measures, we examine only the Gini coefficient to save space.

and social welfare industry where earnings were similar to those of manufacturing. For this reason, the contribution of the industry factor to earnings differentials fell significantly. Even so, its contribution was still greater than in 1995. (2) The contribution of the regional factor represented by the dummy variable of city to earnings differentials witnessed a rapid rise; in 2002, this factor explained about a third of the total variance of earnings differentials. This could be explained by barriers to labor mobility between different cities. The rise in this factor reflects the growing importance of the geographical factor in regional development in the course of globalization. The original barriers to labor mobility make it hard to reduce the growing gap between regions. (3) The contribution of education to earnings differentials saw a marked increase. Given that the rate of return to schooling increased markedly over this period, it is not surprising to see a corresponding rise in the contribution of education to earnings differentials. (4) The contribution to earnings differentials of the two factors of enterprise ownership and occupation also increased year by year, with occupation making a greater contribution. This indicates the intensification of polarization between enterprises with different types of ownership and between occupations. (5) The contribution of full employment to earnings differentials decreased markedly. In 1988, it contributed a third of total earnings differentials, possibly because of the high number of redundant personnel. In our sample, 9.47 percent in our sample were underemployed. By 1995, the contribution of this factor had fallen to 7.4 percent. In this year, only 7.86 percent were underemployed. In 2002, the contribution of this variable fell further to 6.7 percent. (6) The contribution of age to earnings differentials also saw a noteworthy decrease. This is quite understandable given that under the traditional system, age attracted a "seniority wage." For this reason, the contribution of age between 1988 and 1995 was highly significant. But by 2002, the contribution of age had declined following dramatic labor market reform, with other factors that reflected productivity having an increasing effect on earnings. (7) The contribution to earnings differentials of having a second job rose threefold between 1988 and 1995. By 2002, its contribution was 7.5 times its 1995 level.

According to the regression results in Table 5, we find that the coefficients of both industries (including communications, transport, postal services and telecommunications as well as finance & insurance) changed from not significant to significant, and their significance increased steadily. At the same time, the coefficients of the two industries also showed a rapid increase. We deduce that it is highly probable that industries of this kind have accelerated the widening income gap. Galbraith and others have noted that in Russia and China, those sectors with the strongest monopolies obtained the greatest relative benefits. In the two countries, the financial sector has been the no. 1 beneficiary, while the agricultural sector has been the loser.³¹

³¹ J.K. Galbraith, L. Krytynskaia and Q. Wang, "The Experience of Rising Inequality in Russia and China during the Transition," pp. 87-106.

Voor	1988		19	95	2002		
real –	Gini	%	Gini	%	Gini	%	
Second job	0.000	0.147	0.001	0.558	0.009	4.178	
Fully employed	0.061	32.501	0.017	7.422	0.015	6.733	
Sex	0.009	4.603	0.014	6.245	0.012	5.363	
Age	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	
Ethnic minority	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	
Enterprise 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 variable)	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	

Table 5 Earnings Differentials Decomposition Using the Gini Coefficient (after merging industries)

Therefore, we hope to know whether or not the widening earnings differentials of the two broad groups of industries listed above were the result of the industry factor. For this reason, in the next step, we took the model shown in Table 5 and removed the high income finance and insurance sample, with results shown in Table 6. 32

As Table 6 indicates, the contribution to earnings differentials of factors other than industry showed no marked change, but the contribution of the industry factor was reduced considerably. In 2002, its contribution fell from the second tier and was ranked ninth among the 11 variables. Between 1995 and 2002, it actually fell by 0.13 percentage points. It can be seen that the rising income level of the two broad groups of industries described above had already become an important source of the widening income gap in China's cities and towns. The conclusion that the contribution of inter-industry inequality to the income gap had increased is connected with whether the two high income industries are included in the sample. Due to the limitations of our data, we had difficulty in classifying the industries at a more detailed level. However, it can be seen from our regression analysis that industries with

³² It should be pointed out that earnings differentials and contributions to earnings differentials are conceptually different. In terms of measuring the former, as long as people working in high income industries also perform better as regards other factors affecting earnings, removal of the high income sample narrows the earnings gap. However, the contribution of the industry factor to the earnings gap does not necessarily narrow. Consider the following scenario. Assume that historically, high income industries continue to pay high wages but moderately paying industries increase wages very fast; then, the contribution of the inter-industry earnings differential of the remaining samples may well be brought about by moderately paying industries. In such circumstances, if the sample of high paying industries is removed, the contribution of the remaining variables to earnings differentials may increase. Therefore, we believe that it is necessary to undertake empirical study on whether it is high-paying industries that have contributed to the widening of inter-industry earnings differentials.

