

## Chapter 4

# Ownership Sector and the Gender Wage Gap



**Abstract** Using data of the Chinese Household Income Project surveys (CHIP), this study explores the determinants of the gender wage gap by five kinds of ownership sectors from 2002 to 2013 in urban China. A decomposition analysis of the gender wage gap based on the Blinder-Oaxaca decomposition model is employed. The results show that the gender difference in human capital and discrimination against female workers contribute to the gender wage gap; the influence of the unexplained component including the discrimination against female workers increased in each ownership sector from 2002 to 2013. The range of the increase in the influence of the unexplained component is greater for firms in the public sector than for those in the private sector; and the influence of factors on the gender wage gap differs by ownership sector.

**Keywords** Ownership · Gender wage gap · Human capital · Discrimination · China

### 4.1 Introduction

With the progress of market-oriented economy reform in China, income inequality has expanded and become a serious social problem. There have been many studies on the issue, such as those of Zhao et al. (1996; Li et al. (2008, 2013, 2017) and Sicular et al. (2020). Because wages are the largest share of local urban residents' income, a study of wage gaps is undoubtedly of great significance to income inequality. Currently, there are a variety of wage gaps in China. Of these, the gender wage gap has risen to prominence.

Under the market-oriented economy reform period from 1978 to the present, the gender wage gap has become an important issue in China. First, the widening gender wage gap contributes to greater income inequality. Second, the gender wage gap has expanded<sup>1</sup> (Gustafsson and Li 2000; Li et al. 2011; Ma 2009a, 2009b, 2011, 2018a). The gender wage gap was small during the planned economy period because the government focused more on gender equality and carried out a number of positive policies to promote female employment and gender equality. These policies contributed to reducing the gender wage gap (Gustafsson and Li 2000; Liu et al. 2000;

Maurer-Fazio and Hughes 2002; Ma 2018a, 2018c). Conversely, market-oriented economy reform had a disastrous effect on the gender wage gap. It is assumed that the influence of market mechanisms on wage determination may become greater with the growth of the private sector (e.g., domestic privately owned enterprises, foreign-owned enterprises, or the self-employed sector). Most of the wage determination and employment systems in the public sector (government organizations, state-owned enterprises) are still controlled by the government, whereas the influence of market mechanism on wage determination is greater in the private sector. Therefore the labor market in urban China is segmented into the public sector and the private sector (Chen et al. 2005; Demurger et al. 2007, 2012; Zhang and Xue 2008; Ye et al. 2011; Ma 2014, 2018a, 2018b, 2018c). When the wage determination mechanism differs by ownership types, the gender wage gap may vary in different ownership sectors.

Although some empirical studies have investigated the determinants of gender wage gaps, empirical studies of detailed decomposition by different ownership sectors on the gender wage gap are scarce, particularly, regarding how these factors changed as the market-oriented economy reform progressed in the 2000s. This study utilizes data from two periods of the Chinese Household Income Project survey (CHIPs) conducted in 2003 and 2014 (CHIPs 2002, CHIPs 2013) to provide empirical evidence about determinants of the gender wage gap by different ownership sectors (e.g., government organizations; state-owned enterprises: SOEs; collectively owned enterprises: COEs; privately owned enterprises: POEs; foreign-owned enterprises: FOE; self-employed) and its change from 2002 to 2013 in urban China.

This chapter is structured as follows. Section 4.2 introduces the background of labor market reform and the changing gender gap in China. Section 4.3 summarizes the economic theory of discrimination in the labor market and previous empirical studies. Section 4.4 describes the methods of analysis, including an introduction to the models and data. Section 4.5 gives the calculated results, and Sect. 4.6 states and interprets the econometric results. Section 4.7 presents the main conclusions.

## 4.2 Changes in the Gender Wage Gap in Urban China During the Economic Transition Period

In the planned economy period, the government enforced a “socialism reconstruction” campaign. By the 1960s, all POEs and FOE were reformed into SOEs or COEs, comprising the “the public sector” (*Gongyouzhi Bumen*). In the public sector, the Chinese government controlled the number of workers and wage levels and implemented the long-term employment system and the seniority wage system. In order to enforce the communist ideology, the government implemented policies to promote female employment and gender equality. Because the government controlled employment and wage determination, although wage level determination and promotion did not obey market mechanisms, wage distribution was relatively equal, and the gender

gap in employment and wages was small in urban China (Gustafsson and Li 2000; Liu et al. 2000; Maurer-Fazio and Hughes 2002; Ma 2011, 2018a, 2018c).

