Evolution of the Industrial Wage Structure in China Since 1980[*]

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Abstract

Industry mean wages in China have exhibited sharply increased dispersion since the early 1990s. The upward trend in differences of average wages among major industry groups parallels increases in wage and income inequality throughout the Chinese economy. Research on the trend has attributed rising inequality to (1) market forces leading to better matches between worker pay and worker skills; (2) expansion of the share of employment in the non-government ownership sector; and/or (3) residual government control in some industrial sectors that has generated high wages monopoly rent sharing. We show that the industrial wage dispersion in China has evolved to match persistent and wide spread international patterns of industrial wage dispersion and that an increasing proportion of industrial wage dispersion can be explained as the result of observed worker characteristics.

Key words. Industry-Wage Structure; Inequality; China
JEL Codes: J31; D22; D33; L16; O53

Introduction

Wage differentials under planning in China, Eastern Europe, and the Soviet Union were severely compressed relative to the norm in market economies. In their post-planning transition to wage structures determined by market forces, all of these formerly planned economies have experienced increased dispersion of wages and incomes. This growing inequality is observed in industrial, occupational, skill, schooling, and regional dimensions. We focus on the evolution of the industrial wage structure (IWS) in China for two reasons: (i) some scholars and commentators have questioned whether rising wage inequality in China is the result of competitive labor market forces or the result of barriers to competition in industries where government retains a dominant ownership position; (ii) the IWS has received the attention of economists for more than 60 years and remains a topic with tantalizing unanswered questions today.

We show that: (i) most of the increasing dispersion of China's IWS can be explained by wage differentials that correspond to worker characteristics; (ii) privatization and, implicitly, market competition are driving forces behind the evolution of China's IWS; (iii) China's IWS has grown more similar to that in the world's major market economies.

The rest of this paper proceeds as follows. In section 2 we illustrate the evolution of the IWS in China since the beginning of economic reform. Section 3 contains a brief history of the literature on the IWS and presents our methodology. We present our empirical results in section 4, and section 5 concludes.

2. The Chinese Industrial Wage Structure Since 1980.

Two major features of China's IWS are the dramatic increase in wage dispersion in the reform era and its convergence toward a stable and common international pattern of high-wage versus low-wage industries The increased dispersion has attracted much attention in the press as well as in the professional literature.[1] Figure 1 shows that the dispersion of industrial wages in China was very low compared to most other countries until the late 1980s; it accelerated sharply between 1993 and 1995. This was a period of rapid increase in the

[1] Some recent scholarly papers on this topic include Chen et al., 2009; Démurger et al., 2010; Gustafsson and Li, 2001; Whalley and Xing, 2010; Xing and Li, 2011, and Yang et al., 2010.

proportion of workers in China's non-public employment sectors (Gustafsson and Li, 2001), probably encouraged by the policy changes associated with Deng Xiao Ping's Southern Tour in 1992. The upward trend continued, increasing after the year 2003. In contrast,, the IWS trends in the other countries depicted in figure 1 were quite stable[2].

Tables 1 and 2 illustrate the stability of the IWS in industrialized economies over time. In table 1 we see that the rank correlation of industry average wages in the United States in 1985 with average wages in 2008 was 0.90, while in China, the rank correlation of industry average wages in 1985 with 2008 is slightly over 0.40, gradually rising over time, to 1.0 (by definition) in 2008. Table 2 and figure 2 show the correlation of average industry wages in eight major industrialized economies in recent years with average industry wages in China between 1985 and 2008. There is a distinct upward trend in the correlation between China and almost all of the other countries over the period, with the average correlation coefficient exceeding 0.6 in each year since 2004. Figure 3 documents the high degree of correlation of the IWS structure across countries, plotting the frequency distribution of correlation of mean industry wages between pairs of the 13 industrialized economies included in Table 2 for the most recent year data is available. The mean correlation is 0.71 and 90% of the correlations are approximately 0.5 or higher.

Our discussion of the IWS in China and its increasingly close correlation with that in major industrialized economies parallels the observations in earlier research, including that of Slichter (1950), Lebergott (1947), Dunlop and Rothbaum (1955), Papola and Bharadwaj (1970), Krueger and Summers (1987), Genre, Momferatour and Mourre 2005), and Erdil and Yetkiner (2001).

3. *Puzzles in explaining the Industrial Wage Structure: Literature*

Research on the IWS has a long history in part because it has been difficult to explain or account for differences in mean wages across industry groups as equilibrium

[2] . A similar stability in the industrial wage dispersion for 8 nations in the European Union over the period 1991 through 2002 is reported in Genre, Kohn, and Moferatou (2009). Similarly to the data in figure 1, Genre, Kohn, and Monferatou show that Spain (and Portugal) have the highest degree of industrial wage dispersion, while Finland, not represented in figure 1, has a much more compressed IWS, comparable to that of China prior to 1993

differences in observed worker or job characteristics.[3] Thus the question arises: Does the unexplained portion of the IWS reflect unobserved worker job characteristics emerging from a competitive equilibrium, or is it due, at least in part, to non-competitive market forces such as monopoly-rent sharing?

Competitive explanation: Equalizing differentials. Writers at least since Slichter (1950) have offered a variety of explanations of the IWS. Many early studies take as a benchmark the competitive hypothesis (Reder, 1962), which in its simplest form states that equally productive workers should receive the same wages regardless of which industry employs them. But as eloquently expressed by Rosen (1986), worker productivity is only part of the story. Rosen states, "The theory of equalizing differences refers to observed wage differentials required to equalize the total monetary and nonmonetary advantages or disadvantages among work activities and among workers themselves" (p. 641). Even if it is assumed that both sides of the market (employers and employees) possess perfect information about worker and job characteristics adequate tests of the augmented competitive hypothesis (es) require matched employer-employee data with detailed information about both worker and job characteristics (Rosen, 1986). Consequently, consensus on the degree to which observed wage distributions correspond to the competitive paradigm remains elusive. Testing is further complicated when asymmetric information is introduced.

(i)Variation in worker characteristics. In general, observable skills and working conditions have not been shown to account for all of the IWS. In their 1987 paper, Krueger and Summers regress industry mean log wage rates on measures of worker skills and other characteristics (e.g. gender) and can account for about 40 per cent of observed industry wage dispersion. Moreover, the residual industry wage differentials' rank correlation with the raw differentials is about 0.9.

[3] That the differentials unexplained by observed worker or job characteristics mainly reflect market disequilibria would appear implausible in the face of their persistence over time and across countries. Thaler (1989) presents a lucid review and analysis of proposed explanations and their shortcomings.

When worker skills are heterogeneous and some skills are unobserved, testing a competitive equilibrium hypothesis on the IWS is a complex task. Heckman and Sedlacek (1990) find that a Roy (1951) model modified to recognize the importance of heterogeneous sector-specific skills is consistent with self-selection and hourly wages of workers among three sectors—manufacturing, non-manufacturing, and nonmarket work, but they observe only worker schooling and experience.

An appealing method to control for unobserved worker characteristics is to examine the wages for workers who change jobs. Dickens and Katz (1987a) summarize a number of such studies. A major challenge is to account for selection bias that arises because voluntary job change should require that workers are offered higher wages or better working conditions on their new jobs than they received in their old jobs. After accounting for such bias by examining wage outcomes for workers who report that they were displaced from their original employment, Krueger and Summers find that residual industrial wage differentials persist. They conclude that this "cast[s] doubt on explanations of industry wage differentials based on unmeasured quality". However, Murphy and Topel (1987), using a different CPS sample and different method of correcting for selection bias find that the industrial wage differentials for workers who change industries are only one-third of total industrial wage differentials, which suggests that two-thirds are explained by unobserved worker characteristics. Later studies, such as those of Gibbons and Katz (1992) and Blackburn and Neumark (1992) remain agnostic at best that industry wage differentials can be satisfactorily explained as the result of unobserved worker characteristics. Björkland, et al (2007) make innovative use of siblings data for four Nordic countries and the United States are find that unobserved worker characteristics may explain as much as half of the IWS not explained by observed characteristics in the United States and a smaller proportion in the Scandinavian countries (where dispersion of industrial wages is lower).

A further complication in attributing interindustry wage differentials to cross-industry differences in worker characteristics is that the maintained hypothesis of cost minimization is not generally tested. As Thaler (1989) emphasizes, if, for example, firms in industries in which high-profits are protected from competition pay higher wages in order attract "better" workers, they will be able to employ workers with more schooling, better work habits, and so

on. That is, employing "better" workers may be just one way to enjoy monopoly profits rather than minimizing costs to maximize pecuniary profit. Even if industrial differentials are due to cross-industry differences in worker characteristics, observed or unobserved, a widely-accepted test of the competitive hypothesis remains elusive.

(ii) Variation in job characteristics. In the competitive paradigm, the observation that if similar workers who appear similar are paid more in some industries than in others (Krueger and Summers 1988, Katz and Summers 1989) it is the result of compensation for industry-specific job disamenities or inferior working conditions. However, as Rosen (1986) has emphasized, whether these compensating differentials are positive or negative is a complex question. For example, mining jobs are intrinsically dangerous and often require working in dark and otherwise unpleasant locations. Workers who are less averse to working in dark, dangerous places are more likely to select into mining jobs in return for a lower wage premium than workers who are more averse. A positive wage differential for mining appears to hold in China, too, but it has declined as other opportunities have emerged.

(iii.) Challenges to the Competitive Hypothesis: Efficiency Wage Hypotheses and Rent-Sharing. The persistence over time and across countries of unexplained industry-wage differentials presents a serious challenge to the competitive hypothesis under the assumption of full information. Two contending explanations involve relaxing the assumption of full information and/or the assumption of profit maximization.

High-wage industries tend to be those in which employers have a relatively high degree of market power as measured by profit ratios, standard concentration ratios or by firm size, and this has been by some observers as evidence of monopoly rent sharing (Slichter (1950), Pugel (1980), Mishel 1982, Kwoka 1983, Brown and Medoff 1989, Dickens and Katz 1987a and 1987b). However, Krueger and Summers (1988) note that profit rates across industries tend to be insensitive to a broad range of wage variation, suggesting that higher wages lead to lower overall costs, *cet. par.*, and this observation challenges a simple inference of monopoly rent-sharing. For example, high-wage industries tend to have lower quit rates, which means that employers can avoid additional hiring and training costs (Katz and Summers 1989, Akerlof, Rose, and Yellen 1988). Krueger and Summers (1988) analyze the role of efficiency wage models in accounting for the residual IWS. They note that

efficiency-wage models can explain employers' choices to pay higher wages than their employees would receive in alternative jobs as a means to avoid costs associated with monitoring and worker turnover. They parallel Thaler's (1989) observation that it is difficult to separate profit-maximization (e.g. agency problems in large corporations (Brown and Medoff, 1989)from utility-maximization motives. Krueger and Summers (1988) state that they "…prefer to regard rent sharing as a species of efficiency wage theory rather than as an alternative explanation for wage differentials."

