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Keywords
gender earnings differentials, China

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TRENDS IN THE GENDER EARNINGS DIFFERENTIAL IN URBAN CHINA, 1988–2004

JUNSEN ZHANG, JUN HAN, PAK-WAI LIU, and YAOHUI ZHAO*

This paper analyzes changes in the gender earnings gap in urban China over the period 1988–2004 using urban household survey data. The mean female/male earnings ratio declined from 86.3% to 76.2%. Mainly responsible for this diverging trend were rapid increases in returns to both observed and unobserved skills, which accentuated the disadvantage associated with women's lower skill levels. The gender gap in observed skills such as education narrowed over the study period, but did not close, and there is evidence that the gap in unobserved skills widened considerably. Increased discrimination may also have served to widen the gender earnings gap. Analyses by earnings percentile and by sub-period show that although the gap widened much more at the lower end of the earnings distribution than at the upper end over the period as a whole, it widened greatly at the upper end in the most recent years (2001–2004).

Since its economic reform in 1979, China has been enjoying remarkable success in moving toward a market-oriented economy. The transition has had particularly striking effects in the labor market, as reflected by rapidly rising income inequality and returns to education (Park et al. 2004; Zhang et al. 2005). Underlying these changes are reforms of labor market institutions that have, to a large extent, transferred the determination of employment and earnings from the hands of the government to the market. As the government loses its grip over the labor market, are women adversely affected? Because the pre-reform-era government promoted gender equality in work and pay through the administrative assignment of jobs and wage setting, such an effect seems likely. On the other hand, in other countries that, under socialism, promoted a policy of gender equality, the transition to a market economy has had divergent results: female relative wages in Eastern European countries increased, whereas those in Russia and Ukraine declined (Brainerd 2000). In this paper, we use annual household surveys from 1988 to 2004 to document changes in relative earnings of Chinese women in urban areas and to analyze the dynamics behind these changes.

China's Economic Reform and Institutional Features

After the beginning of economic reform in 1979, the Chinese government adopted

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a series of policy and institutional changes aimed at increasing efficiency in the economy. Breakthroughs were made in the rural sector first, followed by product market reforms in the urban sector. Before the reform, state-owned firms, which operated under central planning, heavily dominated the urban sector. By the early 1990s, production decisions had been delegated to firms, and the planned allocation of most products had been terminated. Notwithstanding these changes, however, overall labor market reform had, as yet, made little headway. Firms had little autonomy in setting earnings and removing unwanted workers.

In October 1992, a new reform agenda was ratified by the 14th Party Congress, which proclaimed that China would adopt a "socialist market economy" (Naughton 1995). The years 1992–93 witnessed much progress toward making the employment system more flexible for the nation's 76 million state enterprise workers and 35 million urban collective workers (Naughton 1995). Firms were given more autonomy and discretion in setting earnings and bonuses, and in deciding on recruitment, termination, layoffs, and promotions. Some firms even tried to eliminate the "iron rice bowl" (the permanent employment system) altogether, shifting workers onto a contract basis. Workers, too, were given new freedom. In particular, they could now resign or change jobs much more easily. One of the unique features of China's planned economy before the economic reform was the "assignment" of many jobs by government agencies at various levels, a system accompanied by a set of procedures and regulations that made it extremely difficult for workers in the state and collective sectors to change jobs. Hence, the economic reform of the 1990s not only gave firms more freedom in wage setting but also gave workers greater job mobility.

The "Labor Law of the PRC," which was passed in July 1994 and became effective January 1, 1995, formally enacted the regulations of the labor contract system, and made labor contracts mandatory in all industrial enterprises (Démurger et al. 2006). The labor contract system allows firms to select and hire suitable individuals. The system also increases the flexibility of the labor allocation mechanism. Employees have the right to negotiate the duration, terms, and conditions of their employment, as well as the right to resign. In the late 1980s, firms began to use examinations and interviews in the selection and recruitment process. Following the reform, managers of state-owned enterprises were given much greater decision-making power in recruitment and selection, dismissal, promotion, rewards and punishments, and even the arrangement of vocational training programs (Warner, Goodall, and Ding 1999).

Furthermore, the statutory law formally affirmed the protection of the rights of women, children, and minorities. In particular, according to the 13th Ordinance in the second Chapter of the Labor Law, women have the same employment rights as men. Except for some positions specified by the state, female job applicants cannot be rejected on the basis of gender, and entry requirements for women cannot exceed those for men applying for the same position. Finally, relevant to our study, the 15th Ordinance in the same Chapter prohibits the employment of children under age 16.

To reduce inefficiency in state-owned enterprises, the Chinese government instituted a major urban labor market reform in 1997, known as *xia gang*, whereby a quarter or more of the workers in these enterprises were to be laid off within four years (1997–2000) (Appleton et al. 2002). The labor reform was accelerated in the late 1990s as the government moved ahead with its program to downsize the whole public sector. Officials carefully dealt with various issues arising from the reforms. In 1998, the government established the Ministry of Labor and Social Security to administer social insurance for individuals associated with different kinds of enterprises and institutions. In 1999, the State Council promulgated "Regulations on Unemployment Insurance," which provided for coverage of all enterprises and public services in urban areas.

Brainerd (2000) offers a general discussion of how changing labor market institutions might affect women. The essence of labor market reforms is more autonomy in wage setting and employment decisions for firms

and managers, which could lead to a rise in wage inequality relative to the compressed wage structure in the pre-reform years. The rise in wage inequality may be disadvantageous to women, since they disproportionately occupy the lower end of the earnings distribution. However, more autonomy and competition may have mixed effects on discrimination against women (Brainerd 2000; Liu et al. 2000).

Prior Literature

Women in the pre-reform transitional economies in Eastern Europe and the former Soviet Union fared relatively well in the labor market (Brainerd 2000). They had extremely high labor force participation rates, and female/male wage differentials were similar to those in the West. The Russian Republic was one of the best achievers. In 1989, the female/male wage ratio was 0.69 in Russia, as compared to 0.70 in the United States in 1987.[1] The position of women in the male wage distribution, whether measured by the mean or the median, was higher in Russia than in the United States. Urban Chinese women fared even better than Russian women. Gustafsson and Li (2000) showed that the female/male wage ratio was 0.84 in urban China in 1988. We discuss the position of Chinese women in the male distribution later in the paper.

Market reform does not have a uniform impact on the gender wage gap in transitional economies. Brainerd (2000) showed that the post-transition female/male wage ratio decreased in Ukraine and Russia but increased in Eastern European countries.[2] She attributed the deteriorating performance of women in Ukraine and Russia to the widening of the wage distribution, and the improved performance in Eastern European countries to reduced discrimination, rising returns to education, and the fact that women were better educated in those countries. In a study of Russia, Glinskaya and Mroz (2000) examined changes in gender inequality at the lowest and highest percentiles of the wage distribution. They found that gender inequality declined significantly in the lowest percentiles of the Russian distribution, grew in the upper percentiles, and was stable in the interquartile range. The net effect was a relatively small change in gender inequality, on average, between 1992 and 1995.

There is evidence that the gender earnings gap in urban China widened to some extent under labor market reforms. Gustafsson and Li (2000) reported that the female/male earnings ratio decreased from 84.4% in 1988 to 82.5% in 1995. Using the Blinder-Oaxaca (Blinder 1973; Oaxaca 1973) decomposition, they concluded that the most important source of the increase in the explained differential was education, but that a substantial increasing average earnings gap was attributable to differences in coefficients, which may be due to an increase in earnings discrimination against women, lower unobserved productivity among women, on average, than among men, or both.