Conversely, market-oriented economy reform had an indirect effect on the expansion of the gender wage gap. For example, based on data from the third Chinese Female Social Status Survey (CFSSS) conducted by the National Female Federation, the gender wage gap (the ratio of female to male wages) in urban regions increased from 77.5% (1990) to 63.7% (2010). How did the market-oriented economy reform affect the gender wage gap in China? Three key factors are discussed as follows.

First, SOE reform may have affected the gender wage gap. The government has been implementing SOE reform since the 1980s. This reform allowed most SOEs to gain a bit of management authority: they could decide the wage level and individual bonuses based on the firm's total wage bills. The government determined the firm's total wage bills based on the production plan set by agreement in the prior year. A firm could reserve a portion that was more than the production plan as a firm's reserved saving; the reserved firm's saving could be used to pay workers' bonuses. The reform motivated state-owned enterprises to increase productivity; therefore, SOEs were motivated to pay more to a highly productive worker (highly skilled, or highly educated worker). Thus, when labor productivity is higher for the male group than for the female group, the gender wage gap may increase with the SOE reform.

In addition, starting in 1986, the long-term employment system was replaced by the labor contract system in SOEs, and the employment system reform in SOEs was enforced from the late 1990s. It was found that the risk of retrenchment was higher and reemployment rates lower for the female group (Knight and Li 2006; Ma 2008). The average wage of re-employed workers was lower for the female group than for the male group in SOEs (Appleton et al. 2002; Knight and Li 2006; Ma 2008). The probability of becoming unemployed differed significantly for males and females. This may be a contributory cause of the decreased female labor force participation rate.<sup>2</sup>

Moreover, starting in the 1980s, a section of small and mid-sized SOEs and COEs changed their ownership types to POEs. The SOE reform and the increase in privately owned enterprises may affect the gender wage gap in urban China.

Second, from the 1980s, the government implemented an Opening-up policy. China joined the WTO in 2001, this led to a significant increase in FOEs. In addition, POEs and self-employment has been permitted by the government since the 1990s. Because a firm in the private sector (e.g., FOEs, domestic POEs, self-employed sector) faces a competitive market, it determines wages based on market mechanisms, which means wages are determined by workers' marginal labor productivity. The competitive market should decrease discrimination against female workers. However, because an employer in the private sector can determine workers' wages by himself (herself), it is possible for discrimination against female workers to occur more easily in the private sector than in the public sector. Although some empirical studies have shown that the gender wage gap in the public and private sectors differs, the results are not consistent. For example, Ma (2009b) utilized CHIPS 1995 and CHIPS 2002 survey data for an empirical study that showed that, in all ownership sectors, the gender wage gap expanded from 1995 to 2002; the gender wage gap was greater in

the POEs than in SOEs in 2002. In contrast, Guo and Zhang (2010) utilized Labor Survey data from 2006 for the Northeast region to analyze the gender wage gap in the public sector and the private sector; they argued that the gender wage gap is greater in the public sector than in the private sector. Thus, a more-detailed empirical study about ownership sectors and the gender wage gap is needed.

Third, in order to address the gender wage gap in labor markets, the Chinese government introduced a number of new policies and regulations during the market-oriented reform period. For example, the central government implemented a compulsory education policy and increased public education subsidies to poorer rural areas. These policies may reduce the gender gap for education, considered to be “the discrimination before entry to the labor market.” Based on data from the third CFSSS, the gender gap of years of schooling decreased from 1.9 years in 1990 (male 6.6 years, female 4.7 years) to 0.3 years in 2010 (male 9.1 years, female 8.8 years). The Labor Law (*Laodong Fa*) was published in 1995, and the Labor Contract Policy (*Laodong Hetong Fa*) was promulgated in 2008; these labor policies protect the rights of both males and females and promote equality of employment and wages for both males and females. Local government also promulgated policy to promote the equality of employment and wages between these two groups. For example, Shenzhen City (in Guangdong Province) implemented a policy called the “Gender Equality Promotion Law in the Economy Special Zone” in June 2012, which is the first government law for gender equality in China. These positive policies may affect the gender wage gap in China.

## 4.3 Literature Review

### 4.3.1 *General Economic Theories to Explain the Determinants of the Gender Wage Gap*

What causes the gender wage gap in the labor market? First, based on the discrimination hypothesis (Becker 1957), discrimination against female workers may be shown by employers, customers, and colleagues; this discrimination causes the gender wage gap. To consider the situation in China, it is assumed that as compared with the public sector, an employer’s influence on employees’ wage determination is greater in the private sector; if employer discrimination is severe in the private sector, the gender wage gap may be higher in the private sector than in the public sector.

