A Review of China's Urban Gender Wage Gap from 1995 to 2013

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I. Introduction

In theory, wage earning in the market economy should be a reflection of labor productivity. Productivity is related to workers' individual characteristics such as education, experience and age, and may be affected by life events such as raising children. In urban China, the gap between men and women's wage earnings progressively widened since the 1980s, and narrowed between 2007 and 2013 (Liu 2011; Li and Song 2013; Chi et al. 2014; Song et al. 2019). It is partly related to productivity variation, but more influenced by significant transformation of Chinese labor market, reforms in labor market institutions, and demographic change in recent years.

Broad shifts in Chinese urban labor market set the fundamental background of gender wage gap. These shifts involve both demand and supply side of the market. On one hand, major changes happen to the economic structure and job matching and wage setting system. During the Maoist era and continuing through the 1980s, labor allocation in urban China was governed by planning and wages were set administratively. The major urban employers were state- or collectively owned units, and the urban economy was heavily based in manufacturing. The gender wage gap was relatively small. China's economic reforms brought changes to labor allocation and wage setting, as well as major shifts in the structure of the urban economy. By the 2000s markets had replaced planning, the state and collective sectors had shrunk, and the private sector had emerged as major employers. Liberalization of wage setting and hiring permitted the emergence of wage differentials, including between men and women. The shifts in the composition of employers and the typical hiring and paying mechanism both contributed to the widening of the average gender wage difference. On another hand, the rural-urban migration since 2000 and dramatic expansion of higher education largely reshaped labor supply of Chinese urban market. The entry of large numbers of relatively unskilled rural workers into urban labor markets is thought to have contributed to a widening gap in pay between unskilled and skilled labor. Higher proportions of women than men in urban China work in unskilled jobs. Increased competition from migrants for these jobs may therefore have influenced the gender wage gap. At the same time, the number of new graduates from regular institutions of higher education rose from 850,000 in 1999 to 4.5 million in 2007 and further to 7.4 million in 2017.[1] Women, who historically were less likely to continue on to post-secondary education, have benefited disproportionately. Education among urban women has been catching up with that of urban men, with positive implications for women's relative earnings.

On the institutional side, the market gradually experienced a process of improvement in labor protection and employment formalization since the middle of 2000s, and a relaxation in birth control policy since 2010s. The reforms have mixed impact on the variation of gender wage gap. In 1993, China's minimum wage regulations

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1. National Bureau of Statistics data from the 2015 China Statistical Yearbook, Table 21-9, http://www.stats.gov.cn/tjsj/ndsj/2015/indexeh.htm, accessed Aug. 9, 2016.

were initiated. However, the implementation was weak till 2004. Minimum wage levels were increased substantially during 2007 to 2013 period when the central government was emphasizing "people's livelihood" in policy making (Ye, Li and Gindling 2016). Meanwhile, the Labor Contract Law was established in 2008 and further formalized in 2012, and the Social Security Law was established in 2010.[2] All of these institutional changes aim to protect low-skilled, low-paid and vulnerable workers. Since women are disproportionately located in these groups, the policies can potentially reduce the gender wage gap. In 2012, the Special Regulation of Female Workers' Employment Protection was issued. It extended the length of maternity leave, expanded the coverage to more sectors, and regulated the compensation levels during the leave. The Regulation was released accompanying the relaxation of birth control policy adopted in China. From 1980s to 2010, One-Child Policy was applied in China that ordinary couples were allowed to have only one child. Since the end of 2011, a number of provinces gradually released the birth control started with certain groups of couples. In 2013, the practice was specified by central government and the reform was deepened in 2015 by allowing all couples to have the second child. The reform was not accompanied with corresponding settlement of childcare provision. The childcare system was provided by public owned employers as a legacy of planned economy. The rapid development of private sector since 2000s leads to the loss of affordable, convenient childcare (Du and Dong 2013). A combination of these factors leads to employers' reported reluctancy in hiring female workers who have "high risk" of becoming pregnant, taking maternity leave, and influenced productivity for raising children. The impact of these recent policy changes on labor participation, job matching and gender wage gap needs latest data to be examined. One more policy that relates to gender wage gap is statutory retirement age. Since the 1950s the statutory retirement age has remained at 60 for men, 55 for women who are civil servants and employees of state sector, and 50 for all other women. The five to ten years gap between women and men on retirement ages leads to enlargement of gender wage gap among older workers. In 2016 the government announced its intention to gradually increase the retirement age. Some reports hint that the plan may include reducing the difference in the retirement ages of women and men.