Most past studies of the gender earnings differential in China have focused on a single point in time. For example, Knight and Song (1993) applied the Blinder-Oaxaca decomposition to measure the effect of male/female differences in characteristics on the mean urban earnings difference in 1988. They found that less than 50% of the difference in pay could be explained by inferior female characteristics. Qian (1996) found that market discrimination and productivity differentials coexisted in Beijing and Guangdong in 1993. Liu, Meng, and Zhang (2000) used two data sets from Shanghai and Jinan in 1995 to demonstrate that the move from state to collective or private sectors resulted in a widening of gender earnings gaps in absolute terms. Two studies used the 1992 CLMRP data to compare the gender gap across different groups: Maurer-Fazio and Hughes (2002) analyzed the effect of differences in labor market institutions and market liberalization on the size and composition of gender earnings gaps in China, and Hughes and Maurer-Fazio (2002) studied

[1]The figure for Russia was calculated using monthly wages; that for the United States, using weekly wages.

[2]See also Brainerd (1998), who found that women's relative wages dropped across all percentiles of the wage distribution in Russia.

how the gender earnings gap in urban China is related to marital status, education, and occupation.

None of the foregoing research provides a "moving picture" of the gender earnings gap, showing its pattern over the years. Two later studies looked at changes between two dates. Bishop, Luo, and Wang (2005) found a small increase in the earnings gap between 1988 and 1995 and documented a modest increase in the proportion explained by productivity differences, using quantile regression in the decomposition. Millimet and Wang (2006) tracked income distributions between 1988 and 1995 using tests for stochastic dominance in order to decompose the gender earnings gap. They found that a large gender gap existed in the lower tail, and discrimination explained one-third to one-half of this lower-tail gap.

The prior literature on the gender earnings differential in the Chinese labor market has two major features. First, these studies have almost uniformly applied the traditional Blinder-Oaxaca method that decomposes the male-female earnings difference into a part due to gender differences in observed skills and another part due to a difference in returns to observed skills commonly attributed to discrimination.[3] This approach does not address the issue of how unobserved skills affect the gender earnings gap. As earnings inequality (or earnings dispersion) rises over time in China, it has been found that the portion of inequality unaccounted for by observed skills has risen (Park et al. 2004). A worsening relative residual earnings distribution for women, if it occurs, will have an independent effect on the gender earnings gap. The second feature common to all existing studies is that they examine only one or two points in time, and thus are unable to decipher the trend in gender inequality. Because short-term fluctuations may occur, observed changes over two data points may not represent the trend.

To try to fill this void in the literature, in the present paper we examine gender earnings differentials in urban China in terms of observed and unobserved skill differentials and their premiums over the years 1988–2004, a period of gradual economic transformation in China. Controlling for observable skill determinants, we apply the approach proposed by Juhn, Murphy, and Pierce (1991) to analyze the changes in residual earnings differentials, which are viewed as changes in unmeasured skill prices and quantities over time. On the one hand, the general rise in returns to educational skills might be expected, *ceteris paribus,* to widen the gender earnings gap. On the other hand, we may expect male and female education-related skills to converge as women gain more educational opportunities. We have no basis for predicting the trend in female/male differences in unobserved skills or their prices. Ultimately, how the gender earnings structure changed between 1988 and 2004 is an empirical issue.

Data Description

The rich data used in this paper come from 17 consecutive annual urban household surveys, conducted from 1988 to 2004. The surveys provide detailed information on household size, employment status, income, consumption, savings, cash holdings, and demand for goods and housing. The respondents are chosen to be representative of the population in over 220 cities and towns of various sizes and various regions in China.[4] The Urban Household Survey is carried out by the Urban Survey Organization of the National Bureau of Statistics; it covers 146 cities and 80 towns. The choice of cities and towns, as well as of households, is based on the principle of random and representative sampling. According to the 2002 Handbook of the Chinese Urban Household Survey, the sampling method is consistent over all years under study (National Bureau of Statistics

[3]The only exception is Maurer-Fazio and Hughes (2002), who applied the Juhn et al. approach to analyze gender wage gaps *between* different ownership sectors. Our use of the approach is instead with the aim of analyzing changes in gender wage gaps *over time.*

[4]The survey does not cover the floating population (migrants who lack listings in the urban household registry, *hu kou*). We are not sure whether or how this survey limitation might have affected the results of our analysis.

Table 1a. Mean Gender Earnings, Earnings Gaps, and Ratios: Urban China, 1988–2004.

Year	*Male Mean*	*(S.D., Men)*	*Female Mean*	*(S.D., Women)*	*Mean Difference*	*Gender Ratio*	*Position of Mean Female in the Male Distribution*	*Male Employment Rate*	*Female Employment Rate*
1988	7.585	0.517	7.412	0.527	0.172	84.2%	39.1%	96.9%	96.6%
1989	7.564	0.558	7.397	0.562	0.167	84.6%	39.7%	96.9%	96.8%
1990	7.637	0.508	7.472	0.513	0.165	84.8%	39.7%	97.0%	96.4%
1991	7.694	0.496	7.532	0.512	0.162	85.0%	39.9%	97.2%	95.6%
1992	7.741	0.533	7.564	0.567	0.176	83.8%	40.7%	97.7%	97.2%
1993	7.732	0.562	7.528	0.603	0.204	81.6%	40.3%	97.3%	96.9%
1994	7.829	0.662	7.599	0.710	0.230	79.4%	41.0%	97.3%	96.3%
1995	7.885	0.656	7.663	0.695	0.223	80.0%	40.8%	97.2%	96.6%
1996	7.894	0.700	7.681	0.732	0.213	80.8%	41.6%	97.0%	96.7%
1997	7.997	0.715	7.764	0.808	0.233	79.2%	41.6%	97.2%	95.9%
1998	8.052	0.744	7.849	0.807	0.203	81.6%	42.9%	96.1%	94.7%
1999	8.114	0.736	7.911	0.848	0.203	81.6%	43.3%	95.6%	93.8%
2000	8.233	0.777	8.013	0.870	0.219	80.3%	43.1%	93.8%	91.4%
2001	8.320	0.778	8.088	0.877	0.231	79.4%	42.3%	92.3%	89.0%
2002	8.413	0.702	8.176	0.774	0.237	78.9%	41.2%	89.5%	82.3%
2003	8.497	0.723	8.234	0.784	0.262	76.9%	40.4%	88.8%	80.2%
2004	8.617	0.738	8.339	0.779	0.278	75.7%	40.1%	89.2%	81.0%

Means and standard deviations for the male and female workers, and gender mean earnings gaps, are measured in log points. The gender ratio is the female to male earnings ratio.

2001; this source provides further details on the survey and data). To assess the representativeness of the data, we compare several variables that are available both in our data and in the Statistical Yearbook of China. For 1988, our sample averages for household size, the number of workers in a household, and the per capita household income are 3.7 persons, 2.2 workers, and 1,352 RMB Yuan, respectively, compared to corresponding national averages of 3.6, 2.0, and 1,192 (Statistical Yearbook of China 1989:726); and for 2001, our sample averages for the three variables are 3.2, 1.8, and 7,763, compared to national averages of 3.1, 1.7, and 6,907 (Statistical Yearbook of China 2002:321). Thus, the sample averages are reasonably close to those reported in the statistical yearbooks. To give a fair representation of the whole urban Chinese labor market, as the areas for study we chose Beijing (a rapidly growing municipality in the north), Guangdong and Zhejiang (economically dynamic provinces in the southern coastal region), Liaoning (a northeast province with a great many heavy industries), and Shaanxi and Sichuan (less developed provinces in the northwest and the southwest).

Because the Labor Law sets 16 as the minimum working age, we limited our sample to workers aged 16 or over.[5] The sample is restricted to employees in the surveyed years. Employers, self-employed individuals, retirees, students, domestic workers, persons who have lost the ability to work, and persons waiting for jobs are therefore excluded in the estimation of earnings equations. Annual earnings consist of four major components: basic wage, bonus, subsidies, and other labor-related income.[6] The subsidies consist of extra compensation for workers in occupations rated as exceptionally physically difficult (such as mining and quarrying) or as carrying unusual levels of responsibility (such as high-tech work and management), and we believe they are appropriately treated as part

[5]Our exclusion of retirees imposes an upper age limit of 60 on the working sample. When we tried other age limits, the results were quite similar.