(iv.) The Competitive Paradigm Redux: Implicit Bonding. Murphy and Topel (1999) challenge the validity of the efficiency-wage paradigm under most circumstances, and this challenge also applies to efficiency wages as a satisfactory explanation of industry wage premia. Under conditions of asymmetric information, employers and employees can both gain by entering into arrangements (formal or informal) in which workers are paid less than their alternative wage for some time period and then receive a return to their job-investment after a certain time period. Such implicit contracts in which workers post a bond against their shirking or to assure that they are "high quality" expose workers to the risk of employers' bad faith, but this risk is minimized when employers are concerned about their reputations. Firms that stand to lose the most by gaining bad reputations in the job market are those with large investments in fixed capital and well brand names in their product markets, and so on—characteristics that are frequently identified with high-wage industries. In equilibrium, the present value of workers' alternative job "contracts' are equalized, so there is no excess supply of workers and no disguised unemployment. Empirical tests that critically distinguish between efficiency-wage and Murphy-Topel implicit bonding are difficult, because they would require data on individual workers' wage time paths on actual and counter-factual jobs.

Another issue related to rent sharing is unionization. Unions may bargain successfully for higher wages in industries where monopoly rents are high, and the degree of unionization may be endogenously related to employer market power. There is evidence that industry average wage rates are positively correlated with the extent of unionization (Garbarino, 1950, Dickens and Katz, 1987b), but Krueger and Summers (1987) find that high-wage industries have tended to pay high wages even before the advent of wide-scale unionization.

Recent Research on Inequality and the Industrial Wage Structure in China

Research on the IWS in China has focused on explaining growing wage and income inequality, especially within the urban population. Chen, Lu, and Wan (2010) regress industry average wages on the "usual suspects" including worker characteristics and industry dummy variables. Their results, based on 2007 data from the China Household Income Project (CHIP) indicate that over half of the change in industry wage dispersion since 1988 (holding constant worker characteristics) is attributable to two industries—transportation, storage, post office, and communication; and finance and insurance. Since these two industries are dominated by government-owned enterprises, they infer that government monopoly explains the recent rise in industrial wage differentials. Yue, Li and Sicular (2010) use the 1% sample from the 2005 China Census and divide industries into competitive and monopolistic sectors. They apply a Oaxaca-Blinder decomposition and report that the residual industry wage differential (holding worker characteristics constant) is "unreasonably large" in terms of what might be attributable to unobserved worker characteristics. They conclude that the high wages in these industries is attributable in large part to rent sharing. In contrast, Yang *et al.* (2010) note evidence that the relatively higher growth rate of wages in the State sector after the late 1990s has resulted from dramatic restructuring of state-owned units (SOU's)[4], with the least efficient enterprises being shut down and the least productive workers being laid off through various means.

Other recent research addresses the issue of growing urban wage inequality but does not focus in wage differentials by industry group. Ho, Dong, Bowles, and MacPhail (2002) note that privatization of rural industries in two provinces of China was associated with increased wage dispersion of workers according to their education, experience, and gender and that patterns were similar across different types of private ownership. Whalley and Xing

[4] Here and throughout the paper, we define State Owned Units to include enterprises, agencies or institutions that are wholly or jointly owned and effectively controlled by a local or the central government. Collective Owned Units are defined to include enterprises, agencies or institutions that are wholly or jointly collective-owned and collective-controlled; Other Owned Units are defined to indicate the rest, including solely private owned enterprises, private holding enterprises, and foreign invested enterprises.

(2010) come to somewhat different conclusions than do the authors of the two papers cited above. Their analysis, based on household surveys for the years 1995, 2002, and 2007, finds that the majority of the increase in urban wage inequality is attributable to the rise in the private sector's employment share, although rising inequality within the publicly-owned sector is also an important contributor. Démurger, Li, and Yang (2010) analyze changes in public-private sector earnings differentials between 2002 and 2007 and report that although worker characteristics are increasingly important in explaining wage differentials, segmentation by ownership category remains an obstacle preventing workers from moving out of the lower-wage categories.

Methodology. To demonstrate the degree to which China's IWS has evolved to a pattern similar to that in other major economies we follow the literature in estimating the proportion of industry wage differences attributable to variation in worker characteristics and the return to those characteristics across major industry groups. Similarly to past research, available data limits us to reduced-form estimates of the contributions of worker characteristics (and firm ownership) to China's IWS.

Our basic model is

$$\ln W_i = \beta_0 + I_i\beta_1 + X_i\beta_2 \qquad (1)$$

where

W_i is the ith person's main-job total earnings or hourly wage rate;

I_i is a set of industry dummies indicating the industry of the worker's main job; and

X_i is a set of worker and employer characteristics. Worker characteristics are:

1. Six schooling level dummy variables,
2. a quadratic in workforce experience,
3. tenure on current job,
4. dummy variables representing gender, Chinese Communist Party membership, and minority group status.

Employer characteristic is ownership type:

1. state-owned,
2. collective, and

3. "other," which includes totally privately owned and joint private-state ventures.

All regressions include a dummy variable for the province in which the respondent was living at the time of the survey.

The schooling and experience variables correspond to conventional measures of worker quality; gender and minority status are included to reflect characteristics that frequently are associated with wage differentials across jobs of all types; Chinese Communist Party membership is included to represent unobserved worker quality.[5] and the ownership dummies are included to help identify the relationships between firm ownership and returns to various worker characteristics.

Current-job tenure (available in the CHIP data for 1995 and later) is included to capture current-job specific human capital. An implication of Murphy and Topel (1999) is that workers' implicit performance bonds with employers would generate positively sloped tenure-wage profiles. If tenure-wage profiles are steeper in high-wage industries and if job tenure is on average greater in high-wage industries, we can gain some understanding of industry wage premia. However, without knowledge of individual workers' counter-factual tenure-wage profiles we cannot separate an efficiency-wage explanation from a performance-bond explanation.

3. Data and Empirical Results

The data for estimating relationship (1) come from four wages of household surveys conducted by the China Household Income Project (CHIP). The CHIP samples years are 1988, 1995, 2002, and 2007. The surveys were collected from several thousand households in a varying sample of provinces and are designed to be fairly representative of China's rural and urban households.[6] Variable definitions are reported in Table 3 and summary statistics

[5] Li, et al. (2007) use twins data to provide evidence that CCP membership affects wages through unobserved ability rather than favorable political connections. Unfortunately, CCP membership is not available in the 2007 CHIP survey.

[6] The CHIP-88, -95, and -02 data are available to the public at the Inter-university Consortium for Political and Social Research (ICPSR). For details about CHIP-88 and CHIP-95, see Griffin and Zhao (1993) and Riskin, Zhao and Li (2001). CHIP-02 is discussed and used in Khan and Riskin (2005). Knight, Deng, and Li (2011) and Démurger, Li, and Yang (2011) use and describe the 2005 and 2007 samples and procedures. CHIP 2007 was

for the urban and rural samples are shown in Table 6. Urban sample size ranges from more than 4300 in the 2007 sample to more than 6600 in the 2002 sample. Enterprise ownership information for the rural sample was not collected in 2007. Rural sample sizes range from 628 in 1988 to more than 6500 in 2007.

Distribution of Workers by Industry. The proportion of sampled workers in the manufacturing industry is 51.6% and 55.5% in 1988 (rural and urban, respectively), 58% and 46% in 1995, 41.8% and 56.2% in 2002; and 23.9% and 46.2% in 2007. In contrast to the decline in proportion of manufacturing workers in the urban workforce, the proportion in transportation and communication rose from 8.4% in the 1988 sample to 16.7% in 2007 and in wholesale and retail trade from 12.9% in 1988 to 14.3% in 2007. The proportion of rural workers in the construction and trade industries also rose, from 8.8% and 4.9% in 1995 to 21.6% and 12.6%, respectively, in 2997.

Distribution of Workers by Ownership. In the urban sample, the proportion of workers in the private (other-ownership sector, or OOU's) is less than 1% in 1988, 1.6% in 1995, 39% in 2002, and 36% in 2005, while in the rural sample, the number of workers in OOU's 8.7% in 1995 and 82% in 2002. (Ownership is not reported for rural workers in 2007; we may presume that the proportion in OOU's was even larger in 2007 than in 2002.) The proportion of urban workers in state-owned units (SOU's) is 82% in 1988. In 1995, the proportions of workers in SOUs is 79%and 16.7% for the urban and rural sample, respectively, 50.2% and 5.9%, respectively in 2002, and 57.9% for urban workers in 2007. The remainder of the

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collected jointly with the Project on Rural-Urban Migration in China (RUMIC).

The urban and rural samples are defined by *hukou* type. Independent migrant (urban residents with rural *hukou*) data sets are available only in 2002 and 2007. In every sample, we first dropped the observation with missing relevant variables and obvious input errors (such as a college graduate being less than 10 years old). Then we selected observations who are working or employed, namely dropping students, the retired, etc. We further limited our samples to typical wage-earners so that the self-employed, military, and the managers of government agencies and institutions are dropped. Observations with zero or less income and a few observations that are difficult to be classified by industry are also dropped. In some of the datasets, there is an independent question asking whether the person received any income throughout the year or not. We dropped the observations who are responding "no" to such question whenever the questionnaire allows.

samples are in collectively owned units (COU's).

Estimation Results. The estimation results for equation (1) are contained in tables 4a (urban sample) and 4b (rural sample). Columns (1) through (4) contain the estimation results for regressions that include the industry dummy variables alone. Columns (5) through (8) report results that include both the industry dummies and worker characteristics. Columns (5a), (6a), (7a), and (8a) report results for regressions that include *only* the worker characteristics. The estimation results are not sensitive to whether total or hourly earnings is used as dependent variable, so we limit our discussion to the estimates based on hourly earnings except for 1988, for which work hours data are not available.

Finally, table 4 column (9) reports regression results based on the United States 2011 current population survey (CPS). We view the U.S. IWS as a benchmark against which China's can be compared. Although the regression reported in column (9) includes personal characteristics similar to those in columns (6), (7), (8), and (8b), the schooling and race categories are somewhat different, so we simply do not report them.

The 2002 and 2007 CHIP urban surveys included a sizeable sample or migrants (urban residents with rural *hukou*), and in column 8(b) we report results for the same specification as in column 8 using the urban sample with somewhat more than 3,000 urban migrants; a dummy variable for migrant status is added. The estimated regression coefficients are remarkably robust to inclusion of the migrants; a regression of the industry coefficients in column (8b) with those in column (8) yields a slope coefficient of 0.91 and an R^2 of 0.95. We base our further discussion on the urban samples without migrants.

The impact of worker characteristics and ownership on IWS in urban markets. Table 4 (last two rows) and figure 6 report summary measures of industrial wage dispersion and the proportion of the dispersion that can be "explained"[7] by cross-industry differences in worker characteristics and their returns. The summary measure of the IWS, reported in the next-to-last row of table 4 and the cross-hatched bars of figure 4, is simply the standard deviation (SD) of the industry-variable regression coefficients. For example, the SD for 1988

[7] We use the word "explained" for convenience, because it is simpler than writing "explained".

in column (1) which does not include worker characteristics (SD(No)) is 0.06 and in column (5) for 1988, which includes worker characteristics and enterprise ownership, (SD(Yes)), is 0.05. The proportion of SD(No) that is explained by worker characteristics and ownership is [1-(SD(Yes)÷SD(No))], which is reported in the last row of table 4. For the 1988 sample, the proportion explained is 19%.[8]

Similar to the economy-wide aggregate data, the dispersion of industry mean wages reflected in the urban CHIP samples has increased sharply in the process of marketization. In the urban sample, SD(No) doubled between 1988 and 1995 in the urban sample, and doubled again by the year 2002. However, in contrast to the IWS observed in the aggregate data, the SD of the industry regression coefficients estimated in the urban CHIP samples fell by about 25% between 2002 and 2007.[9]

The proportion of the IWS dispersion explained by worker characteristics (including ownership sector) increases from 19 percent in 1988 and 17 percent in 1995 to 29 percent in the year 2002, doubling to 57% in 2007 (46% in the sample including migrants. It appears obvious that the "explanatory power" of worker characteristics and ownership sharply increased as marketization advanced. We find it remarkable that although the SD of the IWS for the United States in 2011 is larger than that for China in 2007, the proportion "explained" by the distribution of worker characteristics and their returns is almost the same for the two countries.