II. The gender gap in labor market participation

Variation of labor market status of the working-age adults is summarized in Table 1. It uses weighted urban individual samples from Chinese Household Income Project Survey (CHIPS) in 1995, 2002, 2007 and 2013 and is nationally representative.[3] Generally speaking, the majority of working-age adults worked in all years; however, work participation rates were consistently lower for women than men. Work participation was highest in 1995 but dropped significantly in 2002 due to SOE (state-owned enterprise) reforms adopted and workers' layoffs caused. The work participation rates largely recovered in 2007 for men and kept stable in 2013. But that for women never fully recovered. In 2007 and 2013 women's work participation rates were 62–63%, only modestly higher than in 2002. The gender gap in work participation has formed.

The shares of women and men with wage employment by age in 2007 and 2013 are shown in Figure 1. For both women and men, wage job participation is low for the youngest age group but increases quickly with age, reaching over 75% for women and over 80% for men by age 25. After age 25 wage employment participation remains fairly stable for women until the late 40s and for men until about age 50, after which it declines. The gender gap in job participation rates for age 35–49 widened from 2007 to 2013 which is mainly attributed to a decline in female job participation. For older ages, the gap in job participation narrowed slightly as men hastened and women delayed their departure from the labor force.

2. For a fuller discussion of minimum wage policies in China, see Ye et al. 2016.
3. The sample provinces span the eastern, central and western regions of China, including Guangdong, Beijing, Shanxi, Liaoning, Jiangsu, Anhui, Henan, Hubei, Chongqing, Sichuan, Yunnan and Gansu. Note that in 1995 Chongqing was part of Sichuan province (and was included in the Sichuan sample of CHIP for that year).

Table 1. Employment status of adults aged 15–59, 1995, 2002, 2007 and 2013 (%)

	1995		2002		2007		2013	
	Male	Female	Male	Female	Male	Female	Male	Female
Working, total	85.2	75.3	75.9	59.1	80.4	62.3	81.0	62.8
of which: wage jobs	83.7	74.1	72.0	56.4	74.4	58.4	72.1	54.9
of which: self employed	1.5	1.2	3.9	2.8	6.0	3.9	7.8	5.8
Unemployed	2.8	2.6	7.2	9.3	4.3	6.4	2.8	3.6
Retired	3.6	11.4	5.7	16.9	4.3	17.4	3.3	11.3
Student	7.8	7.5	10.1	9.8	10.3	8.8	9.4	9.3
Home maker	0.1	2.3	0.2	3.7	0.2	3.7	0.8	8.7
Other	0.6	0.9	0.9	1.2	0.5	1.3	2.8	4.2
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Sample size (unweighted)	7,440	7,817	7,417	7,755	7,919	8,370	5,741	5,990

Source: Song et al. (2019).
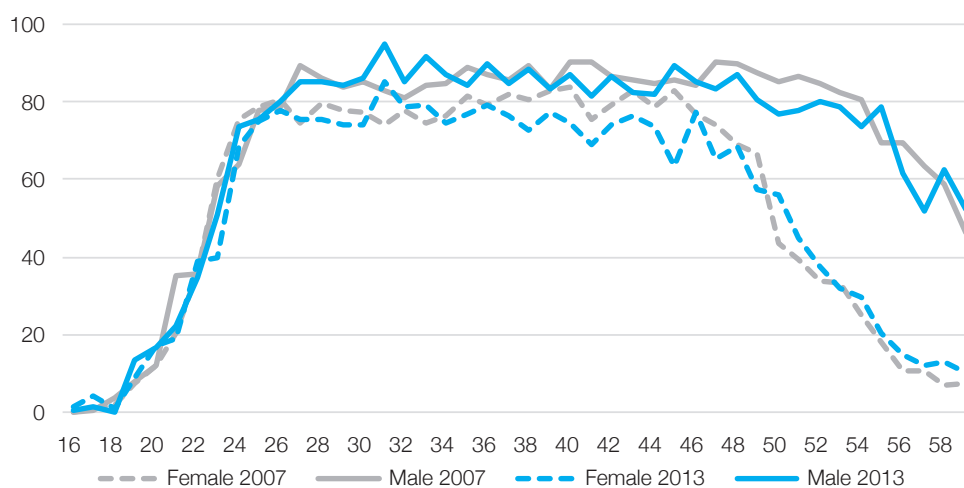
Source: Song et al. (2019).