Second, the statistical discrimination hypothesis (Arrow 1972, 1973; Phelps 1972) states that because an employer cannot have perfect information about employees, he makes decisions on employment and wages for a male worker or a female worker based on the average values of some factors that are not presently observed (work effort, probability of turnover). When the employer predicts that the probability of taking housework (e.g., child care, family care, home cleaning, cooking) is higher

for females than males, he may reduce their employment and set a lower wage level for females.

Third, based on the human capital theory (Becker 1964; Mincer 1974), in a perfectly competitive labor market, the individual wage level is determined by a worker's labor productivity, which is related to a worker's human capital; thus when a worker with higher level of human capital (e.g., higher education level, longer tenure years, or more years of experience<sup>3</sup>), he/she should earn a higher wage. Because foreign-owned enterprises and privately owned enterprises operate in a competitive market, they determine wages based on market mechanisms, which means that a worker's wage is determined by his/her productivity. Thus, when the human capital factors are held constant, the gender wage gap may be lower in the private sector than in the public sector.

Fourth, the labor market segmentation hypothesis also can explain the existence of gender wage gaps. For example, Piore (1970) suggested that the labor market is not a perfect competitive market; it is segmented by the primary market, in which the wage level is higher, and the secondary market, in which the wage level is lower. Thus, when males concentrate in the primary market (e.g., the public sector), while females concentrate in the secondary market (e.g., the private sector), the gender wage gap appears.

Fifth, based on the crowded hypothesis (Bergmann 1974), the labor market is segmented by female-dominated occupations and male-dominated occupations (e.g., manager, professional engineer); the proportion of women in female-dominated occupations (e.g., beautician, clerical staff) is greater, whereas the proportion of men in male-dominated occupations is greater. For this reason, when the wage level in male-dominated occupations is higher than that in female-dominated occupations, gender wage gaps will appear. This is called "the influence of occupational segregation on the gender wage gap" (Bergmann 1974).

As described above, based on these economic hypotheses and theory (the discrimination hypothesis; statistical discrimination hypothesis; human capital theory; primary and secondary labor market segmentation hypothesis; crowd hypothesis), the prediction results for the gender wage gaps in the public sector or the private sector are not clear. An empirical study is needed to provide evidence for analysis.

### ***4.3.2 Summary of Empirical Studies on the Gender Wage Gap in China***

For the empirical studies on the gender wage gap in urban China, Gustafsson and Li (2000), Liu et al. (2000), Ma (2007, 2009a), Li and Yang (2010), Li et al. (2011), and Ma et al. (2013) used the Blinder-Oaxaca decomposition model (Blinder 1973; Oaxaca 1973), the Oaxaca-Ransom decomposition model (Oaxaca and Ransom 1994), or the Melly decomposition model (Melly 2006) to employ the decomposition analysis. They pointed out that both the explained component caused by the differences of human capital and the unexplained component caused by the discrimination

affect the gender wage gap. In most of the studies, a comparison of the influences between these two parts shows that the influence of the unexplained component is greater than that for the explained component. Thus, it is indicated that discrimination against female workers is the main reason for the gender wage gap in China. The contribution rate of influence of unexplained component for the local urban *hukou* resident group was 52.49% in 1988, 63.20% in 1995 (Gustafsson and Li 2000); 44.2–49.3% in 1995, 51.0–58.0% in 2002 (Ma 2009a); 52.0% in 1995, 69.0% in 2002, and 77.7% in 2007 (Li et al. 2011). The value for rural-urban migrants was 74.32–84.38% in 2008 (Li and Yang 2010); the value for the all urban residents and migrants in urban China was 49.18% in 1996 (Meng and Zhang 2001). In addition, the values are 86.08–101.80% in 2006, and 45.31–91.73% in 2009 by wage percentiles (Ma et al. 2013).

Many empirical studies on the effect of segmentation by sector on gender wage gaps in urban China—Wang (2005a), Li and Ma (2006), Ma (2007), Yao and Huang (2008)—analyzed the influence of occupational segregation on the gender wage gap. Wang (2005b), Ge (2007), and Wang and Cai (2008) analyzed the influences of segmentation by industry sectors. All of these studies used the Brown et al. model (Brown et al. 1980). These studies indicate that the unexplained component in the intra-sector differentials is the main reason for the gender wage gap.