In figures 6a and 6b the cross-hatched bars illustrate the inverted-U pattern of the SD(No) of industry coefficients estimated from the CHIP samples. The solid black bars illustrate the proportion of SD explained by the distribution and returns to worker

[8] While [1-(SD(Yes)÷SD(No))] can take on negative values, the inclusion of worker characteristics and ownership almost always "explains" a positive share of the IWS.

[9] Recall that work hours data are not available in CHIP 1988. The correlation coefficients between the CHIP and China Statistical Yearbook industry mean wages are 0.38, 0.38, 0.69, and 0.70 for the years 1988, 1995, 2002, and 2007, respectively. The SYB data do not represent urban workers who are not formal employees employees nor the owners or employees of sole proprietorships. Moreover, our mapping of the CHIP industries into the SIC categories is subject to error.

characteristics,[10] which has an upward trend in the urban sample, but drifts downward in the rural samples after 1995.

Figure 5[11] provides another illustration of the rising degree to which worker characteristics can account for the IWS in China. The series CV1 is the coefficient of variation of industry mean wages as in figure 1. The series CV2 is CV1 multiplied by the proportion of the SD of urban industry wage coefficients that is *not* explained by the distribution of and returns to worker characteristics across industries, i.e. (SD(Yes)÷SD(No)) . The "unexplained" ratio is interpolated between CHIP sample years using a simple quadratic. Even given the sharply rising CV of mean wages by industry calculated from the official aggregate data, the "not explained" SD declines substantially after 1995.

This divergence between total and unexplained IWS sheds light on the issue whether recent increase in China's total industrial wage dispersion is due to government monopoly power in certain high-wage industries. Although rent-sharing in state-owned firms in China cannot be ruled out, we argue that the extent to which it explaind rising industrial wage dispersion is questionable. If rent-sharing were the main force driving wage differentials, we should expect to see that most of the recent increase in industrial wage differentials is attributable to the proportion unexplained by labor characteristics, rather than the explained part. But figure 5 tells us that most of the recent increase in total industrial wage differentials is attributable to increase in explained proportion (even though wages in state-owned units rose more than in other ownership sectors after 2001).

Changes in the rural IWS. The rural samples for 1988 and 1995 are very small compared to the urban samples and to the rural samples in later years, and this may partly account for the very large increase in the SD of the industry coefficients between 1988 and 1995. (There is only one observation in the real estate industry in 1995, for example .) Having said this, we note that the time pattern of the rural SD parallels that of the urban SD,

[10] The regressions on which figures 6a and 6b are based included ownership sector dummies, but the results are essentially unchanged if the ownership dummies are not included in the regressions.

[11] In order to separate the effect from ownership and productive labor characteristics, we dropped ownership from our regression models to derive figure7.

but leads it by one sample year. This is understandable in terms of the rural sector's lead in transition from planning to a market economy. By 2007, the rural and urban SD(No)'s are 0.18 and 0.13, respectively.

The degree to which worker characteristics can account for the industry wage dispersion in the rural samples is everywhere smaller than in the urban samples, less than 10% in 2007 compared to nearly 60% in 2007. We attribute this gap to a greater heterogeneity of worker characteristics demanded among urban enterprises than among rural enterprises. For example, as noted further on, the return to schooling is higher in urban employment than for rural jobs.

Returns to Worker Characterstics: Schooling.[12] One reason for the increased importance of worker characteristics in accounting for the IWS in the urban sample has been rising returns to schooling. [13] For simplicity, we focus on the return to completing four years of college compared to that of completing upper middle school for the urban sample and to three years of technical college (dazhuan) for the rural sample. Comparing 1988, column (5), with 2007, column (8), in the urban sample, we calculate $[1+(\exp 0.27 - \exp 0.15)]^{0.25} = 1.029$, a mean per year rate of return to college (compared to senior high school) of only 2.9% in 1988, but 12.1% in 2007. A similar calculation for the rural sample yields an estimated per-year return to three years of technical college compared to graduating from upper middle school that is negligible in 1995 and 9.4% in 2007. (There are no technical college graduates in the 1988 rural sample.) Since technical college is only three years compared to four years for a standard university curriculum, the increased amount of schooling along with the higher return for workers who have advanced beyond senior high school can help explain why worker characteristics account for a larger portion of the IWS in the recent urban samples than in the

[12] The estimated coefficients of the worker characteristic variables in regressions that do *not* contain the industry dummies are remarkably close in value to those in the regressions that contain the industry dummy variables.

[13] There is a vast literature on increased returns to schooling in China as estimated from simple and augmented Mincer-type equations that documents similar patterns in the return to schooling in China during the reform period, and we do not cite it here.

rural samples.

Returns to Worker Characteristics: Experience and Tenure. The effect on pay of one more year of labor for experience of an individual in the urban sample with ten years in the labor force is 2.9% in 1988. In 1995, for a worker with 10 years' experience and still working at his/her first job the return to one more year on the same job is 4.4%; in 2002 2.8%; and in 2007 1.1%. The effect of an additional year of current job tenure (unobserved in 1988) holding experience constant, is 0.5% in 1995, 0.9% in 2002, and 1.1% in 2007. Thus, the importance of current-job tenure has increased over time, both absolutely and relative to general labor-market experience. In 1995, an urban worker with ten years' current-job tenure who changed jobs would lose 5.2% in accumulated job-specific capital. In 2007 estimates, a similar worker would suffer nearly a 12% loss of firm-specific capital.

In the rural sample, an additional year of experienced paid nothing for a worker with ten years in the labor force in 1988, 2.9% 1995, 2.8% in 2002, and 0.9% in 2007. The return to an additional year of current-job tenure was 0.9% in 2002 and 0.8% in 2007, exhibiting an upward trend relative to total experience that we see in the urban sample, as well.

Other Characteristics: gender and minority status. In the urban sample, the coefficient of the male gender dummy rose from 0.06 in 1988 to 0.21 in 2007; the gender coefficient in the rural sample indicates approximately a 30% premium for males in 1988, declining in 1995 and 2002, but returning to approximately 25% in 2007.

The minority status coefficient is more negative in the urban sample in 2007 than in 1988, although statistically insignificant in both years (but statistically significant in the 2007 sample including migrant workers). In the rural sample, the coefficient is quite negative and statistically significant in 1988, positive in 1995, negative in 2002, and negligible in 2007.

Ownership: direct and indirect effects. We believe that marketization of the economy and the rising proportion of workers in the non-publicly owned sector is the major force behind increased income inequality in China and the rising proportion of the IWS explained by worker characteristics and their returns. As illustrated clearly in figures 4 and 5 respectively, the coefficient of variation of industry mean wages among across OOU's has been far greater than other ownership sectors, while the proportion of workers and staff employed in OOU's has increased from negligible in 1980 to over 50 percent in 2008. Wage

dispersion has also risen in the state-owned sector, and this can be attributed to the need to compete with the private sector for quality workers (Yang et al., 2010), although it remains far smaller than among OOU's. As the regression results reported in table 4 indicate, the *direct* effect of working in the non-state, non-collective sector on wages has gone from positive to negative in urban employment, and it became statistically insignificant in rural employment in 2007.

A subtle indirect impact of the competitive pressures caused by the rising importance of profit-motivated private ownership may have been an increase in the ratio of rate of return to job tenure relative to total labor market experience that we noted above. In regression results reported in another version of this paper[14], this increase has been larger for workers in OOU's than for workers in SOU's. To illustrate, a worker in a SOU in his/her first job and tenth year of work who changed jobs in 2002 would have accumulated 16.4% in general labor market capital but would have suffered approximately a 10.5% reduced wage rate (assuming immediate transfer to a new job due to loss of "tenure capital". An otherwise identical OOU worker would have suffered a 9.4% loss despite having accumulated 10.5% in general labor market capital. However, in 2007, the respective losses would have been 10.0% and 11.6%, respectively, both the SOU and OOU worker having accumulated negligible general labor market capital. These calculations are consistent with increased importance of either efficiency-wage or worker-bonding components in wage setting between 2002 and 2007, in both SOU's and OOU's. However, we cannot distinguish between the efficiency-wage and worker-bonding two hypotheses, given that we do not have information on unemployment or underemployment that would be implied under an efficiency-wage regime .

Sorting of workers by industry. If marketization has impacted the structure of wages across industries it presumably has also affected the inter-inudstry allocation of workers with given characteristics. We focus on schooling because of its importance in determining

[14] For convenience we treat ownership sector as a worker characteristic. Wage regressions stratified by ownership sector are available in a version of this paper available at http://www.econ.ohio-state.edu/Fleisher/working_papers/index.htm

individual wages. We note that, paralleling the general rise in schooling levels of the population, the proportion of workers who had graduated from a level of schooling higher than junior middle school grew from 47% to 82% between 1988 and 2007 in the urban sample. In the rural sample, schooling levels were much lower; the proportion of sampled workers who had achieved more than junior middle school status was only 28% in 2007.

We may expect workers to sort themselves among industries in order to maximize the anticipated returns to their human-capital investments, other things equal. In Table 5 we report that the "sorting ratio" for worker schooling. The sorting ratio for an industry is the proportion of all workers who have education equal to or exceeding junior middle-school who are in the industry relative to the proportion of all workers who are employed in this industry. If the proportion of workers with the designated level of schooling in an industry equals the proportion of all workers who are in the industry, then the sorting ratio will equal 1.0.

Urban Industries. Schooling levels have converged across industries in the urban sample. As shown in the last two rows of table 5, both the standard deviation (SD) of the sorting ratios and the standard deviation weighted by relative industry employment (wSD) decreased between 1988 and 2007. The wSD is considerably smaller than the unweighted SD, indicating that extremes in the sorting ratio occur in industries with relatively small employment shares. An overall impression is that there was a redistribution of educated workers from traditional government jobs, e.g., Public Administration, to non-government jobs, e.g., Manufacturing. One of the biggest changes occurred in Public Administration and Defense, where the sorting ratio was 1.51 in 1988 and only 1.13 in 2007. In Finance, which has been traditionally dominated by SOU's, the sorting ratio for workers with at least a lower middle school education in 1988 was 1.42 but by 2007 had fallen to only 1.17. The Manufacturing, Construction, and Transportation industries gained in their relative proportion of educated workers between 1988 and 2007, and industries that exhibit rather humped-shape changes in the education sorting ratio include Mining, Construction, Trade, Transportation, and Real Estate.

The convergence of schooling levels across industries may at first seem to conflict with the substantial increase in industrial wage differentials over the two decades covered in

Table 5. However, as noted above returns to schooling have increased dramatically, sufficiently so to more than balance the leveling effect of the redistribution of highly educated workers. Put differently, in the absence of increased worker mobility among industries, increased returns to schooling would have had an even larger impact on wage inequality than in fact occurred.