174 Social Sciences in China

a monopoly character had already become an important source of rising inequality among industries. For example, as noted earlier, the production and supply of electric power, gas and water is monopolistic while the industry groups containing communications, transport, postal services and telecommunications on the one hand and finance and insurance on the other include the much debated monopoly industries of railways, the air industry, postal services, telecommunications, banking, securities and insurance.³³

	U		U		/		
Veen	1988		19	1995		2002	
rear	Gini	%	Gini	%	Gini	%	
Having second job	0.000	0.137	0.001	0.627	0.010	4.430	
Fully employed	0.060	31.892	0.017	7.511	0.016	7.177	
Sex	0.009	4.656	0.015	6.457	0.013	5.621	
Age squared	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	
Ethnic minority	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	
Enterprise 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 variable)	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	

Table 6 Earnings Differentials Decomposition Using the Gini Coefficient (after merging some industries and removing the two with the highest income levels)

Conclusions and Policy Implications

This paper examines the changing contribution of inter-industry inequality to the urban income gap. We found that as the urban income gap increased, so did the income gap arising from inter-industry inequality. Moreover, we found that of all the factors included in our model of the widening income gap, inter-industry inequality was the one whose importance grew most rapidly. Between 1995 and 2002, the increase in the contribution of inter-industry earnings differentials came about because of some state-owned monopolistic industries. This shows that in the course of marketization reform, some industries have gained greater benefits while others have not. Acute competition in the labor market has not had an equal impact on all industries. At the same time, we found that region, education, type of enterprise ownership,

³³ Of course, the manufacturing industry sample here includes monopolistic segmented industry such as the tobacco industry while communications, transport, postal services and telecommunications also include quite competitive segmented industry such as ground transport. Even so, our study shows the constant reappearance of high-paying industries like communications, transport, postal services and telecommunications as well as finance and insurance and their increasing contribution to earnings differentials. This suggests that it is these monopolistic segmented industries that constitute the root cause of the industry factor's contribution to widening earnings differentials.

occupation and having a second job were also making an increasing contribution to earnings differentials. On the other hand, the contribution to earnings differentials of age and full employment saw a notable decrease.

The main policy implications of this study are that removing barriers to labor market entry and breaking up monopoly industries in the product market are of great significance for the control of the widening earnings differentials in Chinese cities and towns. From the 2002 regression results, we can see that if we could achieve income equalization between industries, the urban income gap could be reduced by around 5 percent to 10 percent. In fact, if one could just eliminate the unreasonably high income levels in particular industries, the industry factor would cease to be an important contributor to the income gap. We argue that the enormous income gap between different regions reflects impediments to the free flow of labor between regions. This is primarily due to the manifold institutional barriers created by the household registration system (*hukou* system). Therefore, the main policy measure for reducing the regional income gap should be the removal of adverse institutional barriers rather than a simple reliance on financial transfers between regions. Where education is concerned, increased returns to schooling are a necessary result of market reform. Therefore, we can only reduce the income gap through education by equalizing educational opportunities rather than artificially reducing the returns to schooling. In particular, if, in future, we achieve the free flow of labor between regions, but the labor force flowing into the cities has been unable to receive a good education in the rural areas, the rising rate of return to schooling will mean that the earnings gap may still increase.

Our empirical study shows that marketization does not necessarily lead to a market economy characterized by fair competition. Ever-increasing inter-industry earnings inequality as an expression of inequality in the labor market has been capturing more and more public attention. Apart from providing the evidence for inter-industry inequality, we will also provide evidence for the sources of this inequality. What kind of person has the opportunity to enter high-income industries will emerge very clearly before the reader.

Notes on Contributors

Chen Zhao is Deputy Director and Professor at the China Center for Economic Studies, Fudan University. His interests focus on urban and regional development in China. His international publications have appeared in the *Journal of Comparative Economics, Review of Income and Wealth, Economic Modeling, Journal of the Asia Pacific Economies*, etc.

Wan Guanghua is Principal Economist in the Asian Development Bank, and Professor of the School of Public Finance and Economics at the Yunnan University of Finance and Economics. His research interests focus on income distribution and poverty reduction in developing economies. His international publications have appeared in the *Journal of Comparative Economics, Review of Development Economics, Journal of Economic Geography, Review of Income and Wealth*, etc.

Lu Ming is Professor at the School of Economics of Fudan University. He is interested in the study of urban-rural migration and urbanization in China. His international publications have appeared in the *Journal of Comparative Economics, Review of Income and Wealth, International Labor Review, Monthly Labor Review*, etc.

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