Studies of labor market segmentation by various ownership sectors on the gender wage gap are inconclusive. Even though Liu et al. (2000), Maurer-Fazio and Hughes (2002), Demurger et al. (2007), and Guo and Zhang (2010) used the Blinder-Oaxaca model to decompose the factors affecting the gender wage gap in the public sector and the private sector separately, these studies use survey data from before 2007; information regarding the issue is scarce in the current situation. Ma (2018a) investigated the influence of ownership sector on the gender wage gap from 2002 to 2013 using Brown et al. decomposition model, but the gender wage gap in each ownership sector was not analyzed.

Using CHIPs 2002 and CHIPs 2013 for urban residents, this study investigated determinants of the gender wage gap in each ownership sector, and we will compare the results of different sectors (government organization, SOE, COEs, POEs, and self-employed sector) and by these two periods (2002 and 2013). We can discover new evidence leading to an investigation of the labor market segmentation by ownership sectors and the gender wage gap during the 2000s in urban China.

## 4.4 Methodology and Data

### 4.4.1 Model

To estimate when other factors, for example, human capital, are consistent, how segmentation by ownership sectors affects male and female wage levels and the wage functions are calculated, the OLS model is expressed as Eq. (4.1.1).<sup>7</sup>

$$\ln W_i = \beta_O OWN_i + \beta_X X_i + u_i \quad (4.1.1)$$

To consider the sample selection bias problem (a worker can choose to work or not) found in the OLS model, the Heckman two-step model (Heckman 1979) is used. The estimated results of the distribution function and the density function by the probit regression model (the dependent variable is  $\Pr(Y_i = 1)$ , which indicates the probability of participation in work), and the inverse Mill's ratio—the adjusted items ( $\lambda = \phi(\cdot)/\Phi(\cdot)$ ) are calculated. The corrected wage functions expressed by Eqs. (4.1.2) and (4.1.3) are estimated using these adjusted items.

$$\ln W_i = \beta_M Male_i + \beta_O OWN_i + \beta_X X_i + \beta_\lambda \lambda_i + u_i \quad (4.1.2)$$

$$\ln W_{ij} = \beta_O OWN_{ij} + \beta_X X_{ij} + \beta_\lambda \lambda_{ij} + u_{ij} \quad (4.1.3)$$

( $j$  : *male, female*)

In Eqs. (4.1.1), (4.1.2), and (4.1.3),  $i$  represents the individual,  $j$  represents the male or female worker,  $\ln W$  is the logarithm of wage,  $X$  represents factors (years of schooling, years of experience, industry, occupation dummy variables) which affect wage,  $OWN$  is the ownership sector dummy variable, and  $u$  is a random error item. The results of Eq. (4.1.2) indicate the overall influences of sector segmentation by ownership on wages for the total sample; the results of Eq. (4.1.3) show the influences of ownership types on wages for males and females separately.

Next, to decompose the determinants of the gender wage gap, the Blinder-Oaxaca decomposition model<sup>3</sup> (Blinder 1973; Oaxaca 1973) is used. The decomposition model is expressed as Eq. (4.2.1) and Eq. (4.2.2).<sup>4</sup>

$$\ln W_m - \ln W_f = \beta_m(X_m - X_f) + (\beta_m - \beta_f)X_f \quad (4.2.1)$$

$$\ln W_m - \ln W_f = \beta_f(X_f - X_m) + (\beta_f - \beta_m)X_m \quad (4.2.2)$$

In Eq. (4.2.1) and Eq. (4.2.2),  $X_m$  and  $X_f$  are variable means of men and women, respectively.  $\beta_m$  and  $\beta_f$  are estimated coefficients in wage functions. Based on the human capital theory (Becker 1964; Mincer 1974) and discrimination hypothesis (Becker 1957; Arrow 1972, 1973; Phelps 1972), the decomposition model decomposes the wage gap between men and women into two parts: the human capital endowment (known as the explained component) [ $\beta_m(X_m - X_f)$  or  $\beta_f(X_f - X_m)$ ] and the endowment return (known as the unexplained component) [ $(\beta_m - \beta_f)X_f$  or  $(\beta_f - \beta_m)X_m$ ]. The explained component expresses the differentials of individual characteristics such as the differences in human capital endowments. The unexplained component includes the differences in return to human capital, wage determination systems, discrimination, or capabilities not presently measurable. The larger

the estimated explained component is, the greater is the influence of human capital differences between men and women on the wage gap, and vice versa.