[6]Although the survey asked respondents to specify their monthly earnings, the data provided to us included annual earnings. A limitation of the data set is that it does not include working hours for most years; nor does it include non-wage benefits such as housing, health care, and pensions.

Table 1b. Mean Gender Earnings, Earnings Gaps, and Ratios after Data Trimming.[a]

Year	*Male Mean*	*(S.D., Men)*	*Female Mean*	*(S.D., Women)*	*Mean Difference*	*Gender Ratio*	*Position of Mean Female in the Male Distribution*
1988	7.588	0.514	7.441	0.517	0.147	86.3%	40.1%
1989	7.565	0.552	7.410	0.555	0.155	85.6%	40.2%
1990	7.648	0.482	7.498	0.492	0.150	86.1%	40.3%
1991	7.699	0.485	7.559	0.497	0.140	86.9%	40.9%
1992	7.736	0.527	7.563	0.550	0.172	84.2%	40.3%
1993	7.727	0.554	7.525	0.578	0.202	81.7%	40.0%
1994	7.824	0.656	7.616	0.690	0.207	81.3%	41.7%
1995	7.885	0.644	7.659	0.672	0.226	79.8%	40.5%
1996	7.888	0.697	7.706	0.717	0.182	83.4%	42.6%
1997	7.981	0.717	7.780	0.803	0.201	81.8%	42.7%
1998	8.034	0.742	7.898	0.791	0.136	87.3%	45.4%
1999	8.116	0.729	7.975	0.829	0.141	86.9%	45.7%
2000	8.231	0.780	8.073	0.844	0.157	85.4%	45.2%
2001	8.323	0.783	8.131	0.870	0.192	82.5%	43.8%
2002	8.414	0.702	8.190	0.768	0.224	79.9%	41.7%
2003	8.497	0.723	8.234	0.784	0.262	76.9%	40.4%
2004	8.617	0.737	8.345	0.776	0.272	76.2%	40.3%

[a]Table 1b recapitulates the Table 1a estimation, but with the data trimmed to regularize unemployment rates across years. See the text discussion.

Means and standard deviations for the male and female workers, and gender mean earnings gaps, are measured in log points. The gender ratio is the female to male earnings ratio.

of labor earnings. Earnings are deflated using the city consumer price index for Beijing and the provincial CPIs for Guangdong, Liaoning, Zhejiang, Shaanxi, and Sichuan. The CPI is set at 100 for each region in year 1988.[7]

Overview of Gender Earnings Differences

Table 1a shows means and standard deviations of earnings for male and female workers, the mean gender earnings gap, and female-male earnings ratios. We observe that the female-male earnings ratio decreased from 84.2% in 1988 to 75.7% in 2004. Meanwhile, consistent with the findings in Park et al. (2004), the standard deviation of male and female log earnings distributions increased substantially. This increase in earnings disparity, we suspect, contributed to an increase in the gender earnings differential.

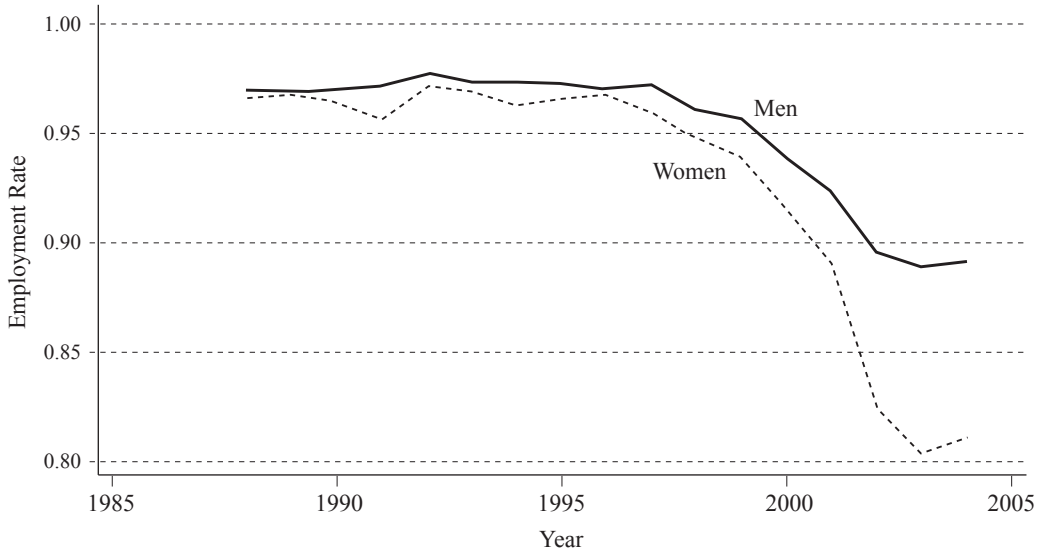
The employment rate, defined as the employment-participation ratio,[8] is reported in the last two columns of Table 1a and is depicted in Figure 1. We find that both men and women experienced a dramatic decline in the employment rate (from 97% for both genders in 1988 to 89% for men and 81% for women in 2004), in particular starting in the late 1990s. The rate declined much more sharply for women than for men. It is likely that more low-skilled women than low-skilled men exited from employment over time. The changing participation rates for men and women may pose a sample selection problem, which could bias the estimation results for the gender earnings gap.

To deal with the potential problem of sample selection, we follow Hunt (2002) and trim the data as necessary to obtain consistent

[7]The CPI data are from the Statistical Yearbook of China.

[8]It is calculated as the number of persons employed (that is, employees, employers, the self-employed, and so on) divided by the number of labor market participants (all persons either employed or seeking jobs).

Figure 1. Employment Rate for Men and Women in Urban China, 1988-2004.



Source: Urban Household Survey.

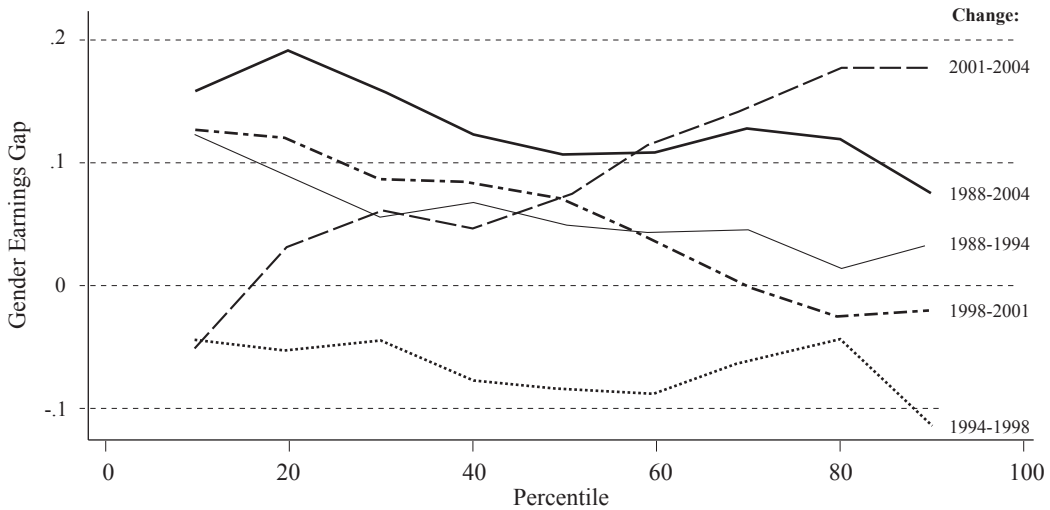
employment rates for all years, equal to the lowest employment rates documented in any year in the sample period. In practice, we run a probit regression for men and women respectively for each year,[9] and then we drop individuals with the lowest employment probability to get the targeted rates: 88.8% for men and 80.2% for women (the lowest rates in the period, both of which occurred in 2003; see Table 1a). The resulting sample is comparable with respect to employment propensities from year to year across our sample period. Table 1b reports the results for the trimmed data.