Rural Industries: Schooling. Sorting ratios for the rural sample are shown only for 2002 and 2007, because the 1988 and 1995 rural sample sizes are quite small. There is considerably greater variation in the rural sorting ratios than in the urban sample, with the SD in 2007 being about 10 times larger than that in the urban sample; the wSD is also much larger in the rural than in the urban sample, but as in the urban sample, it is smaller than the unweighted SD. However, the wSD of the sorting ratio increased in the rural sample between 2002 and 2007 in contrast to convergence of weighted sorting ratios in exhibited the urban sample.

5. Summary and Conclusion

We have shown that the increasing inequality of wages in China across industries has moved China from a position of very low wage dispersion to a postion more typical of many major industrialized economies. Much of this increase results from increasing returns to observed worker characteristics, particularly schooling, and reallocation of workers across industries as enterprises have been forced to minimize costs if they are to survive under pressure of increased competition. Not only has the dispersion of industrial wages moved into the zone populated by other major economies, the actual industrial wage pattern in China has become increasingly similar to the pattern of developed countries. For example, the similarity between the industry regression coefficients for China and the United States is particularly striking as illustrated in table 4, columns (8) and (9). The convergence of China's IWS toward an international pattern that has been remarkably stable over time implies that fundamental market forces are at work.

Evidence that the mechanism underlying rising industrial wage inequality can be sign in that differential pay within the non-publicly owned sector has been much greater than within the state-owned sector, so that the rising proportion of workers in the private sector has increased overall wage inequality. Moreover, despite the relatively rapid growth of wages

among SOU's in recent years, the importance of state ownership in an industry cannot explain proportional increases in industry average wages. To illustrate, a regression of the proportionate change in industry mean wages between 2002 and 2007 against the proportion of industry workers in SOU's in 2007 yields a statistically insignificant, negative slope coefficient as illustrated in figure 9.[15]

Yet fascinating problems remain. (1) To what extent is the proportion of industry wage differentials unexplained by observed worker characteristics the result of pay for unobserved talents and abilities? (2) To what extent do high wage industries pay more simply because they are more profitable? An(3) how can rent sharing be separated from an efficiency-wage hypothesis regarding unexplained industry-wage differentials? Resolving these issues requires access to matched detailed employee and employer information which is not yet available.

[15] The basic result is unchanged when the change in the proportion of industry workers in SOU's between 2002 and 2007 is the regressand and/or when the regressor is a measure of wage rates in the private sector.

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Table 1

Rank Correlation of Industry Average Wages
With the year 2008 (for selected years)

	China		U.S.
Year	Rank Correlation With Agriculture, Hunting, Forestry, and Fishing	Rank Correlation Without Agriculture, Hunting, Forestry, and Fishing	Rank Correlation Without Agriculture, Hunting, Forestry, and Fishing
1985	0.4056	0.2273	0.8951
1988	0.4755	0.3182	0.9231
1991	0.4476	0.2818	0.9231
1992	0.6573	0.5545	0.9231
1993	0.5245	0.3818	0.9231
1994	0.7133	0.6273	0.9161
1997	0.8392	0.7909	0.9161
2000	0.7063	0.6182	0.9580
2003	0.8042	0.7455	0.9650
2006	0.9580	0.9455	0.9650
2008	1	1	1

Note: China data are taken from International Labor Office Yearbook of Labor Statistics; U.S. Data from U.S. Bureau of Labor StatisticsCurrent Employment Statistics, Average hours and earnings of production and nonsupervisory employees on private nonfarm payrolls by major industry sector, 1964 to date.

Table 2

Correlation of Average Industry Wage
With China (for selected years)

Country/Year	With China/1985	With China/1986	With China/2007	With China/2008	Number of Industries
Average	0.05	0.12	0.64	0.64	
Australia/2004	0.39	0.45	0.44	0.46	10
Australia/2006	0.26	0.34	0.41	0.41	10
Canada/2007	0.64**	0.75**	0.08	0.07	10
Canada/2008	0.63*	0.63**	0.10	0.10	10
Denmark/2006	0.18	0.28	0.61*	0.62*	9
Denmark/2007	0.10	0.20	0.69**	0.70**	9
France/2001	-0.04	0.02	0.79***	0.79***	10
France/2002	0.02	0.08	0.77***	0.77***	10
Germany/20007	-0.29	-0.20	0.74**	0.74**	9
Germany/2008	-0.28	-0.18	0.75**	0.74**	9
Japan/2007	0.03	0.04	0.50	0.48	7
Japan/2008	0.02	0.03	0.50	0.47	7
Korea/2007	0.01	0.10	0.78**	0.76**	9
Korea/2008	0.06	0.11	0.70**	0.69**	9
Netherlands/2004	0.15	0.24	0.47	0.48	10
Netherlands/2005	0.15	0.24	0.48	0.49	10
Portugal/2007	-0.12	-0.08	0.87***	0.86***	9
Portugal/2008	-0.09	-0.06	0.87***	0.85***	9
Spain/2007	-0.13	-0.05	0.90***	0.89***	9
Spain/2008	-0.11	-0.03	0.90***	0.90***	9
Switzerland/2006	-0.45	-0.40	0.81***	0.81***	10
Switzerland/2008	-0.44	-0.40	0.82***	0.81***	10
Taiwan/2007	0.08	0.19	0.68*	0.65*	8
Taiwan/2008	0.06	0.18	0.69*	0.66*	8
UK/2006	0.22	0.28	0.60*	0.63*	10
UK/2007	0.19	0.24	0.65**	0.68**	10

Note: Data from ILO Yearbook of Labor Statistics. *** p<0.01, ** p<0.05, * p<0.1

Table 3

Variable Definitions

Variable	Definition	Availability in CHIP
Wage (Yuan)	Total annual earnings from the current job	All
Hour (hour)	Total annual working hours in the current work unit	NA in 1988
Industry	A set of dummy variables for industry classification according to ISIC (International Standard Industry Classification) Rev.3.1	All
Education Dummies	A set of dummy variables for each specified level of education attainment	All
Experience (Years)	Age minus years of schooling	All
Job Tenure (Years)	Years of experience in the current work unit	NA in 1988
Male	Dummy variable for male	All
Communist Party	Dummy variable for being a member of Communist Party	NA in 2007
Minority	Dummy variable for minority ethnic group	All
State Owned Unit(Reference Group)	Dummy variable for State Owned Units	NA in 2007 rural data
Coop Owned Unit	Dummy variable for Cooperative Owned Units	NA in 2007 rural data
Other Owned Unit	Dummy variable for Other Owned Units	NA in 2007 rural data

Note. Industry classification in the CHIP questionnaires is similar to but does not precisely accord to ISIC Rev 3.1. Therefore, reclassification by the authors was necessary.

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Table 4a Log Wage Regressions Urban

	（1）	（2）	（3）	（4）	（5）	(5a)	（6）	(6a)	（7）	(7a)	（8）	(8a)	(8b)	(9)
Survey Year	1988	1995	2002	2007	1988	1988	1995	1995	2002		2007	2007	2007 Incl Migrants	2011 U.S. CPS
Mining and Quarry	0.09***	0.27***	0.15***	0.17*	0.05***		0.14**		0.12**		0.08		0.06	0.10
Public Utilities			0.44***	0.25***					0.36***		0.15***		0.10***	0.19***
Construction	0.04	0.00	0.07	0.08	0.02		-0.03		0.02		0.04		0.03	-.05*
Trade, Hotels, Restaurants	-0.02	-0.08***	-0.26***	-0.20***	0.00		-0.05**		-0.15***		-0.04		-0.06***	-0.23***!
Transp.Stor.Communic.	0.09***	0.13***	0.17***	0.12***	0.04***		0.11***		0.15***		0.09***		0.03	-0.02
Financial Intermed.	0.06	0.22***	0.37***	0.41***	0.06		0.30***		0.25***		0.25***		0.22***	0.05**
Real Estate	-0.09**	-0.05	0.20***	0.10**	-0.09***		-0.03		0.20***		0.17***		0.12***	-0.01
Public Admin & Defense	0.08***	0.17***	0.20**	0.29***	-0.02		0.05		0.06		0.07**		0.05*	0.07**
Education	0.09***	0.23***	0.25***	0.39***	-0.04**		0.08**		0.19***		0.10**		0.04	0.03
Health & Social Work	0.04*	0.19***	-0.23***	0.26***	-0.02		0.10**		-0.11***		0.10**		-0.05	-0.04*
Lower Middle					0.08***	0.08***	0.12***	0.13***	0.28***	0.26***	0.17**	0.16**	0.10***	Included but not reported
Professional School					0.17***	0.16***	0.33***	0.34***	0.53***	0.54***	0.46***	0.47***	0.33***	
Upper Middle School					0.15***	0.15***	0.21***	0.22***	0.47***	0.47***	0.30***	0.30***	0.21***	
Technical College (Dazhuan)					0.22***	0.21***	0.41***	0.44***	0.72***	0.74***	0.67***	0.69***	0.55***	
University Graduate					0.27***	0.26***	0.46***	0.49***	0.92***	0.96***	0.88***	0.91***	0.77***	
Experience (Age-Schooling)					0.03***	0.03***	0.04***	0.042***	0.02***	0.02***	0.00	0.00	0.01***	
Experience^2 (÷10^3)					-0.42***	-0.42***	-0.69***	-0.67***	-0.24***	-0.24***	-0.15*	-0.12	-0.28***	
Job Tenure (÷10)							0.051***	0.052***	0.088***	0.097***	0.11***	0.11***	0.10***	
Male					0.06***	0.06***	0.09***	0.09***	0.10***	0.13***	0.21***	0.21***	0.013***	
Communist Party					0.07***	0.07***	0.10***	0.11***	0.07***	0.07***			0.18***	
Minority					-0.02	-0.02	-0.10***	-0.10***	0.07	0.07	-0.10	-0.10	-0.10*	
Migrant													-0.07***	
Coop Owned Unit					-0.10***	-0.10***	-0.24***	-0.25***	-0.19***	-0.24***	-0.15***	-0.17***	-0.07**	
Other Owned Unit					-0.00	-0.01	0.14**	0.12**	-0.07***	-0.13***	-0.10***	-0.14***	-0.07***	
Constant	5.42***	0.39***	1.47***	2.25***	4.80***	4.31***	-0.38***		0.58***	0.59***	1.54***	1.61***	1.55***	1.66**
N	5637	6656	5618	4325	5637	5637	6656	6656	5618	5618	4325	4325	7395	11,274
R^2	0.21	0.15	0.21	0.19	0.44	0.432	0.31	0.30	0.33	0.326	0.34	0.34	0.37	0.30
Std Dev of Ind Coeff	0.06	0.13	0.23	0.18	0.05		0.11		0.16		0.08		0.08	0.14
[1-(SD(Yes)÷SD(No))] (note 5)					0.19		0.17		0.29		0.57		0.46	0.44