#### 4.4.2 Data and Variable Setting

The survey data of CHIPs 2002 and CHIPs 2013 are used for the analysis. The data was compiled by the Economic Institute of the Chinese Academy of Social Sciences (CASS) and Beijing Normal University in 2003 and 2014. The sampling method is stratified random sampling based on samples of the National Bureau of Statistics (NBS). Because there are design similarities in the questionnaire data, we can use the same information for analyzing the two periods. CHIPs covers the representative regions in China, including Beijing, Shanxi, Liaoning, Jiangsu, Anhui, Guangdong, Henan, Hubei, Sichuan, Chongqi, Yunnan, and Gansu in 2002; and Beijing, Shanxi, Liaoning, Jiangsu, Anhui, Guangdong, Henan, Hubei, Sichuan, Chongqi, Yunnan, Gansu, Shandong, and Hunan in 2013. For comparing the two periods, we selected the regions (provinces) covered in two surveys, including Beijing, Shanxi, Liaoning, Jiangsu, Anhui, Guangdong, Henan, Hubei, Sichuan, Chongqi, Yunnan, and Gansu.

The analytic objects of this study are workers of local urban residents. Because the sample selection bias for the choice of work or non-work is considered in the study, working and non-working individual samples are used. In considering the mandatory retirement system<sup>5</sup> implemented in the public sector, the analytic objects are limited to groups aged 16–59. All of the abnormal value samples<sup>6</sup> and the missing value samples were deleted. The samples used in analysis including working and non-working individuals is 14,607 for 2012, 13,549 for 2013.

To maintain the analysis samples by each ownership sector and to consider the features of the sectors' distributions, based on CHIPs 2002 and CHIPs 2013 questionnaires, work sectors are divided into seven categories: (i) the group in the public organizations, including government organization and the relationship of work units with the government, called “*Shiye Danwei*” (GOVs); (ii) the group in state-owned enterprises (SOEs); (iii) the group in collectively owned enterprises (COEs); (iv) the group in the privately owned enterprises (POEs), including the group in domestic privately owned enterprises and foreign-owned enterprises (FOEs)<sup>7</sup>; (v) the group in the self-employed sector (Self); (vi) the group in other ownerships sector that is not included in (i)–(v) (Others); and (vii) the non-working group.

In the wage function, the dependent variable is the logarithm value of hourly wage. The *wage* is defined as “the total earnings from work.” It comprises the basic wage, bonus, and any subsidy, which is calculated based on market prices. The hourly wage are calculated based on total wages and corresponding work hours. For example, in 2002, work hours yearly were calculated as work hours daily  $\times$  work day monthly  $\times$  work months yearly; hourly wage are calculated by total yearly wages divided by yearly work hours. The consumer price index (CPI) in 2002 is used as the standard for adjusting the nominal wage every year.



Independent variables are those likely to affect the wage level and the probability of entry to sectors: they are conducted as follows.

First, the six kinds of ownership sector dummy variables are: the government organizations (GOVs), the state-owned enterprises (SOEs), the collectively owned enterprises (COEs), the privately owned enterprises (POEs), self-employed (Self), and other ownerships sectors (Other).

Second, age, years of schooling, years of experience,<sup>8</sup> and health status (if the answer is “very good” or “good,” it is equal to 1; otherwise it is equal to 0) are used as the indices of human capital. It is thought that these factors may affect wages or the probability of entry to various ownership sectors.

Third, considering marital status (having spouse is equal to 1, otherwise 0) and ethnicity (Han ethnicity is equal to 1, minority ethnicity is equal to 0) might affect the probability of entry to the sector or wage levels, these dummy variables are used.

Fourth, because wage gaps occur by occupation and industry sectors, occupation dummy variables (manager, professional worker and technician, production worker, clerical staff, others) and industry sector dummy variables are used. To maintain the analysis samples by each industry category, the industrial categories<sup>9</sup> are reclassified. Five kinds of industries—construction and manufacturing, retail, wholesale, service, and other industries—are used to construct the category variables.

Fifth, because the regional disparity for economic development levels and the labor markets differ by region, East, Central, and West region dummy variables are used to control these influences.

## 4.5 Descriptive Statistical Results

### 4.5.1 *Gender Gap of Individual Characteristics*

The mean values of variables by male and female group and the gender gap are shown in Table 4.1.

First, the gender wage gap (the gender gap of the logarithmic value of hourly wage) increased from 0.179 (2002) to 0.270 (2013). It is observed that as market-oriented reforms progressed in China, the gender wage gap has expanded.

Second, the gender gaps of age, years of experience, years of schooling, and health status are small in both 2002 and 2013. This suggests that the gender gap of human capital is small.

Third, the distribution proportion of occupation types differs by gender. For example, the proportions of managers are 10.5% (2002) and 1.8% (2013) higher for males than for females.