A comparison of Tables 1a and Table 1b reveals that the gender earnings gap falls somewhat after we control for the selection problem. The difference in the gap across the two tables is small between the late 1980s and the early 1990s, when employment rates were very high for both men and women. Our exclusion from the sample of a higher proportion of lower-skilled women than of lower-skilled men raises the apparent relative earnings of women. Therefore, the gender earnings gap shown in Table 1b is smaller than that based on the raw sample. However, the two tables show similar gender gaps for recent years, when the employment rate is close to that of 2003. We will use the trimmed data in the rest of this paper.[10]

[9]The dependent variable is employment (= 1 if employed, 0 otherwise). The independent variable set consists of such variables as education, age, household size, number of employed people in this household, and household income.

[10]In fact, there is also sample selection with respect to labor force participation rates, because changes in this variable over time differ by gender. We find that between 1988 and 2004, the participation rate fell from 85.4% to 78.9% for men and from 77.9% to 66.5% for women. The possible selection bias due to changing participation rates moves in the same direction as the bias we have corrected for. Taking both selection problems into consideration in the analysis requires trimming the data with respect to the employment-population ratio. The employment-population ratio (calculated as the product of the employment-participation rate and the participation rate) declines from 82.7% to 70.4% for men, and from 75.3% to 53.1% for women. As compared to our previous estimates, using the lowest employment-population ratio to trim the data would result in lower gender wage gap estimates for the earlier

Figure 2. Changes in the Gender Earnings Gap over Time, by Earnings Deciles.



Source: Urban Household Survey.

A better understanding of the gender earnings gap can be gained by examining all earnings deciles than by focusing solely on the mean. Table 2 shows the gender earnings gap by each decile of the respective male and female earnings distributions for each year. It is clear that the distribution of the gender earnings gap is uneven across deciles. Smaller decile numbers tend to have larger gender earnings gaps. In other words, a wider divergence between female and male earnings tends to be found among lower earnings groups. We also see that the trend over time at the mean (Table 1b) and the median (50th percentile in Table 2) differs substantially from the trend for both the first decile and the ninth decile in Table 2. Compared to the 17-year change in the mean gender gap in log real earnings shown in Table 1b (from 0.147 log points in 1988 to 0.272 log points in 2004), the corresponding change for the first decile was much more pronounced (from 0.182 to 0.341 log points), and that for the ninth decile was more modest (from 0.156 to 0.230 log points) (Table 2). In other words, whereas the average woman's earnings declined moderately relative to the average man's, the decline was much more severe for lower-earnings women relative to lower-earnings men, and considerably milder for upper-earnings women relative to upper-earnings men. These findings starkly contrast with those reported by Glinskaya and Mroz (2000) for Russia from 1992 to 1995, which showed a dramatic increase in gender inequality at the ninth decile and a much gentler change in gender inequality at the first decile. These patterns prompt us to investigate the sources of gender earnings gap changes not only for workers at the mean earnings level, but also for those in the lower and higher earnings groups.

From the Table 1b statistics, we can calculate the change in the mean gender earnings gap that occurred across consecutive years. We identify four periods with distinct patterns of change: the years 1988–1994 saw a rise in the mean gender earnings gap; 1994–1998, a fall; 1998–2001, a rise once again; and

years and similar estimates for recent years. The gender wage gap would increase more steeply than in our main analysis because of the exclusion of a higher proportion of low-skilled women in the earlier years. As a result, the present analysis underestimates the change in the gender wage gap from 1988 to 2004.

Table 2. The Gender Earnings Gap by Distribution Percentile.

	Percentile								
Year	*10*	*20*	*30*	*40*	*50*	*60*	*70*	*80*	*90*
1988	0.182	0.146	0.140	0.136	0.138	0.134	0.122	0.125	0.156
1989	0.195	0.175	0.162	0.154	0.133	0.127	0.129	0.147	0.201
1990	0.200	0.162	0.154	0.141	0.138	0.121	0.121	0.137	0.161
1991	0.153	0.155	0.135	0.135	0.131	0.128	0.127	0.127	0.117
1992	0.194	0.173	0.162	0.162	0.153	0.151	0.130	0.135	0.175
1993	0.245	0.197	0.187	0.180	0.160	0.167	0.184	0.184	0.209
1994	0.306	0.237	0.196	0.205	0.188	0.176	0.168	0.139	0.189
1995	0.308	0.218	0.203	0.200	0.190	0.199	0.186	0.196	0.211
1996	0.296	0.221	0.203	0.170	0.162	0.162	0.163	0.144	0.143
1997	0.339	0.229	0.209	0.191	0.166	0.166	0.171	0.128	0.120
1998	0.262	0.185	0.151	0.128	0.103	0.088	0.107	0.095	0.074
1999	0.250	0.213	0.132	0.138	0.107	0.086	0.082	0.039	0.064
2000	0.289	0.261	0.154	0.147	0.113	0.114	0.070	0.071	0.065
2001	0.391	0.305	0.238	0.212	0.172	0.124	0.105	0.069	0.053
2002	0.297	0.279	0.265	0.237	0.210	0.186	0.176	0.168	0.163
2003	0.354	0.326	0.310	0.271	0.240	0.226	0.209	0.201	0.192
2004	0.341	0.339	0.300	0.259	0.245	0.242	0.251	0.245	0.230

Note: The gender earnings gap is the male log earnings at a given decile minus the female log earnings at the same decile.

2001–2004, a sharp rise. In the analysis to follow, we will pay special attention to these four periods. Our rich data set allows us to explore possible reasons for changing trends in the gender earnings gap over time.

Figure 2 presents gender earnings gaps by earnings deciles for the periods 1988–1994, 1994–1998, 1998–2001, and 2001–2004, as well as for the overall period 1988–2004. Between 1988 and 1994, the gender earnings gap increased mildly for most earnings groups, when the mean gender earnings ratio fell from 86.3% to 81.3%. In contrast, the gap narrowed slightly for most earnings groups between 1994 and 1998, when the mean gender earnings ratio rose from 81.3% to 87.3%. For the period 1998–2001, during which the mean gender earnings ratio fell to 82.5%, there was a significant increase in the gap at the bottom, but a mild reduction at the top.[11] The trend in the last period, 2001–2004, markedly differed from that in all three prior periods studied: the gender earnings gap widened greatly in the top decile and to a lesser degree in the lower deciles; in the bottom decile, there was even a small decline in the gap.

Finally, we examine another important measure of gender inequality, the percentile position of the mean female in the male earnings distribution. As shown in the last column of Table 1b, this metric rose from 40.1 in 1988 to 45.7 in 1999, then fell to 40.3 by 2004.[12] The apparently stable or even marginally improved position of the mean woman in the male earnings distribution over the years 1988–2004 does not contradict our earlier finding that the gender earnings gap measured by the earnings ratio deteriorated over the period. The two trends may coexist when earnings inequality rises over time (see, for example, Blau and Kahn 1996:32–33). In this paper, one of our main tasks is to account for the general rise in earnings inequality between male and female workers.

[11]The mean gender earnings ratio declined by 5% between 1988 and 1994, rose by 6.2% from 1994 to 1998, fell by 4.7% from 1998 to 2001, and fell by 6.7% from 2001 to 2004.

[12]This trend differs a bit from that of the median Russian woman, whose position in the Russian male wage distribution, expressed in percentile terms, climbed from 31.5 in 1992 to 35.5 in 1995 (Glinskaya and Mroz 2000).

Methodology for Decomposing Changes in the Gender Earnings Gap

In an influential 1991 paper, Juhn, Murphy, and Pierce (hereafter referred to as JMP 1991) introduced a decomposition method that identifies a residual represented by the percentile rankings of each worker in the residual wage distribution and the "price" of the residual represented by the dispersion of the residual.[13] Changes in the residual differential between two groups are decomposed into changes in the difference in their mean percentile ranks and changes in the dispersion of the residual wage distribution. The former can be interpreted as changes in the level of unmeasured skill, and the latter as changing returns to unmeasured skill.[14] JMP's method has been applied in analyzing gender wage inequality (Blau and Kahn 1994, 1997; Brainerd 2000). The main advantage of this approach lies in its ability to identify the role of the changing wage structure (inequality) in explaining changes in gender inequality.