Figure 1. Shares of women and men with wage employment, by age (%)

III. The raw gender wage ratio

The raw gender wage ratio (as shown in Table 2) is calculated as the average female wage divided by the average male wage. The ratio declined progressively from 87% in 1995 to 83% in 2002, and further to 71% in 2007. Between 2007 and 2013 the downward trend reversed and the gender wage ratio increased to 74%. The gender wage ratio varies by age. In all years the wage ratio was higher for young workers and lower for older subgroups, especially in 2007. From 2007 to 2013 the gender wage ratio improved for middle-aged and older workers, but changed little for younger age groups. With respect to education, the gender wage ratio has followed a two-step pattern that is lower for education levels up through high school and higher for education levels of vocational secondary school, vocational post-secondary school, college and higher. The gender wage ratio reduced sharply for the least educated from 1995 to 2007 which indicates the result of intensified

Table 2. The raw gender wage ratio in the CHIP estimation sample overall and by subgroup (%)

	1995	2002	2007	2013
Overall average	86.7	82.7	70.6	74.2
Age group				
25–29	98.9	89.5	86.5	86.6
30–34	84.2	84.4	78.8	76.9
35–39	86.9	84.0	68.4	75.0
40–44	87.8	80.8	66.1	69.2
45–49	83.9	82.1	66.1	72.2
Educational attainment				
Primary and less	87.1	77.3	61.1	69.9
Middle school	84.7	74.0	68.0	67.9
High school	84.4	84.8	72.2	72.3
Vocational school	93.0	97.5	77.1	79.4
Polytechnics	96.5	89.8	76.6	76.7
College and beyond	92.9	90.4	75.4	77.9
Marital status				
Single	95.5	98.3	96.5	100.6
Married	85.7	81.4	68.5	72.0
Others	112.5	96.4	119.4	91.4
Number of children under age 16 in household				
0	88.5	85.6	72.4	77.5
1	86.3	80.6	69.5	71.9
2 or more	81.2	73.6	68.2	68.7
Ownership				
Public unit and SOE	89.6	87.6	74.9	78.9
Collective sector	81.5	79.4	76.9	70.9
Private firm, self-employed, and joint-venture or foreign firm	93.3	69.7	70.7	72.7
Other ownership	76.6	76.4	65.6	85.2

Source: Compiled by authors.

competition for the low skilled jobs due to layoffs in late 1990s and increased inflow of rural workers to the urban market. To the opposite, from 2007 to 2013 the ratio for most education subgroups remained unchanged while that for the least educated subgroup improved. The trend is attributed to the shortened supply of low-skilled workers and the effect of a series of public policy targeting labor market protection. The gender wage ratio was close to 100% for single individuals in all years, indicating little or no gender wage gap. For married individuals, however, the wage ratio was lower and declined markedly to 70% in 2007 and remaining basically unchanged at 72% in 2013. The gender wage ratio also varies by number of children. In all years the gender wage ratio is lower for women with children than for women without children. For all child subgroups the gender wage ratio deteriorated between 1995 and 2007. From 2007 to 2013 the increase in the wage ratio was most noticeable for women without children. The gender wage ratio varies by ownership of the work unit and sector of occupation. In most years the gender wage ratio was highest in public and state-owned work units. These subgroups include more highly educated workers, so their higher wages may reflect differences in education.

IV. Regression based gender wage gap

To control the influences of difference in characteristics between male and female, Mincer wage earnings

equations are adopted using ordinary least squares (OLS) with standard errors adjusted to reflect clustering arising from the survey sampling design. To be specific, pooling women and men together using the regression equation:

$$lnY_i=\alpha+\beta\ Female_i+\sum_j\gamma_j X_{ji}+\mu_i \tag{1}$$

where for each individual i the ln of wage earnings $ln\ Y_i$ is a function of whether or not the individual is female (*Female* equals one if female, zero otherwise), plus j other characteristics X_{ji} and the residual μ_i. The coefficient of interest is $\hat{\beta}$, which indicates the presence of a gender wage gap after controlling for other characteristics. Individual characteristics include dummy variables for marital status, number of children, ethnicity, age group, and education level. Employment characteristics includes dummy variables for ownership of the individual's work unit, occupation, and sector of employment. Provincial fixed effects is also controlled.

Table 3 summarizes the main result of the pooled regression. Estimated $\hat{\beta}$ are uniformly negative and significant, indicating an urban gender wage gap that persists over time. Changes in the magnitude of the $\hat{\beta}$ coefficient over time confirm that the gender wage gap widened from 1995 to 2007, but narrowed from 2007 to 2013. The gap in wage at absolute value increased from 10% in 1995 to 15% in 2002 to 22% in 2007, and then decreased to 19% in 2013.[4] The coefficient on single marital status is in all cases negative and significant, ranging from −.17 to −.23 which indicates the presence of a marriage wage premium (married is the omitted reference category), but the trend is not clear over time. The coefficients on the dummy variable for one child are largely insignificant, but the coefficients on the dummy variable for two or more children are mostly negative and significant in 2007. The coefficients on the age variables indicate that in general wages rise with age up through the early 40s and then level out. The estimated coefficients on education are mostly significant and consistent with expectations, with higher levels of education having higher returns. Moreover, the additional returns to higher levels of education compared to lower levels of education increased substantially over time, especially from 1995 to 2007. The steepening education-earnings relationship implies that differences in education increasingly contributed to wage inequality.