Fourth, the distribution proportion of ownership sectors differs by gender. For example, the percentages of workers in SOEs are 7.4% (2002) and 6.3% (2013) higher for males than for females, while the percentages of workers in COEs and POEs are higher for females than for males. This indicates that the distribution

**Table 4.1** Gender gap of individual attributes

	2002			2013		
	Male	Female	Gap	Male	Female	Gap
Log. hourly wage	1.628	1.449	0.179	2.430	2.160	0.27
Age	41	39	2	42	40	2
Exp	30	27	3	24	22	2
Years of schooling	12	11	1	12	12	0
Health	70.2%	66.0%	4.2%	82.0%	81.8%	0.2%
Han race	95.9%	95.7%	0.2%	95.3%	95.0%	0.3%
Married	89.2%	86.7%	2.5%	86.8%	86.3%	0.5%
Occupation category						
Manager	19.5%	9.0%	10.5%	6.2%	4.4%	1.8%
Prof. and Tech	18.0%	23.9%	−5.9%	15.3%	16.1%	−0.8%
Prod. Worker	20.6%	23.5%	−2.9%	8.1%	8.3%	−0.2%
Clerical staff	33.0%	23.8%	9.2%	24.4%	12.8%	11.6%
Other	8.8%	19.8%	−11.0%	45.9%	58.3%	−12.4%
Ownership sector						
GOVs	31.5%	33.1%	−1.6%	24.1%	24.1%	0.0%
SOEs	38.6%	31.2%	7.4%	19.4%	13.1%	6.3%
COEs	5.4%	9.2%	−3.8%	4.5%	4.8%	−0.3%
POEs	14.4%	14.8%	−0.4%	26.6%	28.7%	−2.1%
Self	8.3%	8.3%	0.0%	18.2%	20.2%	−2.0%
Other	1.7%	3.5%	−1.8%	7.3%	9.2%	−1.9%
Industry sector						
Cons. & manu	31.1%	26.3%	4.8%	22.8%	14.9%	7.9%
Retail	9.5%	14.6%	−5.1%	12.8%	23.7%	−10.9%
Service	8.8%	14.9%	−6.1%	16.4%	20.9%	−4.5%
Other	50.5%	44.2%	6.3%	48.0%	40.5%	7.5%
Region category						
East	38.8%	39.0%	−0.2%	41.3%	42.2%	−0.9%
Central	35.4%	33.9%	1.5%	36.7%	34.0%	2.7%
West	25.8%	27.2%	−1.4%	22.0%	23.8%	−1.8%
Observations	5,249	4,147		5,272	4,197	

Source Calculated based on CHIPS2002 and CHIPS2013

Note (1) Samples limited on age16–59

(2) gender gap = Male–Female

proportion of males is higher in the public sector, while the distribution proportion of females is higher in the private sector.

Fifth, the distribution proportion of industrial sectors differs by gender. Concretely, the percentages of workers in the construction and manufacturing industry are 4.8% (2002) and 7.9% (2013) higher for males than for females, while the percentages of workers in retail industry are 5.1% (2002) and 10.9% (2013) higher for females than for males.

Sixth, the difference in the distribution proportion of regions by gender is small.

To sum up, it is observed that although the gender gaps of human capital and regional distributions are small, large gender differences remain in the distribution proportions of ownership sectors and occupational and industrial sectors. These factors may influence the gender wage gap, and we should consider them in the following econometric analyses.

### ***4.5.2 Gender Wage Gap by Ownership Sector***

The mean values of wage by gender in each ownership sector are shown in Table 4.2. The ratio of women to men is used as the index of gender wage gap. The higher ratio means the lower gender wage gap. The main findings are as follows.

First, in all sectors combined, wages are lower for females than for males in both 2002 and 2013. Concretely, the gender gap in monthly wages (the ratio of female monthly wages to male monthly wages) was 73.1–85.9% in 2002 and 70.6–84.7% in 2013; the hourly wage gender gap (the ratio of female hourly wages to male hourly wages) was 79.5–104.0% in 2002 and 75.0–86.7% in 2013.

Second, the gender wage gap was larger in the private sector (COEs, POEs, self-employed sector) than in the public sector (government organization and SOEs) in both 2002 and 2013. For example, in 2013, the results based on hourly wage showed that the gender wage gaps in the public sector were 86.4% (public organization) and 86.4% (SOEs); whereas, the gender wage gaps in the private sector were 78.9% (COEs) and 75.0% (POEs), and 77.8% for the self-employed sector.

Third, although the gender wage gap increased from 2002 to 2013 in all sectors, the increase in the gender wage gap was larger for the private sector than for the public sector. For example, the hourly wage gender gap increased from 91.0% (2002) to 86.4% (2013) for government organizations, and it increased from 85.2% (2002) to 75.0% (2013) for the POEs and FOEs, separately.