JMP specified a wage equation for men. Blau and Kahn (2006) argued that the coefficients for male earnings equations probably reflect a more accurate estimation of the return to potential experience than would a female or pooled equation. The male equation is written in the form

$$\ln w_{mt} = X_t \beta_t + \sigma_t \theta_t, \tag{1}$$

where θ_t is the standardized residual of the male wage regression with mean 0 and variance 1, and σ_t is the standard deviation of the residual of the male wage equation. Assuming that the male wage structure is a non-discriminatory wage structure, women's wages are imputed using men's estimated wage coefficients. Thus, the male-female log wage gap for year t is

$$D_t = \ln w_{mt} - \ln w_{ft} = \Delta X_t \beta_t + \sigma_t \Delta\theta_t. \tag{2}$$

Equation (2) states that the pay gap can be decomposed into a portion due to gender differences in measured skills, ΔX_t, weighted by male returns at year t, β_t, and a portion due to gender differences in the standardized residual from the male equation, $\Delta\theta_t$, multiplied by the money value per unit difference in the standardized residual, σ_t.

The difference in the male (m)/female (f) wage gap between 2 years, 0 and 1, can then be decomposed using equation (2):

$$\begin{aligned} D_1 - D_0 &= (\Delta X_1 - \Delta X_0)\beta_1 + \Delta X_0(\beta_1 - \beta_0) \\ &\quad + (\Delta\theta_1 - \Delta\theta_0)\sigma_1 + \Delta\theta_0(\sigma_1 - \sigma_0) \\ &= [(X_{1m} - X_{1f}) - (X_{0m} - X_{0f})]\beta_{1m} \\ &\quad + (X_{0m} - X_{0f})(\beta_{1m} - \beta_{0m}) + [(\theta_{1m} - \theta_{1f}) \\ &\quad - (\theta_{0m} - \theta_{0f})]\sigma_{1m} + (\theta_{0m} - \theta_{0f})(\sigma_{1m} - \sigma_{0m}). \end{aligned} \tag{3}$$

The first term in equation (3), the "observed X effect," reflects the contribution of changing male-female differences in observed labor market skills, X. The second term, the "observed price effect," reflects the effect of changing prices of observed labor market skills for men. The third term, called the "gap effect" by Blau and Kahn, measures the effect resulting from a change in the relative position of women in the male residual wage distribution. Women's relative position will change if their relative quantity of unobserved skills changes, or if there is a change in labor market discrimination against women.[15] The fourth term, the "unobserved price effect," measures the contribution to the gender wage gap of widening male residual wage inequality. This is the general price effect for unobserved skills. For example, given that women have lower relative unobserved skill levels, a rising male return to unobserved skills would weight the female unobserved skill deficit more heavily, and hence a larger pay gap would arise.

[13]Differing specifications of wage (earnings) equations are responsible for the absence of a residual in the first approach and its presence in the second. The Blinder-Oaxaca framework is essentially a two-equation model in the sense that men and women have their own wage equations (Lam and Liu 2002). Residuals in both equations disappear when evaluated at the mean. In JMP's framework, there is only one male wage equation. Women's relative position is evaluated in terms of the male wage equation, thus leading to the appearance of a residual even in the mean wage equation for women.

[14]JMP (1991) and especially Suen (1997) discussed some subtle issues regarding the interpretation of the decomposed items.

[15]Brainerd (2000) pointed out that this term may also reflect demand and supply shifts that have affected men and women differentially.

Table 3. Mean Values of the Selected Male and Female Subsamples.

Panel A: Mean Values, Male Subsample

	Year				
Variable	*1988*	*1994*	*1998*	*2001*	*2004*
Observations	2,870	3,290	3,226	2,940	9,767
Age	38.626	39.712	40.652	41.758	42.644
Earnings	2,192.51	3,054.86	3,960.92	5,370.11	7,200.09
Years of Schooling	11.227	11.998	12.117	12.167	12.467
Potential Experience	21.402	21.716	22.538	23.592	24.177
Experience Squared	562.354	571.388	604.409	656.764	695.632
Beijing	5.7%	13.1%	11.2%	13.9%	16.1%
Lliaoning	23.0%	28.0%	27.4%	28.0%	27.9%
Zhejiang	13.5%	13.7%	13.2%	13.5%	16.6%
Guangdong	18.5%	14.8%	16.0%	16.8%	13.3%
Sichuan	25.9%	18.1%	19.2%	14.9%	14.2%
State-Owned	83.3%	83.9%	82.4%	75.2%	68.8%
Professional & Technician	18.4%	23.0%	19.7%	17.4%	19.7%
Cadre	13.7%	13.6%	11.3%	12.3%	6.5%
Administrative Worker	22.4%	21.2%	24.4%	23.1%	29.9%
Commerce Staff	3.9%	3.8%	4.0%	4.7%	4.0%

Panel B: Mean Values, Female Subsample

	Year				
Variable	*1988*	*1994*	*1998*	*2001*	*2004*
Observations	2,490	2,725	2,607	2,273	7,156
Age	36.020	36.809	37.687	38.143	38.636
Earnings	1,892.76	2,519.34	3,589.61	4,747.09	5,623.30
Years of Schooling	10.243	11.623	12.071	12.429	12.568
Potential Experience	19.778	19.189	19.620	19.717	20.068
Experience Squared	465.047	444.128	463.093	468.672	491.820
Beijing	5.7%	13.4%	11.8%	14.2%	14.9%
Lliaoning	23.3%	27.7%	24.9%	27.3%	23.9%
Zhejiang	13.3%	14.0%	14.3%	13.0%	18.3%
Guangdong	18.5%	14.7%	17.1%	19.5%	15.1%
Sichuan	26.9%	18.5%	20.1%	13.9%	15.6%
State-Owned	66.9%	74.5%	75.7%	68.7%	60.6%
Professional & Technician	18.7%	28.6%	24.9%	22.0%	21.2%
Cadre	2.9%	3.7%	4.4%	4.4%	2.0%
Administrative Worker	19.3%	20.6%	25.0%	27.9%	31.1%
Commerce Staff	10.7%	8.8%	7.8%	9.9%	9.3%

Continued

While the JMP decomposition is often applied at the mean (see Blau and Kahn 1994, 1997), it can also be carried out at any percentile of the wage distribution. Each percentile group can be defined to include all individuals within 10 percentile rankings. Therefore, the 10th percentile includes individuals with a percentile ranking ranging from 0 to 20, while the 90th percentile includes individuals with percentile ranking ranging from 80 to 100. The details of the computation of the four components can be found in JMP (1991) and in Blau and Kahn (1994, 1997).

The sum of the first and third terms in equation (3) represents the full effect of gender-specific factors—the total effect of gender differences in observed skills and of

Table 3. Continued.