Table 4b Log Wage Regressions Rural

	（1）	（2）	（3）	（4）	（5）	(5a)	（6）	(6a)	（7）	(7a)	（8）	(8a)
Survey Year	1988	1995	2002	2007	1988	1988	1995	1995	2002	2002	2007	2007
Mining and Quarry		0.07	0.24***	0.21***			-0.022		0.10		0.15**	
Public Utilities				0.11*							0.022	
Construction	0.19*	0.12	0.083***	0.11***	0.16		0.06		-0.034		0.037*	
Trade, Hotels, Restaurants	0.11	-0.11	-0.087**	0.060**	0.023		-0.14		-0.031		0.059**	
Transp.Stor.Communic.	0.39**	0.50***	0.30***	0.27***	0.26*		0.40***		0.19***		0.19***	
Financial Intermed.	0.09	0.51**	0.24	0.25**	0.029		0.27		0.11		0.19	
Real Estate		-1.50**	0.43*	0.17**			-1.37*		0.39*		0.13*	
Public Admin & Defense	0.18**	0.37***	0.048	-0.077*	0.074		0.10		0.008		-0.19***	
Education		0.08	0.25**	0.38***			-0.12		0.016		0.20***	
Health & Social Work	0.17**	-0.09	-0.20**	0.081	-0.0058		-0.14		-0.26***		0.027	
Lower Middle					0.15**	0.14**	0.02	-0.02	0.08**	0.08**	0.024	0.021
Professional School					0.20	0.17	022*	0.16	0.21***	0.21***	0.22***	0.24***
Upper Middle School					0.12	0.096	-0.07	-0.11	0.14***	0.14***	0.045	0.038
Technical College (Dazhuan)							0.04	0.01	0.61***	0.60***	0.34***	0.35***
University Graduate					0.22	0.16	-0.29	-0.42	0.070	0.10	0.54***	0.57***
Experience (Age-Schooling)					0.0083	0.0071	0.024***	0.03***	0.028***	0.029***	0.0096**	0.0104**
Experience^2 (÷10^3)					-0.29	-0.28	-0.46***	0.51**	-0.46***	-0.47***	-0.35***	-0. 37***
Job Tenure (÷10)									0.0945**	0.0903**	0.083***	0.0811**
Male					0.27***	0.30***	0.14**	0.18***	0.17***	0.17***	0.22***	0.23***
Communist Party					-0.033	-0.016	0.22**	0.27***	0.050	0.055		
Minority					-0.32**	-0.31**	0.18	0.13	-0.10*	-0.10*	-0.012	0.02
Coop Owned Unit					-0.17**	-0.18***	-0.10	-0.10	0.00689	-0.01	Not	
Other Owned Unit					-0.23**	-0.19**	-0.08	-0.08	-0.029	-0.05	reported	
Constant					8.34***	8.33**	0.30	0.35	-0.389**	-0.404**	1.346***	1.365***
N	628	923	3647	6536	628	628	923	923	3647	3647	6536	6536
R^2	0.11	0.055	0.225	0.036	0.182	0.173	0.184	0.165	0.279	0.273	0.095	0.083
Std Dev of Ind Coeff	0.11	0.63	0.20	0.13	0.10		0.55		0.18		0.12	
[1-(SD(Yes)÷SD(No))] (note 5)					0.08		0.16		0.11		0.08	

Notes:

1. The dependent variable is log annual earnings in columns 1 and 9 and annual earnings divided by hours worked elsewhere.

2. Data come from successive waves China Household Income Project (CHIP). Samples include respondents who reported themselves to be working or employed, excluding the self-employed, and managers of government institutions and enterprises. Farmers are excluded.

3. Omitted dummy variables are (a) schooling level less than lower middle school or illiterate;(b) ownership is State; (c) industry is manufacturing.

4. Significance levels are *** p<0.01, ** p<0.05, * p<0.1

5. Proportion of IWS dispersion explained by worker characteristics is [1-(SD(Yes)÷SD(No))]. In columns (9) through (20), results are reported only for regressions that include worker characteristics

6. All regressions include a dummy variable for the province in which the respond was living at the time of the survey.

7. Column (9) industries are close approximations of the industrial classifications for China. We do not report the personal characteristics regression coefficients because the categories, although similar, do not precisely match those for China.

! Average of Trade and Hotels & Restaurants. Both are highly significant.

Table 5 Indicator of Worker Sorting

Industry Proportion of Workers With Senior Middle School or Higher÷Industry Proportion of Workers[*]

Industry	Urban				Rural	
	1988	1995	2002	2007	2002	2007
Mining and Quarry	0.96	1.21	0.96	0.95	0.66	1.04
Manufacturing	0.87	0.93	0.93	0.93	0.92	0.89
Public Utilities	NA	NA	1.14	1.03	NA	1.16
Construction	0.80	0.85	1.03	0.93	0.73	0.54
Trade, Hotels, Restaurants	0.95	1.00	1.01	0.87	1.17	0.89
Transp.Stor.Communic.	0.92	1.02	1.00	0.97	1.46	1.14
Financial Intermed.	1.42	1.42	1.36	1.17	3.56	2.61
Real Estate	1.00	1.04	1.24	1.03	1.11	2.31
Public Admin & Defense	1.51	1.37	1.38	1.13	2.65	2.52
Education	1.74	1.43	1.32	1.19	3.58	3.79
Health & Social Work	1.54	1.36	0.98	1.12	2.19	1.87
Standard Deviation (SD)	0.34	0.22	0.17	0.11	1.12	1.00
Weighted Standard Deviation (wSD)[**]	0.07	0.02	0.01	0.01	0.19	0.35

[*]The proportion of workers with the indicated schooling level who are in each industry divided by the proportion of all workers in each industry; If the proportion of workers with the designated level of schooling in an industry equals the proportion of all workers who are in the industry, then the ratio will equal 1.0;.

[**]Weight is the proportion of all workers who are in each industry.

Table 6 Summary Statistics

Rural										
Year	Industry Class.	Education	Experience	Tenure	Male	Comm. Party	Minority	Hours	Wage	Obs.
1988	Mining and Quarrying									
	Manufacturing	7.30	11.95		0.68	0.16	0.02		1683.92	324
	Public Utilities									
	Construction	6.98	10.95		0.95	0.12	0.02		2244.87	43
	Trade, Hotels, Restaurants	7.58	14.58		0.80	0.33	0.03		2128.84	40
	Transp.Stor.Communic.	8.10	10.20		1.00	0.35	0.05		2701.57	20
	Financial Intermed.	8.08	18.23		0.92	0.46	0.08		2765.18	13
	Real Estate									
	Public Admin & Defense	9.29	12.87		0.96	0.82	0.12		1735.26	77
	Education									
	Health & Social Work	10.76	11.62		0.85	0.24	0.06		1764.96	111
	Total									628
Year	Industry Class.	Education	Experience	Tenure	Male	Comm. Party	Minority	Hours	Wage	Obs.
1995	Mining and Quarrying	8.33	15.00		0.89	0.00	0.00	2553.78	6158.89	9
	Manufacturing	8.56	16.54		0.59	0.04	0.02	2509.24	8164.60	597
	Public Utilities									
	Construction	9.15	15.88		0.94	0.11	0.05	2956.30	10412.05	81
	Trade, Hotels, Restaurants	9.28	16.63		0.59	0.17	0.02	2604.52	6232.26	46
	Transp.Stor.Communic.	9.42	14.79		0.79	0.19	0.02	2453.67	14219.16	43
	Financial Intermed.	11.10	18.30		0.90	0.60	0.10	2028.00	11175.80	10
	Real Estate	9.00	3.00		0.00	0.00	0.00	2080.00	1020.00	1
	Public Admin & Defense	11.13	19.02		0.89	0.54	0.00	2279.48	10828.59	61
	Education	11.85	19.11		0.74	0.18	0.02	2048.13	5618.82	62
	Health & Social Work	9.69	17.15		0.23	0.15	0.15	2328.00	9784.92	13
	Total									923

Rural										
Year	Industry Class.	Education	Experience	Tenure	Male	Comm. Party	Minority	Hours	Wage	Obs.
2002	Mining and Quarrying	8.45	22.87	5.06	0.92	0.08	0.08	1767.42	4396.20	142
	Manufacturing	8.66	15.66	5.01	0.56	0.05	0.05	2062.75	4787.48	2077
	Public Utilities									
	Construction	8.58	19.94	4.90	0.92	0.05	0.08	1645.88	3544.19	735
	Trade, Hotels, Restaurants	9.08	12.61	3.24	0.51	0.06	0.07	1891.09	3751.22	383
	Transp.Stor.Communic.	9.36	17.66	5.59	0.88	0.13	0.05	1866.89	5806.85	159
	Financial Intermed.	11.43	19.29	8.57	0.57	0.21	0.00	2005.71	7422.79	14
	Real Estate	9.30	14.40	1.50	1.00	0.10	0.00	980.00	3080.90	10
	Public Admin & Defense	9.39	22.61	4.91	0.78	0.17	0.00	1651.30	4298.00	23
	Education	11.22	18.25	11.00	0.55	0.18	0.04	1790.16	5280.84	51
	Health & Social Work	9.62	17.83	8.74	0.53	0.17	0.00	2209.43	5322.77	53
	Total									3647
Year	Industry Class.	Education	Experience	Tenure	Male	Comm. Party	Minority	Hours	Wage	Obs.
2007	Mining and Quarrying	8.95	22.48	8.09	0.80		0.01	2775.78	19762.04	92
	Manufacturing	8.68	15.79	5.99	0.53		0.00	2905.92	16478.42	3026
	Public Utilities	8.84	22.13	8.85	0.87		0.00	2589.05	16725.73	95
	Construction	8.27	22.13	8.87	0.90		0.01	2950.23	17759.08	1412
	Trade, Hotels, Restaurants	8.60	17.12	6.51	0.53		0.01	2801.35	16683.25	821
	Transp.Stor.Communic.	8.90	19.26	6.97	0.82		0.01	2647.70	19335.73	508
	Financial Intermed.	10.04	21.19	8.00	0.59		0.00	2345.78	17493.33	27
	Real Estate	10.11	16.27	5.69	0.54		0.00	2656.89	17724.71	85
	Public Admin & Defense	10.18	27.30	12.95	0.80		0.00	2228.81	13951.45	253
	Education	11.31	21.51	15.03	0.56		0.04	2191.76	17798.24	134
	Health & Social Work	9.20	22.97	11.81	0.63		0.00	2563.12	16890.70	86
	Total									6539

Urban										
Year	Industry Class.	Education	Experience	Tenure	Male	Comm. Party	Minority	Hours	Wage	Obs.
1988	Mining and Quarrying	10.30	20.79		0.72	0.25	0.01		2000.93	218
	Manufacturing	10.09	19.92		0.52	0.18	0.03		1913.98	3130
	Public Utilities									
	Construction	9.98	21.24		0.58	0.24	0.02		2047.30	161
	Trade, Hotels, Restaurants	10.12	19.70		0.41	0.17	0.03		2060.31	727
	Transp.Stor.Communic.	10.02	21.63		0.67	0.22	0.04		2209.78	473
	Financial Intermed.	11.40	18.10		0.48	0.29	0.08		1985.28	62
	Real Estate	10.22	20.25		0.58	0.17	0.02		1946.34	60
	Public Admin & Defense	11.86	21.47		0.72	0.54	0.06		2158.93	266
	Education	12.72	22.02		0.51	0.35	0.04		2097.08	350
	Health & Social Work	11.91	20.39		0.36	0.31	0.04		2056.53	190
	Total									5637
Year	Industry Class.	Education	Experience	Tenure	Male	Comm. Party	Minority	Hours	Wage	Obs.
1995	Mining and Quarrying	11.76	21.85	19.33	0.62	0.14	0.04	2132.00	5867.97	79
	Manufacturing	10.82	20.47	16.29	0.55	0.17	0.04	2230.59	5407.47	3893
	Public Utilities									
	Construction	10.77	21.94	17.48	0.58	0.19	0.03	2246.36	5848.21	256
	Trade, Hotels, Restaurants	10.94	19.33	13.48	0.45	0.18	0.04	2232.03	5125.10	1060
	Transp.Stor.Communic.	11.01	20.28	16.90	0.61	0.22	0.07	2233.89	6325.70	395
	Financial Intermed.	12.20	13.87	9.95	0.45	0.25	0.02	2180.36	6175.50	100
	Real Estate	10.99	20.63	14.61	0.46	0.17	0.03	2241.94	6384.67	219
	Public Admin & Defense	12.58	20.28	13.94	0.58	0.43	0.03	2192.25	6369.74	252
	Education	12.70	21.78	16.55	0.45	0.28	0.05	2134.46	6696.64	211
	Health & Social Work	12.19	20.37	15.74	0.36	0.23	0.03	2204.42	6453.25	191
	Total									6656