These tabulated calculation results indicate that the gender wage gap differs by different ownership sectors, and these calculated values changed from 2002 to 2013.

**Table 4.2** Gender wage gaps in each ownership sector

	2002			2013		
	Male	Female	Gender gaps (%)	Male	Female	Gender gaps (%)
Monthly wage (Yuan)						
GOVs	1,314	1,129	85.9	3,838	3,156	82.2
SOEs	1,077	887	82.4	3,900	3,305	84.7
COEs	786	643	81.8	3,273	2,312	70.6
POEs	1,112	884	79.5	3,695	2,681	72.6
Self	874	639	73.1	3,635	2,570	70.7
Others	866	718	82.9	2,529	1,801	71.2
Total	1,051	796	75.7	3,651	2,751	75.3
Hourly wage (Yuan)						
Pub	7.8	7.1	91.0	22.0	18.6	86.4
SOEs	6.3	5.4	85.7	21.9	19.0	86.4
COEs	4.3	3.9	90.7	18.5	15.4	78.9
POEs	6.1	5.2	85.2	19.9	15.0	75.0
Self	3.9	3.1	79.5	17.6	13.5	77.8
Others	5.0	5.2	104.0	15.0	13.1	86.7
Total	6.4	5.5	85.9	20.0	15.9	80.0

Source Calculated based on CHIPS2002 and CHIPS2013

Note (1) Gender gap of monthly wage = Females /Males; Gender gap of hourly wage = Females /Males

- (2) Pub: government organizations; SOEs: state-owned enterprises; SOEs: collectively owned enterprises; POEs: privately owned enterprises including domestic privately owned enterprises and foreign owned enterprises; Self: self-employment sector; Other: the other sector

## 4.6 Econometric Analysis Results

### 4.6.1 How Does the Ownership Sector Affect Wage Levels?

When other factors including ownership sectors are held constant, does the gender wage gap occur? How does the ownership sector affect wage levels? Does the gender wage gap differ by ownership sector? To answer these questions, wage functions are estimated by using the total sample and subsamples distinguished by ownership types. The results are shown in Table 4.3 (total sample) and Table 4.4 (subsample). The Heckman two-step model is used to adjust the sample selection bias caused by the choice of work or non-work.

First, when other factors are constant, the logarithm values of hourly wages for males are 5.9% (2002) and 18.5% (2013) points higher than for females (see Table 4.3). This indicates that, except for the individual characteristic differentials that are controlled in the model, other factors (discrimination against females, unobservable

**Table 4.3** Results of wage function

	2002		2013	
	coef	t-value	coef	t-value
Male	0.050***	3.67	0.186***	9.76
Ownership (GOVs)				
SOEs	−0.082***	−4.65	0.086***	3.41
COEs	−0.385***	−13.76	−0.051	−1.33
POEs	−0.094***	−4.11	0.011	0.44
Self	−0.564***	−19.81	−0.012	−0.43
Others	−0.324***	−7.79	−0.143***	−4.47
Years of schooling	0.053***	16.42	0.077***	23.23
Years of Experience	0.020***	3.33	0.017***	3.77
Years of Experience squared	−0.000	−0.9	−0.000*	−1.79
Health	−0.019	−1.39	0.079***	4.00
Han race	−0.026	−0.84	0.035	1.03
Occupation (Clerical staff)				
Manager	0.095***	4.33	0.188***	5.19
Prof. and Tech	0.132***	6.99	0.122***	3.84
Prod. Worker	−0.085***	−4.38	−0.090***	−3.17
Others	−0.184***	−7.65	−0.098***	−4.36
Industries (Cons. & Manu.)				
Retail/Catering	−0.063**	−2.52	−0.143***	−5.03
Service	−0.026	−1.06	−0.122***	−4.57
Others	0.163***	9.23	0.027	1.14
Region (East)				
Central	−0.407	−26.99	−0.201***	−11.75
West	−0.324	−20.56	−0.155***	−8.04
Inverse Mill's ratio	−0.146	−3.59	−0.141***	−2.98
Constant	0.817	6.79	1.165***	11.42
Observations	14,607		13,549	
Censored observations	5,211		4,080	
Uncensored observations	9,396		9,469	
Wald chi2(19)	3928.230		1850.200	
Prob > chi2	0.000		0.000	

Source Calculated based on CHIPs2002 and CHIPs2013

Note (1) \*\*\* $p < 0.01$ , \*\* $p < 0.05$ , \* $p < 0.10$

(2) Calculated by Heckman two-step model. The Results by the selection function are not expressed in this table