The impact of employment characteristics is close to expected. The coefficients of ownership in all years but 1995 are negative and significant, indicating that wages have been highest in the reference category, the state sector. Moreover, the magnitude of the wage difference has been fairly large. In 2013, for example, the log point difference in wages between the state sector and non-state sectors was 0.23–0.24. Since proportionately fewer women than men are employed in the state sector, these wage differentials are relevant to the gender wage gap. With respect to production sector, the reference category is manufacturing. The coefficients for construction and mining have been either positive and significant or not significant, which implies that wages in construction and mining have been similar to or higher than wages in manufacturing. As of 2013, wages in construction and mining were not significantly different than in manufacturing. The coefficients differ among the tertiary sectors and across the years, but as of 2013 none of the tertiary sector industries had a positive, significant coefficient, and four had negative, significant coefficients. As the pattern of employment across sectors is not the same for women and men, these wage differences across production sectors contribute underlie the raw gender wage gap.

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4. In a semi-log regression the estimator of the percentage effect p of a dummy variable on the outcome variable is given by $p=(e^c/e^{(0.5*Vc)})-1$ (Giles 2011).

Table 3. Results of pooled wage equations

	1995	2002	2007	2013
Female	−0.106***	−0.162***	−0.252***	−0.213***
Single	−0.196***	−0.169***	−0.229***	−0.178***
Other marital status	0.045	−0.065	−0.043	0.100**
1 minor child	0.000	−0.015	−0.029*	0.007
2 and plus minor children	0.001	−0.042	−0.141**	−0.060
Aged 30–34	0.106***	0.092***	0.077**	0.258***
Aged 35–39	0.216***	0.185***	0.115***	0.345***
Aged 40–44	0.250***	0.208***	0.099***	0.388***
Aged 45–49	0.242***	0.230***	0.103***	0.354***
Minority	−0.083***	0.055	−0.019	0.029
Middle school	0.102***	0.105*	0.079	0.075
High school	0.131***	0.248***	0.179**	0.307***
Vocational secondary school	0.213***	0.354***	0.294***	0.325***
Vocational post-secondary school	0.213***	0.422***	0.442***	0.568***
College and higher	0.285***	0.584***	0.641***	0.784***
Collective sector	−0.246***	−0.250***	−0.225***	−0.242***
Private/joint venture/foreign owned	0.142*	−0.241***	−0.162***	−0.229***
Other ownership	−0.107	−0.134***	−0.399***	−0.335***
Commercial or service worker		−0.246***	−0.101***	−0.002
Office worker	0.066***	0.087***	0.075***	0.088**
Official or manager	0.173***	0.229***	0.216***	0.114*
Professional or technician	0.143***	0.140***	0.171***	0.141***
Agricultural and related			−0.071	−0.265*
Others	0.002	−0.384***	−0.044	−0.094
Agriculture	−0.054	0.038	0.016	−0.131
Mining	0.127***	−0.048	0.330***	0.100
Construction	0.084**	−0.024	0.015	−0.008
Public utilities	−0.014	0.006	0.171***	−0.065
Transportation and communication	0.060*	0.124***	0.068***	0.059
Commerce and trade	−0.109***	−0.025	−0.027	−0.149***
Finance and insurance	0.229***	0.121***	−0.066**	−0.200***
Education and culture	−0.003	0.090***	0.048*	−0.230***
Health and social welfare	0.038	0.171***	0.177***	−0.093
Scientific research and technology	0.110***	0.187***	0.200***	0.009
Government and social organizations	0.002	0.068**	0.018	−0.180***
Constant	6.011***	6.529***	7.229***	7.410***
Observations	8,278	7,064	8,019	4,633
R-squared	0.248	0.315	0.379	0.278

Source: Song et al. (2019).
*Note*s: 1. Standard errors in parentheses, *** *p*<0.01, ** *p*<0.05, * *p*<0.1.
2. These regressions do not include interactions between the female dummy variable and other characteristics.