Urban										
Year	Industry Class.	Education	Experience	Tenure	Male	Comm. Party	Minority	Hours	Wage	Obs.
2002	Mining and Quarrying	11.51	21.68	17.05	0.72	0.19	0.05	2151.73	9822.54	171
	Manufacturing	11.39	22.98	18.02	0.59	0.23	0.03	2214.98	10230.40	2351
	Public Utilities	12.23	21.61	16.88	0.63	0.26	0.06	2116.63	14379.16	271
	Construction	11.87	23.04	17.67	0.69	0.25	0.02	2230.56	12782.14	281
	Trade, Hotels, Restaurants	11.54	19.42	11.13	0.43	0.16	0.03	2401.58	9482.37	873
	Transp.Stor.Communic.	11.54	21.86	16.68	0.71	0.22	0.03	2264.49	13325.30	613
	Financial Intermed.	13.54	17.76	12.19	0.49	0.32	0.01	2133.26	14692.16	188
	Real Estate	12.85	19.29	10.16	0.66	0.25	0.04	2222.24	15348.44	68
	Public Admin & Defense	13.21	23.56	13.00	0.52	0.48	0.13	2215.35	14114.24	62
	Education	13.13	19.24	13.38	0.49	0.22	0.08	2072.36	12202.62	98
	Health & Social Work	11.52	20.81	9.75	0.41	0.18	0.04	2329.22	9275.92	642
	Total									5618
Year	Industry Class.	Education	Experience	Tenure	Male	Comm. Party	Minority	Hours	Wage	Obs.
2007	Mining and Quarrying	12.96	19.96	15.80	0.67		0.02	2220.59	27206.67	54
	Manufacturing	12.33	21.33	16.27	0.66		0.00	2249.38	28100.29	1032
	Public Utilities	13.00	20.38	15.54	0.67		0.01	2174.85	35075.83	284
	Construction	12.75	19.44	13.93	0.72		0.00	2646.92	30125.52	174
	Trade, Hotels, Restaurants	12.03	18.36	9.67	0.47		0.01	2351.38	23961.32	617
	Transp.Stor.Communic.	12.63	18.66	14.06	0.70		0.01	2306.29	30397.36	722
	Financial Intermed.	14.27	15.58	12.92	0.50		0.01	2122.22	38448.65	202
	Real Estate	12.96	17.00	9.73	0.48		0.01	2225.60	32166.37	230
	Public Admin & Defense	14.18	19.89	13.76	0.65		0.01	2393.33	34709.36	468
	Education	14.80	18.16	16.07	0.48		0.02	2122.53	32875.85	324
	Health & Social Work	14.07	16.78	14.03	0.44		0.01	2161.34	31403.42	218
	Total									4325

Migrant										
Year	Industry Class.	Education	Experience	Tenure	Male	Comm. Party	Minority	Hours	Wage	Obs.
2002	Mining and Quarrying	8.57	19.29	9.71	1.00	0.00	0.43	2332.57	9342.86	7
	Manufacturing	9.20	17.20	4.75	0.63	0.03	0.90	2997.33	8858.92	181
	Public Utilities	9.95	17.91	3.86	0.64	0.09	0.91	2968.73	11536.36	22
	Construction	8.54	17.38	4.50	0.91	0.04	0.90	3059.86	11028.52	115
	Trade, Hotels, Restaurants	8.36	16.57	4.07	0.45	0.01	0.90	3511.15	7632.03	406
	Transp.Stor.Communic.	9.47	17.26	4.59	0.86	0.03	0.90	3075.17	10932.41	58
	Financial Intermed.	9.67	24.78	2.78	0.56	0.11	1.00	3235.56	8253.33	9
	Real Estate	8.60	18.95	4.30	0.65	0.00	1.00	3224.00	7002.00	20
	Public Admin & Defense	9.39	18.03	4.16	0.68	0.16	0.95	3088.25	6000.00	38
	Education	8.90	21.23	5.10	0.62	0.10	0.95	3370.67	8457.85	39
	Health & Social Work	9.00	23.42	3.92	0.50	0.08	1.00	2591.33	6960.00	24
	Total									919
Year	Industry Class.	Education	Experience	Tenure	Male	Comm. Party	Minority	Hours	Wage	Obs.
2007	Mining and Quarrying	8.65	19.06	5.47	0.71		0.00	2771.29	23654.12	17
	Manufacturing	9.52	14.55	3.94	0.61		0.03	2758.19	22914.72	927
	Public Utilities	9.00	13.47	3.67	0.51		0.00	3114.53	21965.81	95
	Construction	8.65	20.50	6.09	0.86		0.00	3200.88	24316.55	488
	Trade, Hotels, Restaurants	9.20	12.27	3.17	0.50		0.01	3098.10	20221.80	1230
	Transp.Stor.Communic.	9.03	15.99	3.72	0.87		0.01	3091.71	21090.35	136
	Financial Intermed.	11.80	12.50	2.10	0.60		0.00	2501.20	29496.00	10
	Real Estate	10.57	11.87	3.46	0.50		0.06	2830.15	24173.33	54
	Public Admin & Defense	9.25	18.92	4.00	0.58		0.00	3206.67	21070.00	12
	Education	9.97	18.73	5.07	0.40		0.03	2634.67	20116.00	30
	Health & Social Work	8.58	19.69	4.41	0.39		0.01	2973.52	15694.65	71
	Total									3070

Notes: Education, Experience, and Tenure are measured in years; Male, Communist Part, and Minority are proportions; Hours and Wage are annual working hours and annual earnings, respectively.

Figure 1 Coefficient of Variation for Industry Mean Wages Across Countries

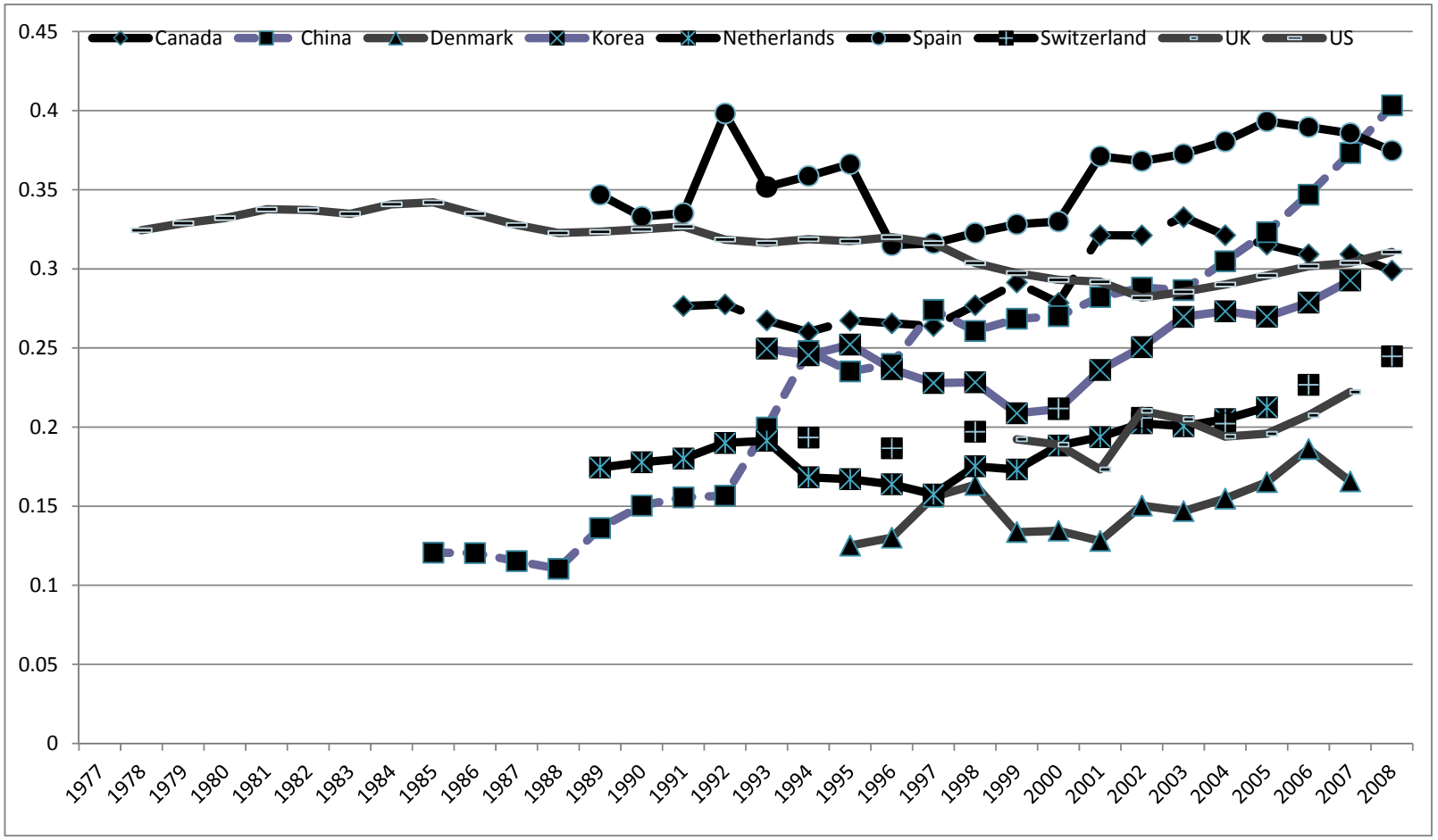


Figure 2. Average Correlation Coefficient of Industrial Mean Wages in China with 13 Developed Capitalist Countries