Panel C: Mean Values at the 10th and 90th Earnings Deciles, Male Subsample

	10th Percentile		*90th Percentile*	
Variable	*1988*	*2004*	*1988*	*2004*
Observations	580	1,950	580	1,950
Age	30.028	40.935	42.579	43.609
Earnings	1,118.39	2,137.14	3,641.27	16,418.80
Years of Schooling	10.627	11.171	11.638	13.883
Potential Experience	13.413	23.765	24.941	23.726
Experience Squared	276.671	701.001	697.886	660.341
Beijing	3.1%	3.7%	4.8%	31.3%
Lliaoning	27.0%	41.1%	9.8%	6.7%
Zhejiang	6.8%	8.4%	17.8%	27.9%
Guangdong	6.6%	4.8%	50.0%	29.0%
Sichuan	34.7%	23.7%	12.4%	3.2%
State-Owned	66.2%	50.1%	86.4%	76.1%
Professional & Technician	9.2%	8.4%	25.0%	31.2%
Cadre	1.6%	1.6%	19.7%	12.2%
Administrative Worker	19.2%	17.5%	18.6%	37.0%
Commerce Staff	7.8%	8.4%	3.3%	1.9%

Panel D: Mean Values at the 10th and 90th Earnings Deciles, Female Subsample

	10th Percentile		*90th Percentile*	
Variable	*1988*	*2004*	*1988*	*2004*
Observations	502	1,452	502	1,452
Age	31.491	38.102	38.888	39.387
Earnings	944.72	1,521.66	3,089.33	13,081.78
Years of Schooling	9.398	11.245	10.934	13.910
Potential Experience	16.101	20.858	21.954	19.477
Experience Squared	368.688	536.761	535.564	460.174
Beijing	2.8%	3.4%	5.2%	30.5%
Lliaoning	27.2%	42.5%	10.0%	8.2%
Zhejiang	5.6%	8.8%	16.3%	25.3%
Guangdong	6.4%	5.3%	50.8%	28.2%
Sichuan	41.0%	21.2%	13.7%	4.8%
State-Owned	40.6%	41.7%	80.5%	74.9%
Professional & Technician	6.6%	6.1%	28.5%	36.6%
Cadre	0.2%	0.4%	4.6%	4.3%
Administrative Worker	10.5%	19.1%	23.7%	40.4%

gender differences in wage rankings for the given level of observed characteristics. On the other hand, the sum of the second and fourth terms reflects the wage structures—the total effect of changing returns to observed and unobserved characteristics.

In the rest of the paper, we apply the JMP (1991) method to explain the change in the gender earnings differential at the mean level and top and bottom earnings deciles for the whole data period of 1988–2004 and the four sub-periods (1988–1994, 1994–1998, 1998–2001, and 2001–2004). We will analyze why the gender earnings differential diverged at the beginning (1988–1994), converged in the middle years (1994–1998), and then diverged at the end (1998–2001 and, more sharply, in 2001–2004), and address why the pattern found for the relatively affluent (those at the 90th percentile of the earnings distribution) differs from that for workers near the bottom of the distribution (the 10th

percentile). We use the coefficients from the mean regressions in the decompositions of the 10th and the 90th percentile gender earnings gaps; we assume that all workers in the sample face the same skill prices. Furthermore, to decompose the earnings gap at the mean, we use the mean values of X's and ΔX's in equation (3). To decompose the earnings gap at the 10th or 90th percentile, we use the mean values of X's and ΔX's of the specific percentile group.

Results and Discussion

To prepare for the decomposition of the gender earnings gap, we first report the observed characteristics of men and women in selected years (Table 3). Until recently, Chinese women received less education than men did. However, over the data period, the gender gap in education narrowed. Indeed, by the first years of the 21st century, women had outstripped men in years of schooling. Our expectation is that this relative gain for women will be found to have helped reduce the gender earnings gap over the sample period.

Over the 1988–2004 period, potential experience rose for both men and women, on average, increasing from 21.4 to 24.2 years for men and from 19.8 to 20.1 years for women (Table 3).[16] The average age of male and female workers rose, respectively, from 39 to 43 and from 36 to 39. A plausible reason for the younger average age of female workers is that the general retirement age in China is 60 for men but 55 for women.

Earnings regressions on the male sample provide us with returns to observed characteristics and the change over the years. The regression results for 1988, 1994, 1998, 2001, and 2004 are shown in Table 4. The dependent variable is log earnings, and the independent variables include years of education, potential experience and its square, provincial dummy variables, and industry and occupation dummy variables. The most noticeable of the regression results is the rise in the coefficient on schooling from 2% in 1988 to 6.9% in 2004.[17] Given the greater initial average years of education for men than for women, we expect this change to tend to widen the divergence in the gender earnings gap.[18]

Before further analysis, we first examine whether the decomposition results are sensitive to the inclusion of industry, occupation, and ownership variables in the regression. Table 5 shows the results both with and without controlling for these variables (columns 2 and 1, respectively). We find close similarity across these two sets of results. However, including the industry, occupation, and ownership variables adds enough explanatory power to the decomposition to shift a portion of contributions from the category "unobserved prices" to the category "observed prices." Henceforth, we therefore report results only from analyses that include all these variables.

Table 5 shows the decomposition results for changes in the mean, bottom-decile, and top-decile gender earnings gaps from 1988 to 2004. The results for the change in the mean gender earnings difference (column 2) clearly show that the changes in observed characteristics contributed to a large reduction in the gender earnings gap. A major driving force behind this effect was the narrowing of the gender gap in education over the years. Offsetting that effect, however, were changes in prices of observed characteristics over the period, especially rising returns to education, which tended to increase the gender earnings gap. Notwithstanding the aforementioned slight improvement of the mean woman's position in the male earnings distribution, the gender earnings gap increased over the period due to the worsening of her position in the residual earnings distribution, a development that could, in

[16]Potential experience is imputed as age minus years of schooling minus six.

[17]See Zhang et al. (2005) for detailed documentation and analysis of the rising returns to education.

[18]Note that this portion $(X_{0m} - X_{0f})(\beta_{1m} - \beta_{0m})$ corresponds to the second term in equation (3). This portion is evaluated at the initial value of education. It rises when returns to education increase and the initial value of male education exceeds that of female education.

Table 4. Regression Results for Men in 1988, 1994, 1998, 2001, and 2004.

Variable	*1988*	*1994*	*1998*	*2001*	*2004*
Years of Schooling	0.020	0.044	0.044	0.047	0.069
	(5.56)***	(9.71)***	(8.14)***	(7.56)***	(23.53)***
Potential Experience	0.059	0.045	0.045	0.052	0.037
	(22.22)***	(14.32)***	(11.23)***	(11.55)***	(16.09)***
Experience Squared/100	–0.090	–0.069	–0.069	–0.096	–0.059
	(15.34)***	(9.55)***	(7.54)***	(9.54)***	(12.03)***
Beijing	0.251	0.601	0.802	0.830	0.834
	(6.70)***	(17.49)***	(19.39)***	(18.90)***	(38.30)***
Liaoning	0.135	0.286	0.293	0.252	0.216
	(5.23)***	(9.57)***	(8.52)***	(6.55)***	(11.00)***
Zhejiang	0.343	0.684	0.676	0.713	0.796
	(11.81)***	(20.17)***	(17.09)***	(15.97)***	(36.43)***
Guangdong	0.543	1.151	1.221	1.153	0.928
	(20.06)***	(34.48)***	(32.16)***	(27.13)***	(40.97)***
Sichuan	0.092	0.223	0.211	0.181	0.113
	(3.64)***	(6.99)***	(5.82)***	(4.19)***	(5.10)***
State-Owned	0.166	0.094	0.073	0.084	0.184
	(7.72)***	(3.76)***	(2.64)***	(2.90)***	(13.31)***
Constant	5.863	6.171	6.404	5.914	6.484
	(14.21)***	(34.09)***	(37.81)***	(29.81)***	(85.94)***
Observations	2,861	3,280	3,205	2,918	9,750
R-Squared	0.40	0.45	0.42	0.41	0.44

Notes: Included in the regression specification are years of schooling, experience, experience squared, province dummies, occupational dummies, a state-ownership dummy, and industry dummies. Absolute values of t-statistics are in parentheses.

***Statistically significant at the .01 level.

turn, be due to a larger gender gap in the quantity of unobserved skills, an increase in discrimination, or a combination of the two. The gender gap in unobserved skills could have widened owing to the typically higher rates of labor market intermittency for women than for men, which would tend to reduce women's relative human capital investment. The dramatically increasing percentage of Chinese women dropping out of the labor market (Han 2006) also supports this argument. In addition, when the state-owned enterprises were restructured, the officially mandated retirement age for women was lowered, with the consequence that a higher proportion of women than men were laid off or forced to retire earlier. Even if some women transferred to other jobs following their layoff or forced retirement, such changes still had more adverse effects on the industry-, occupation-, and firm-specific human capital of women than of men, a pattern that is also unobservable in our analysis. The increase in discrimination may be due to institutional changes associated with labor market decentralization. The rising autonomy of enterprises may have induced managers to practice discrimination against women in wage setting. Maurer-Fazio and Hughes (2002) found that the male–female wage differential as a whole and the unexplained portion of that differential (due to discrimination) are largest in the most liberalized sector, which is the sector with the greatest autonomy in hiring and dismissals. The fourth component, the widening of the conditional (or residual) earnings distribution, also substantially contributed to the increase in the gender earnings gap.