V. Decomposition of gender wage gap

Oaxaca-Blinder decomposition methodology is explored to diagnose the component of gender wage gap. For each of the female and male samples regression equation (1) is run without the dummy variable *Female*. Then, according to the Oaxaca-Blinder decomposition (Blinder 1973, Oaxaca 1973), the difference between average ln male and average ln female wages can be written as:

$$\overline{lnY_m} - \overline{lnY_f} = (\hat{\alpha}_m + \sum_j \hat{\gamma}_{j,m} \overline{X_{j,m}}) - (\hat{\alpha}_f + \sum_j \hat{\gamma}_{j,f} \overline{X_{j,f}})$$

$$= [(\hat{\alpha}_m - \hat{\alpha}_f) + \sum_j (\hat{\gamma}_{j,m} - \hat{\gamma}_{j,f}) \overline{X_{j,m}}] + [\sum_j \hat{\gamma}_{j,f} (\overline{X_{j,m}} - \overline{X_{j,f}})] \qquad (2)$$

The first term on the right hand side of equation (2) is that portion of the wage difference that can be attributed to differences between male and female coefficients, including the constant terms (the "unexplained" portion). The second term is that portion of the wage difference that can be attributed to differences between male and female characteristics (the "explained" portion). The "explained" component of the decomposition is the share of the difference in ln wages between men and women that can be attributed to differences in average endowments of women and men, that is, differences in the means of characteristics such as age, education, and so on. The remainder or "unexplained" component of the difference is attributed to differences in the estimated coefficients and constant terms for women and men, and it can reflect discrimination as well as unobserved factors that are not captured by the regressions.

The decomposition result is shown in Table 4. The contribution of endowments accounts for 25.0% to 27.6% of total gender wage gap in all years, and the overwhelming majority of the gender wage gap is unexplained. Differences between women and men in observed characteristics were not the major source of the gender wage gap. Rather, the wage gap was largely unexplained. Here ownership of work unit, occupation and sector of employment are treated as endowments, so that the fact that women tend to work in lower-wage sectors and occupations increases the explained component of the gender gap. To what extent are changes over time in the gender wage gap the result of changes in the contributions of endowments versus coefficients. From 1995 to 2007 the total differential between men and women in the ln wage (*T*) increased; from 2007 to 2013 it declined. The decomposition results reveal that the increase in the differential from 1995 to 2007 was associated with increases in both the difference due to endowments (*E*) and to the difference due to the coefficients including constant terms (*C*). Similarly, the decline from 2007 to 2013 was associated with declines in both these components. In all years, however, the contribution of endowments was relatively small. In other words, changes over time in the gender wage gap, including the decline in the gap from 2007 to 2013, have reflected changes in both the explained and unexplained components of the gap, but especially changes in the unexplained component.

Table 4. Decomposition of the ln gender wage gap

	1995	2002	2007	2013
Total differential (T=E+C)	15.2	23.6	35.4	27.0
Amount attributable to:				
endowments (E)	4.2	5.9	9.4	7.0
coefficients + constant term (C)	11.0	17.7	26.0	20.0
Percentage of total explained by endowments (E/T)	27.6%	25.0%	26.6%	25.9%
Percentage of total unexplained (C/T)	72.4%	75.0%	73.4%	74.1%

Source: Song et al. (2019).

VI. Conclusions/discussion

This paper provides consistent estimates of the gender wage gap in urban China from 1995 to 2013 and investigate factors contributing to that gap. From 1995 to 2007 a substantial, progressive widening of the gap is found, while from 2007 to 2013 the gender wage gap took a new direction and narrowed. Changes in China's gender wage gap are related to changes in the urban economy. Employment of both women and men has been shifting from the state-owned sector to the non-state sector and from the secondary sector to the tertiary sector. Women continue to be disproportionately employed in the non-state sector with less institutional protections and lower-paid sectors. These sectoral patterns have contributed to the persistent gender wage differential.

Recent narrowing is to some extent due to the convergence of characteristics between women and men, that is, a reduction in the "explained" component of the gap. Notably, the education difference between women and men shrank; higher share of individuals are single, especially for women; and the number of children declines. It is also attributed by reduction in the "unexplained" component of the gap. For instance, reduction in the differences in returns to being young (ages 25–39), having less education (middle school and less), being unmarried, and being married without children between genders. The changes could reflect the effect of policies adopted such as expansion of higher education, strengthened minimum wage regulation, improvements in parental leave and maternity insurance. Besides, as older ages continue to experience a larger gender wage gap, if proposed reduction in the retirement age differential between women and men is to be implemented, perhaps the gender wage gap for older age groups will in the future shrink. Yet, some recent developments could offset these trends, in particular, the recent relaxation of the one-child policy. It could exacerbate negative incentives for employers, with consequences for the gender wage gap in the future.

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