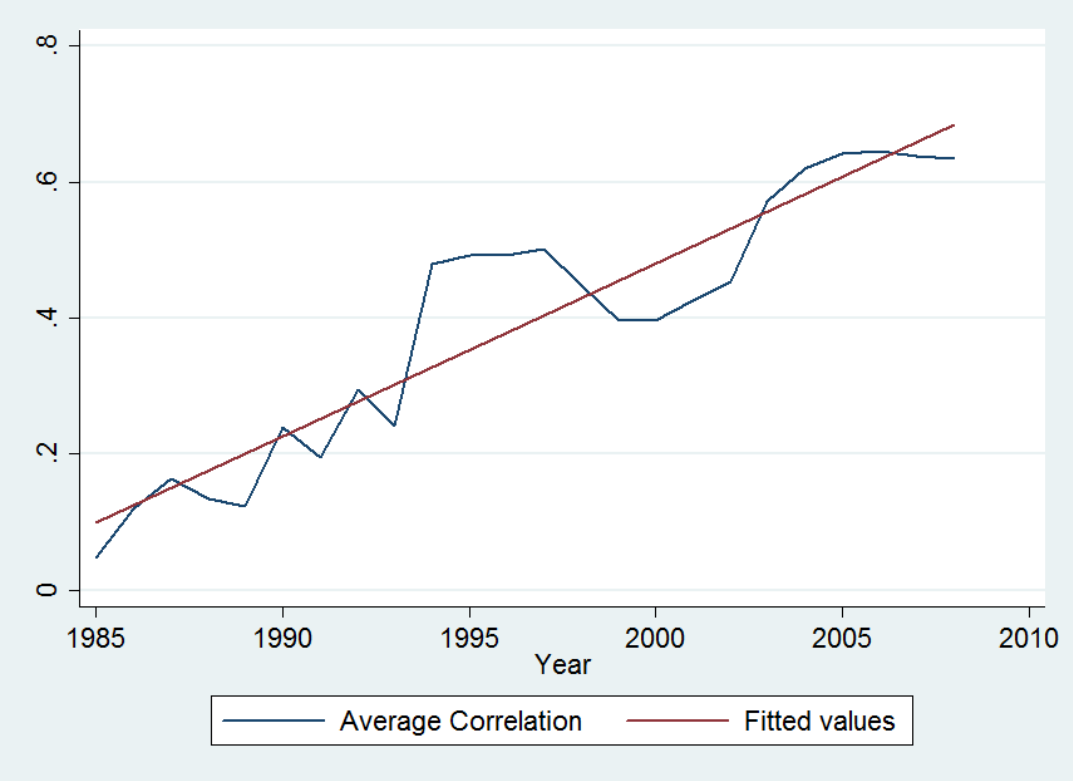


Figure 3

Frequency Distribution of IWS Correlation Coefficients Across 13 Developed Countries

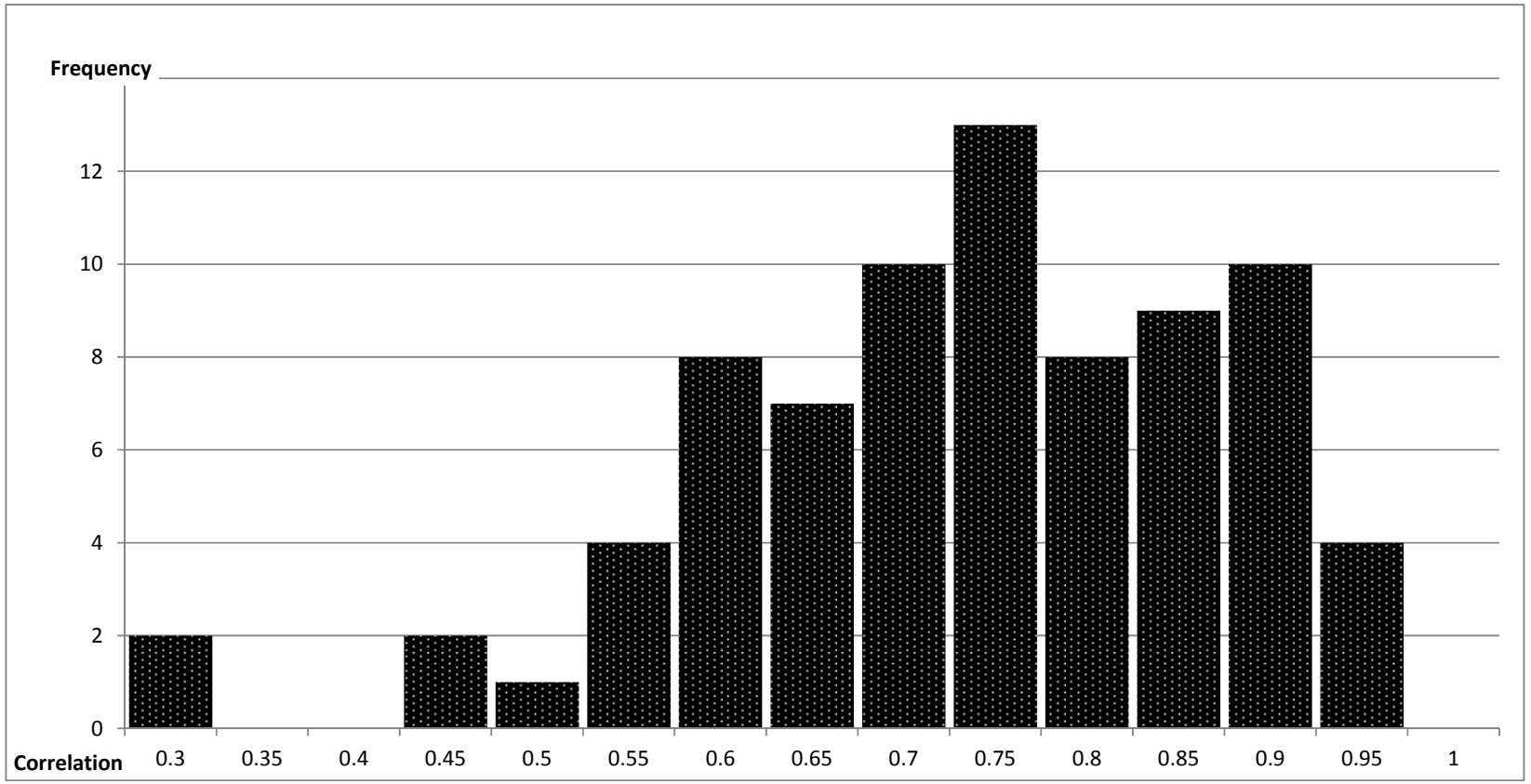


Figure 4a Urban

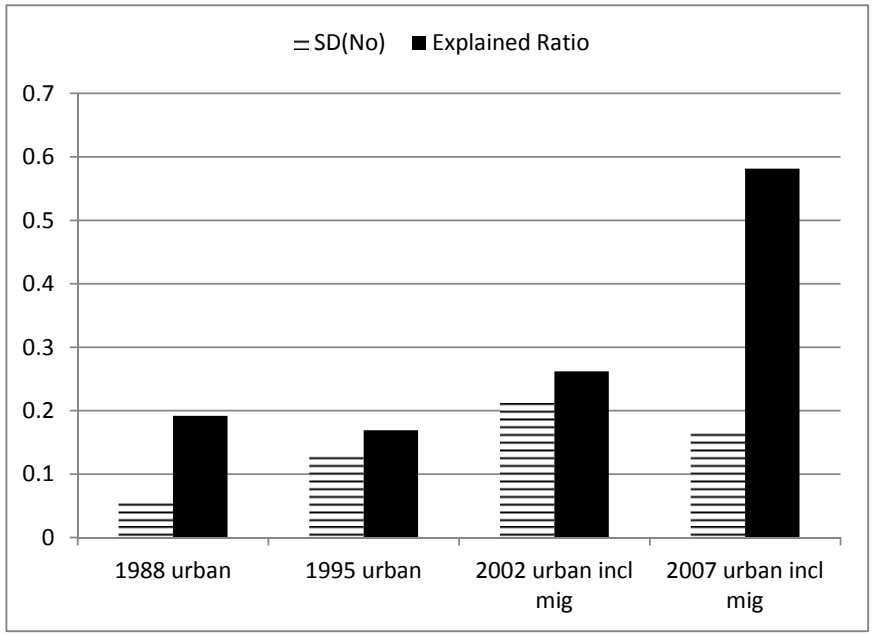
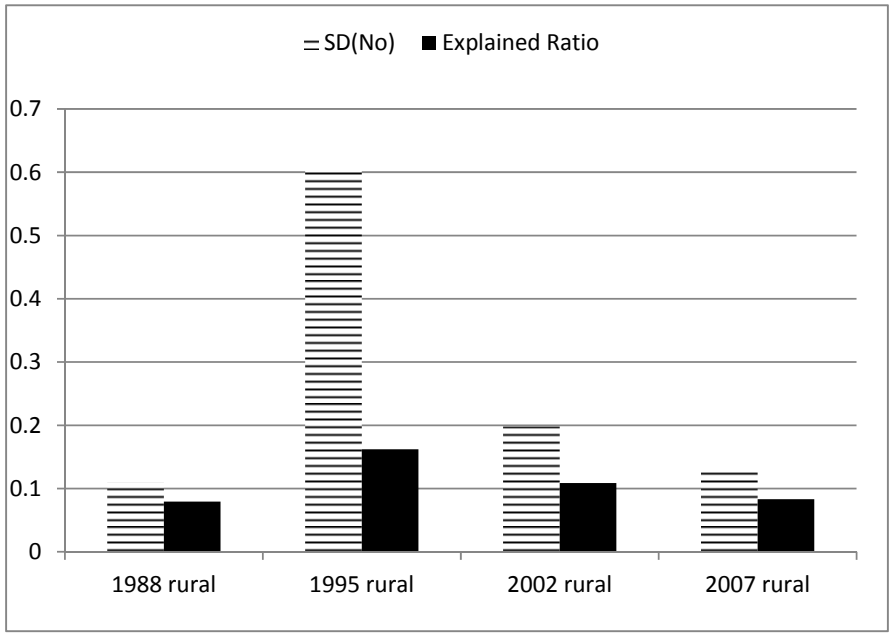


Figure 4b Rural



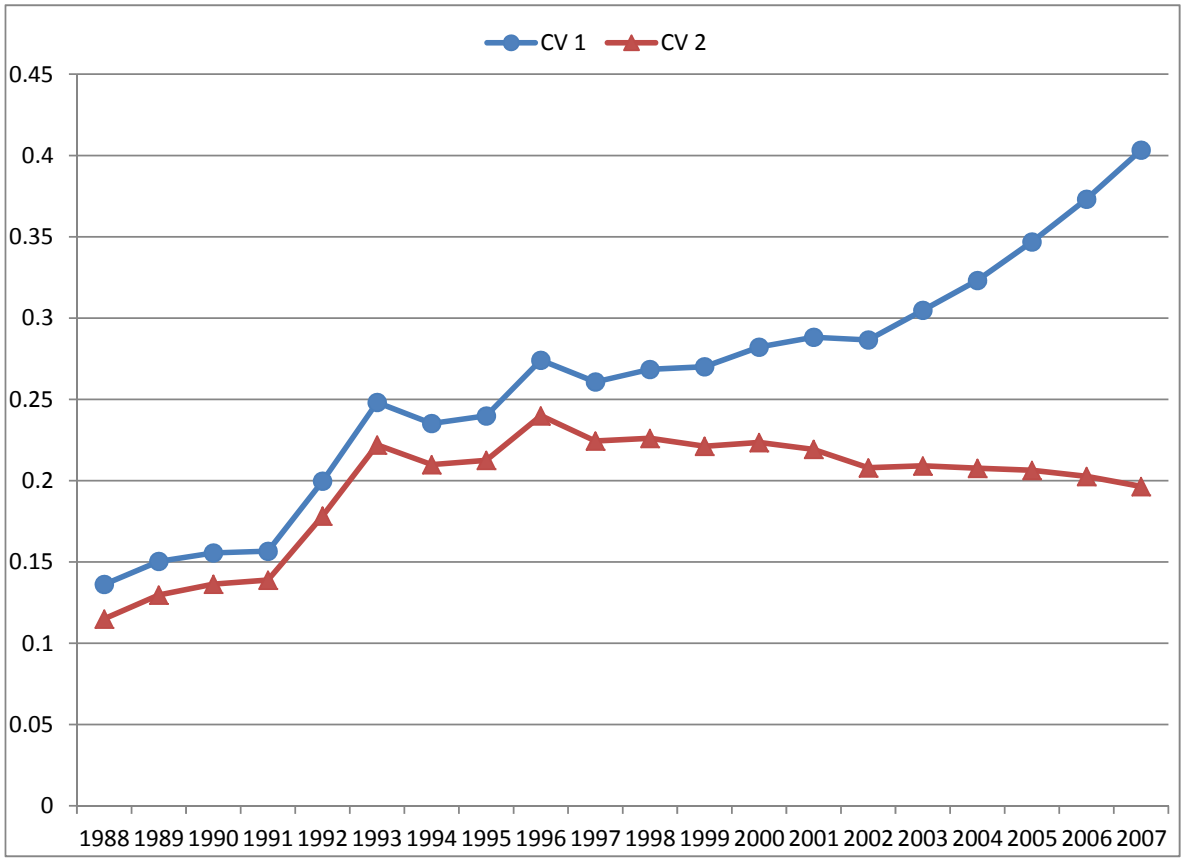
Notes:

i. SD(No) is the standard deviation of the coefficients of industry dummy variables in regressions that do not include worker characteristics.

(ii) Explained Ratio is the proportion of the SD that can be explained by the distribution of observed worker characteristics across industries. It is [1-SD(2)/SD(Yes)] where SD(Yes) is the standard deviation of the coefficients of industry dummy variables in regressions that include worker characteristics.

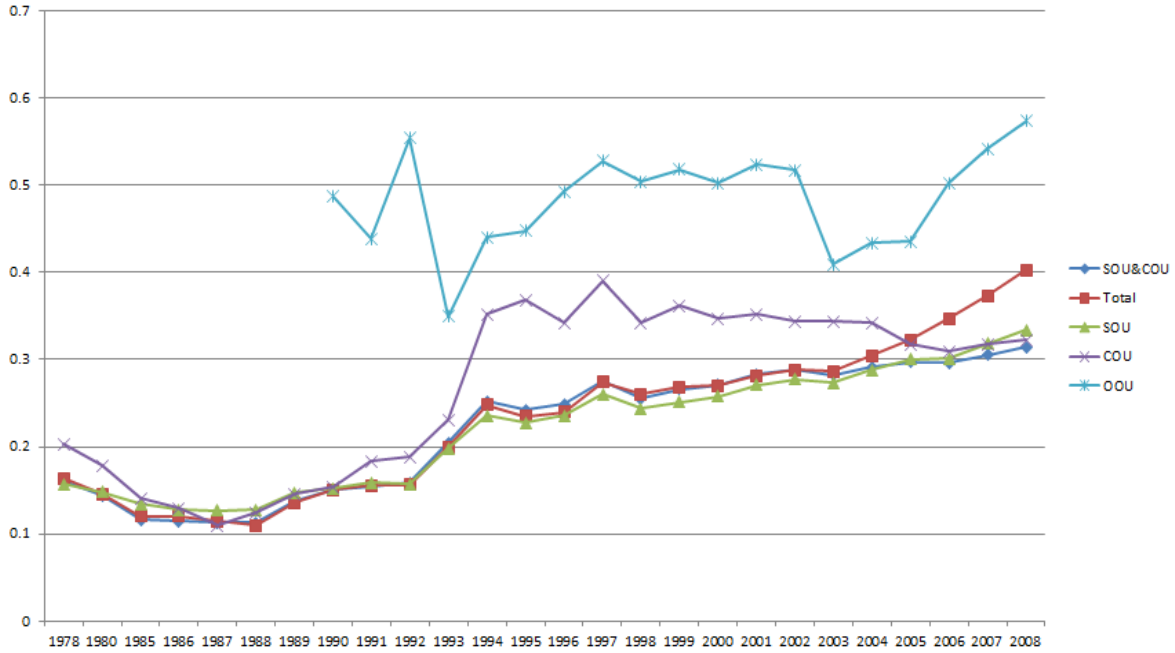
(iii) Migrant workers are not observed in the 1988 and 1995 urban CHIP surveys.

Figure 5 Coefficient of Variation Mean Wages by Industry



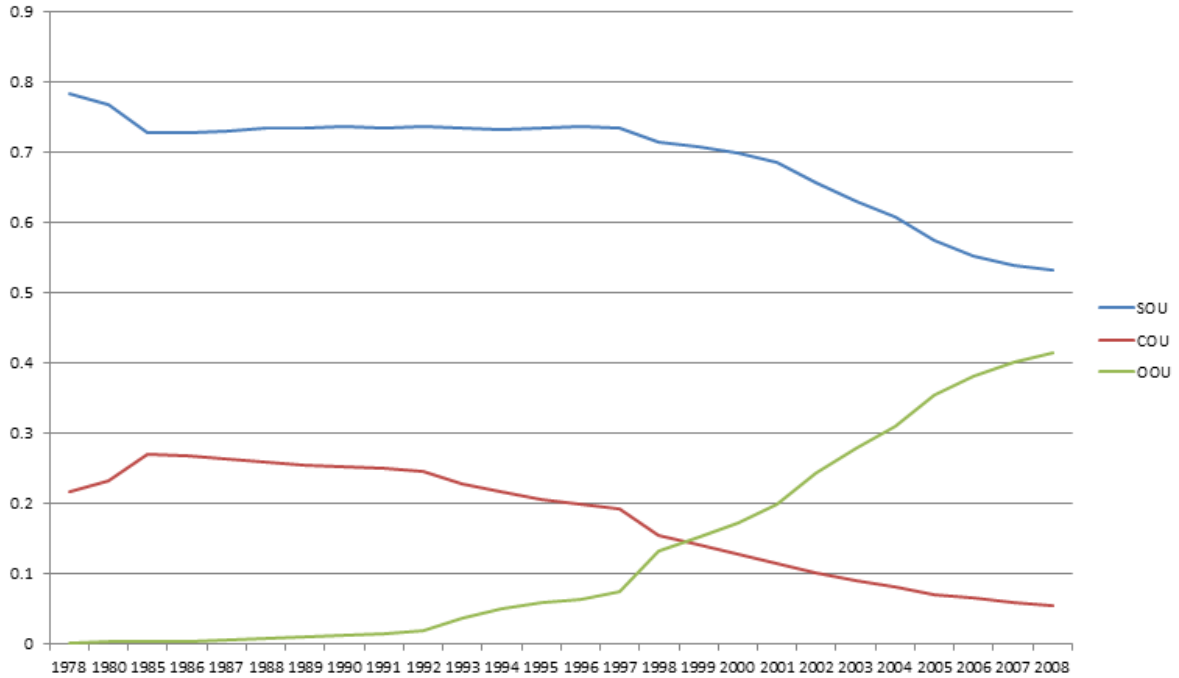
Note: Series CV 1 is the coefficient of variation (CV) of industry mean wages in China as in figure 1. Series CV 2 is equal to CV 1 multiplied by the ratio of the CV of industry mean wages to the CV of industry mean wages net of the effect of worker characteristics obtained from the CHIP urban samples. Values of the ratio for years between the four CHIP surveys are obtained by fitting a quadratic trend to the calculated ratios for 1988, 1995, 2002, and 2007.

Figure 6 Coefficient of Variation, Industry Mean Wages by Ownership



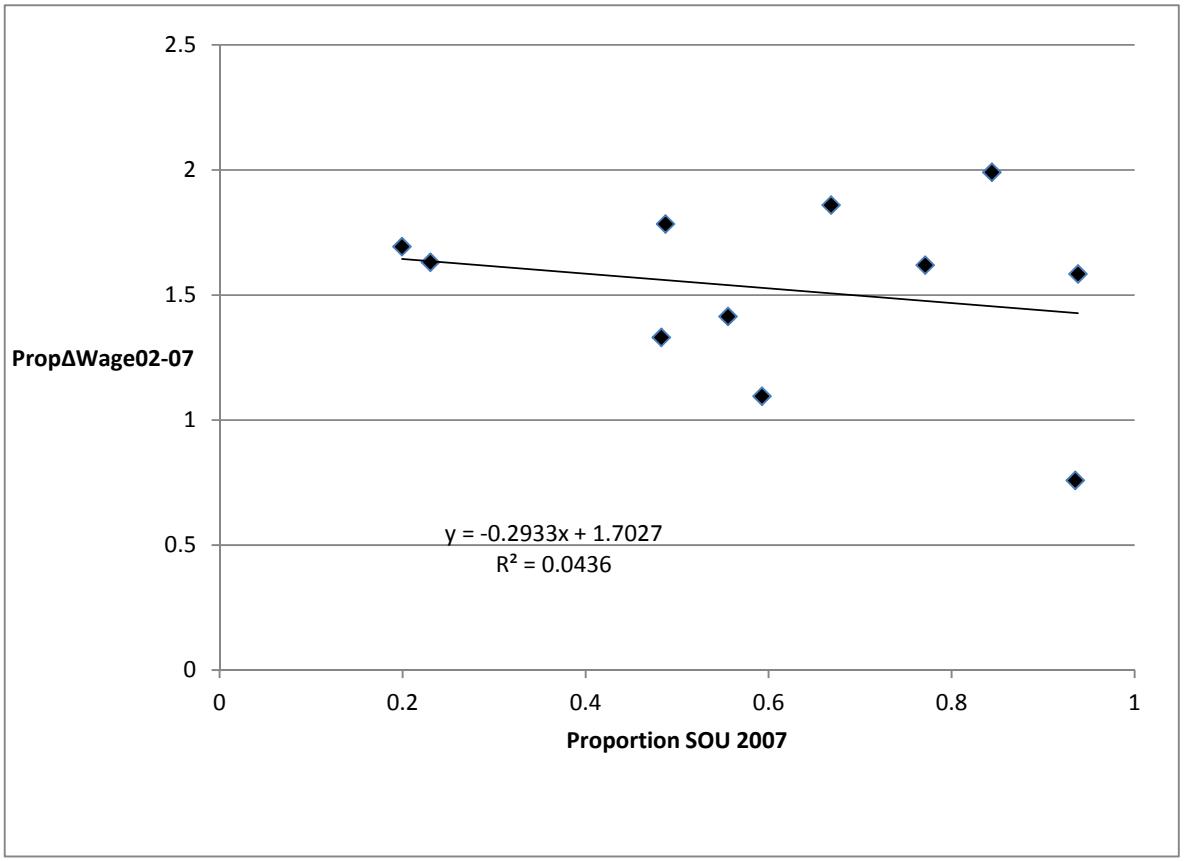
Source:

Figure 7. Proportion of Workers and Staff by Ownership Sector



Source:

Figure 8 Proportionate Change in Industry Mean Wages 2002-07 Compared to Proportion of Industry Workers in SOU's 2007.



Source: CHIP 2007 and authors' calculations.