In summary, we find that the net result of gender-specific changes in *quantities* of observed and unobserved skill effects was to reduce the gender earnings gap by 6.4%, but the net result of changes in *prices* of those ef-

Table 5. Decomposition of Changes of the Average, Bottom, and Top Gender Earnings Gaps, 1988–2004.

Variable	*Mean*	*Mean*	*10th Percentile*	*90th Percentile*
Change in Differential	0.125	0.125	0.296	0.079
Observed *X*'s:	–0.092	–0.099	0.053	–0.046
	(–74%)	(–79.1%)	(17.9%)	(–58.7%)
Observed Price:	0.074	0.094	0.143	0.054
	(60.1%)	(75.5%)	(48.4%)	(69.3%)
Gap (Residual Quantities)	0.08	0.091	0.050	0.027
	(64.3%)	(72.7%)	(16.7%)	(34.1%)
Unobserved Prices	0.062	0.039	0.050	0.044
	(49.6%)	(30.9%)	(17.0%)	(55.4%)
Sum Gender-Specific	–9.7%	–6.4%	34.6%	–24.6%
Sum Earnings Structure	109.7%	106.4%	65.4%	124.6%
Controls for Industry, Occupation, and Ownership	No	Yes	Yes	Yes

Notes: Numbers in parentheses show the percentage of each component's contribution to the change in the overall differential over the two years.

fects—that is, in the earnings structure—was to increase the gap by 106.4%. Therefore, we conclude that rising returns to skills, especially observed skills as reflected in the rising returns to education, are responsible for the increase in the gender earnings gap in the 1990s.

The rest of Table 5 decomposes the gender earnings gap at the bottom and top deciles. The bottom-decile gap increased by 0.296 log points, but at the top decile the gap rose only slightly, by 0.079 log points. Observed quantities had opposite effects on the gender earnings gap in the 90th and 10th deciles: the differential in observed skills between high-earning women and men narrowed, while that between low-earning women and men widened, contributing, respectively, a 0.046-log-point reduction and a 0.053-log-point increase in the gender earnings gap. Similarly, the male/female differential in prices of observed skills such as educational qualification and occupational profiles was larger for the lower earnings group than for the higher earnings group. Thus, rising returns to these skills contributed a much larger divergence in the gender earnings gap for the relatively poor group (0.143 log points) than for the relatively affluent group (0.054 log points). The gap effect (the effect resulting from a change in the relative position of women in the male residual wage distribution, as caused by changes in the relative quantity of unobserved skills, changes in labor market discrimination, or both) was higher in the poor group (0.050) than in the affluent group (0.027). Both were positive, implying that women at both high and low earnings levels fell behind their male counterparts in unobserved skills. Turning to the unobserved price effect, the widening of the male residual earnings distribution for the low-earnings group was also larger than that for the high-earnings group. Overall, the improvements in observed skills of high-earning women tended to reduce the gender gap for them, but the effects of changes in unobserved skills and rising returns to observed and unobserved skills dominated. The net effect at higher earnings levels was an increase in the gender earnings gap, but a modest one. For low-earning women, however, the picture was far worse: subject to deterioration of both observed skills and unobserved skills relative to men's, adverse changes in the earnings structure, and increased discrimination, women in this group saw the difference between their earnings and men's widen considerably.

Table 6 reports decomposition results for the change in the mean gender earnings gap during the four sub-periods, 1988–1994, 1994–1998, 1998–2001, and 2001–2004. This gap widened by 0.060 log points between 1988

Table 6. Decomposition of the Change in the Average Gender Earnings Gap in Four Sub-Periods.

	Years			
Variable	*88–94*	*94–98*	*98–01*	*01–04*
Change in Differential	0.060	–0.071	0.056	0.080
Observed *X*'s:	–0.036	–0.038	–0.016	0.041
	(–61.1%)	(54.1%)	(–28.1%)	(51.4%)
Observed Price	0.044	–0.004	–0.021	0.026
	(73.8%)	(6.1%)	(–36.7%)	(32.4%)
Gap (Residual Quantities)	0.032	–0.049	0.091	0.031
	(54.2%)	(69.0%)	(162.7%)	(38.9%)
Unobserved Prices	0.020	0.021	0.001	–0.018
	(33.0%)	(–29.3%)	(2.0%)	(–22.8%)
Sum Gender-Specific	–6.8%	123.1%	134.6%	90.3%
Sum Earnings Structure	106.8%	–23.1%	–34.6%	9.7%

Notes: Numbers in parentheses indicate the percentage of each component's contribution to the change in the overall differential over the two years.

and 1994; fell by 0.071 log points between 1994 and 1998; widened by 0.056 log points between 1998 and 2001; and widened more sharply, by 0.080 log points, between 2001 and 2004.

The observed *X* effect reduced the gender earnings gap over the first three periods, but enlarged it during the last period. This finding indicates that the average woman's measured skill level rose faster than the average man's throughout the years 1988–2001, but that trend reversed in the last period, 2001–2004.

The story is different for changes in unobserved skills, which brought men's and women's earnings closer together in the period 1994–1998 (an effect of –0.049 log points), but splayed them in each of the three other periods (by 0.032 log points in 1988–1994, 0.091 log points in 1998–2001, and 0.031 log points in 2001–2004). The implied upward movement of women in the residual male earnings distribution in 1994–1998 but downward movement in the other periods may reflect a relative gain in unobserved skills or less discrimination (or both) between 1994 and 1998 and the reverse of those trends in the other periods. Although reasons for changes in discrimination must remain conjectural, it is possible that the enactment of the 1994 Labor Law reduced discrimination between 1994 and 1998, and that accelerated labor market reform, which increased firms' autonomy, increased it between 1998 and 2004.

Table 6 indicates that the effect of changes in both observed and unobserved prices in most periods was to widen the gender earnings gap. This is consistent with the rise in returns to various skills across all four sub-periods, which would have amplified women's earnings disadvantage, given their lower skill levels. As reported earlier, the return to education in 1994 was more than double that in 1988, and it rose further to 6.9% in 2004.

Table 6 shows that there were very distinctive patterns of change in the gender earnings gap during the Chinese economic transition, reflecting variation across periods in the relative influence of observable and unobservable skills and institutional effects. Wage structure changes were primarily responsible for the widening gender gap in the years 1988–1994, which witnessed a dramatic rise in earnings dispersion (Han 2006). Although the narrowing of the education gap during this period reduced the influence of male/female differences in observable skills, this effect was offset by the gender gap in unobservable skills, coupled with rising returns to both observable and unobservable skills. In the second period, 1994–1998, institutional factors dominated: particularly influential were the enactment of the Labor Law in 1994 and a spike in the demand for women due

Table 7a. Working Hours and the Gender Earnings Gap.

Year	*Monthly Working Hours, Men*	*Monthly Working Hours, Women*	*(a) Gender Gap in Hourly Earnings*	*(b) Gender Gap in Annual Earnings*	*(b) – (a)*	*Average Female Residual in Male Equation of Annual Earnings*	*Average Female Residual in Male Equation of Hourly Earnings*
2002	178.18	174.66	0.20	0.22	0.02	–0.18	–0.14
2003	180.18	176.77	0.24	0.26	0.02	–0.19	–0.16
2004	180.73	177.49	0.25	0.27	0.02	–0.21	–0.18

to rapid economic growth. Wage structure changes played much less of a part in the widening of the gender wage gap during this period than in 1988–1994; the predominant factors were, rather, women's sharply increasing relative skills, or reduced discrimination, or a combination of the two, with the result that the gap narrowed. Institutional factors again predominated during the third period, 1998–2001, when the restructuring of state-owned enterprises affected women—especially low-skilled women—more than men. During this period, a large proportion of workers lost their "iron rice bowl" (*tie fan wan*) and became unemployed (*xia gang*). Low-skilled women were harmed the most. Indeed, we observe dramatically declining participation and employment rates for women (Han 2006). As women reduced their commitment to the labor force, it is possible that discrimination against them increased, or changes in unobservable skills such as gender-specific human capital investment widened the gender earnings gap. Our results thus indicate that the dominant influence during these years was the gap effect. The sharper increase in the gender earnings gap from 2001 to 2004 is largely the consequence of changes in the observable quantity effect and the gap effect. Key to the observable quantity effect in this case is a higher proportion of women than of men being laid off from good-paying jobs in state-owned enterprises.

Finally, also meriting some discussion are the roles played by schooling and the public sector. (Due to space constraints, we do not report the detailed results pertinent to these factors.) Education is of particular interest given the dramatic increase in both its quantity and price in China in recent years. Over our sample period, changes in the quantity and price of schooling had effects of –0.075 and 0.049 log points, respectively, on the gender earnings gap, making them the predominant components of the observed quantity (–0.099) and price (0.094) effects shown in column (2) of Table 5. That is, the sharp rise in women's relative education was the main contributor to the observed quantity effect, which tended to reduce the gender gap; and the rising price of education constituted an important reason for the observed price effect, which increased the gender gap. In an analysis to gauge how the downsizing of the public sector affected the gender earnings gap, we use the proportion of state-owned enterprises (SOEs) as a proxy for the size of the public sector. The contributions to the gender gap of SOE quantity and price are –0.005 and –0.007, respectively. Although these numbers are dwarfed by the overall observed quantity and price effects, they suggest that the downsizing of the public sector served to narrow the gender earnings gap to some extent. A breakdown by sex shows that the decline in employment share in SOEs from 1988 to 2004 was much steeper for men (from 83.5% to 68.8%) than for women (from 67% to 60.6%). On balance, therefore, the downsizing of the public sector, in which jobs tend to carry a wage premium, must have tended to narrow rather than widen the gender earnings gap.

The Role of Working Hours

Our use of annual earnings as the depen-

Table 7b. Working Hours for Men and Women across the Wage Distribution.

	Male Working Hours			*Female Working Hours*		
Year	*Earning Percentile below 33.3%*	*Earning Percentile 33.3%–66.7%*	*Earning Percentile above 66.7%*	*Earning Percentile below 33.3%*	*Earning Percentile 33.3%–66.7%*	*Earning Percentile above 66.7%*
2002	181.52	178.22	174.81	177.95	174.54	171.51
2003	182.86	180.40	177.28	179.25	177.68	173.40
2004	183.10	180.66	178.42	180.64	177.58	174.25

dent variable in the foregoing analyses could be problematic if working hours varied substantially across the wage distribution or over our sample period. Because our data provide limited information on working hours, which are available only for the most recent three years in our period (2002–2004), we can only partially address this concern.[19]

If workers respond to lower wages by working fewer hours, then the lower annual earnings that we have observed for these workers may be partly caused by a declining labor supply rather than a lower wage. Because men and women could have different labor supply patterns, the gender gap in annual earnings might not reflect the true price effect. We first examine the difference between the gender gap in hourly earnings and the gender gap in annual earnings, as shown in Table 7a. We find that monthly average working hours of men exceeded those of women by three hours, and the gender gap in hourly earnings fell short of that in annual earnings by about 0.02 log points. Thus, using annual earnings results in a small overestimation, but the overestimation remains largely constant for the three years. In addition, we compare the average female residual calculated from the male equation for hourly earnings with the same variable calculated from the male equation for annual earnings, as reported in Table 7a. This comparison allows us to evaluate whether the missing labor supply effect would greatly change the contributions of unobserved skills. The average female residual is slightly lower if we use the hourly earnings equation, which is in accordance with the previous finding that annual earnings overstate the gender earnings gap to some extent. However, the difference between the two estimations remains almost stable over time.

One particular concern is the possibility that the widening gender gap at the bottom of the earnings distribution is the consequence of the working hours effect. In Table 7b, we present average working hours by earnings percentile: below 33.3%, between 33.3% and 66.7%, and above 66.7%. We find that individuals with lower annual earnings worked longer hours, a pattern that obtained for both men and women. The gender gap in working hours was similar for high- and low-earning workers. Table 7b also indicates that working hours at the bottom of the earnings distribution did not exhibit a declining trend, but rather increased at a similar rate for men and women. Thus, it does not seem to be likely that part-time work increased more among women in the lower-earning group than among those in higher income groups. In short, the widening gender gap at the bottom of the earnings distribution does not seem to have arisen from the working hours effect.

It thus appears that our results for the most recent three years are robust with respect to gender differences in working hours. Since we do not have working hours information for other years in the sample period, however, we have not yet ruled out the possibility of an important working hours effect on our main results. Could the relationship between male and female working hours before 2001 have differed greatly from that for 2001–2004? As noted, working hours remained almost

[19]The UHS dataset provides information on months of work in a year and working hours in the last month, but it does not furnish weeks or days of work in a month, nor does it indicate whether the working hours are constant or changing over months.

constant in state-owned enterprises, which employed the majority of workers in earlier years. Since the labor market decentralization of recent years caused divergence, not convergence, in working hours, we believe it unlikely that the difference between men and women in working hours was larger in the earlier years of our study period than in the most recent years. Our finding that this factor had no important effect even in the years when it could be expected to be most influential gives us confidence that it does not impart an important bias to our results for the period as a whole.

Conclusions

As revealed in the data from the Urban Household Surveys in China, between 1988 and 2004 the mean female/male earnings ratio declined by about 10.1 percentage points, from 86.3% to 76.2%. The main contributors to this diverging trend were rapid increases in returns to both observed and unobserved skills, which magnified the skill-deficit-related disadvantage already borne by women. Women on average also lost ground due to the widening of the gap in unobserved skills or an increase in discrimination (or both). Although the gender gap in observed skills such as education narrowed over the years, which worked to reduce the gender earnings gap, that effect was not strong enough to offset the negative forces.

We also examined the gender earnings gap by each decile of the respective male and female earnings distribution for each year. The gap, we found, widened much more in the lower earnings group than in the upper earnings group. Indeed, women in the bottom decile saw their earnings fall sharply relative to those of men in the same decile. Because low-earning women are greatly disadvantaged relative to men in both observed and unobserved skills, during the study period they were penalized heavily by rising returns to these skills. In addition, they moved down in the male conditional earnings distribution, suggesting an enlarged gap in unobserved skills or an increase in discrimination. Upper-earnings women also lost ground, with an especially dramatic increase in the gender earnings gap for the top earnings decile in the first years of the 21st century. However, the gender gap in the higher tail of the earnings distribution was much smaller than that in the lower tail.

The value of urban China to labor economists as a unique natural experiment is underscored by examination of each of the four sub-periods, which reveals the variation over time in the balance of factors contributing to changes in the gender earnings gap during the economic transition. We found that the gap increased by 0.060 log points from 1988 to 1994, decreased by 0.071 from 1994 to 1998, increased again by 0.056 from 1998 to 2001, and then increased more sharply, by 0.080, from 2001 to 2004. The divergence during the years 1988–1994, which was mild, was mainly due to changes in the wage structure—in particular, a dramatic rise in earnings dispersion. The decline in the gender earnings gap from 1994 to 1998 was caused by institutional changes, such as the enactment of the Labor Law in 1994, that protected the rights of women. The restructuring of state-owned enterprises was the main force behind the rise in the gender earnings gap from 1988 to 2001. Finally, the sharp increase in the gap from 2001 to 2004 stemmed from observable quantity effects and increasing discrimination.

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