**Table 4.4** Estimated gender wage gaps by ownership sector

	2002		2013	
	coef	t-value	coef	t-value
GOVs	0.051***	2.59	0.145***	5.59
SOEs	0.110***	5.05	0.188***	5.20
COEs	0.044	0.85	0.294***	4.18
POEs	0.091**	2.55	0.214***	7.58
Self	0.196***	3.53	0.304***	7.64
Others	0.238**	2.19	0.219***	3.81

Source Calculated based on CHIPS2002 and CHIPS2013

Note (1) \*\*\* $p < 0.01$ , \*\* $p < 0.05$ , \* $p < 0.10$

(2) Samples by different ownership sectors are used in these estimations

(3) Calculated by Heckman two-step model. Years of schooling, years of experience, years of experience squared, health, ethnicity, occupation, industry, region dummy variables are calculated, the results are not showed in this table

(4) The Results of the selection function are not expressed in this table

individual ability) affect the gender wage gap in both 2002 and 2013. Moreover, the results show that the gender wage gap expanded from 2002 to 2013.

Second, as compared with workers in government organizations, wage levels are lower for workers in other sectors (see Table 4.3). In 2002, average wage levels were 8.2% points lower for workers in SOEs, 38.5% points lower for workers in COEs, 9.4% points lower for workers in the POEs, 56.4% points lower for workers in the self-employed sector, and 32.4% points lower for workers in other sectors. In 2013, average wage levels were 8.6% points higher for workers in SOEs and 14.3% points lower for workers in other sectors. However, when other factors are held constant, the wage gap between public organizations and COEs, POEs, and the self-employed sector is not statistically significant. This might be due to the increased influence of other factors (individual characteristics, including human capital) on wages from 2002 to 2013 in the private sector.

Third, the gender wage gap differs among ownership sectors, and the wage gap changed from 2002 to 2013 in all sectors (see Table 4.4). When the coefficient is a positive value and it is statistically significant at the 1% or 5% statistical level, it denotes that there maintains a gender wage gap. The coefficient of the male dummy variable in wage function is utilized as an index of the gender wage gap. It is observed that in 2002, the gender wage gap in SOEs (11.0% points), POEs (9.1% points), the self-employed sector (19.6% points), and other sectors (23.8% points) was higher than that in government organizations (5.1% points). In 2013, the gender wage gap in SOEs (18.8% points), COEs (29.4% points), the POEs (21.4% points), the self-employed sector (30.4% points), and other sectors (21.9% points) was higher than that in government organizations (14.5% points). These results show that the gender wage gap was higher in the private sector than that in the public sector in both 2002 and 2013, and the disparity in the gender wage gaps of the public and private sectors increased from 2002 to 2013.

### 4.6.2 How Does the Ownership Sector Affect the Gender Wage Gap?

Which factors contribute to gender wage gap? How does the ownership sector affect the gender wage gap? To answer these questions, we employed a decomposition analysis based on the Blinder-Oaxaca decomposition model using the total samples including five kinds of ownership sectors. The results are summarized in Table 4.5. The new findings are as follows.

First, in general, although both the explained component and the unexplained component contribute to the gender wage gap in 2002 and 2013, the contribution rate of the unexplained component on the gender wage gap increased from 51.9% (2002) to 80.2% (2013). This indicates that as market-oriented economy reform progresses,

**Table 4.5** Decomposition results of gender wage gap

	Values		Percentage	
	Explained	Unexplained	Explained (%)	Unexplained (%)
<b>【2002】</b>				
Total	0.086	0.093	48.1	51.9
Ownership	0.015	0.011	8.5	6.0
Education	0.008	−0.128	4.7	−71.8
Experience	0.029	0.002	16.2	1.0
Health	0.000	0.010	0.0	5.6
Ethnic	0.000	0.067	0.0	37.5
Occupation	0.023	0.039	12.9	21.6
Industry	0.012	0.021	6.7	11.8
Region	−0.002	−0.004	−0.9	−2.4
Constants	0.000	0.076	0.0	42.6
<b>【2013】</b>				
Total	0.053	0.216	19.8	80.2
Ownership	0.006	0.067	2.2	24.8
Education	0.001	0.062	0.3	22.9
Experience	0.019	0.21	7.2	77.8
Health	0.000	−0.016	0.1	−5.9
Ethnic	0.000	0.015	0.1	5.5
Occupation	0.009	0.001	3.2	0.3
Industry	0.020	0.033	7.5	12.1
Region	−0.002	0.000	−0.7	−0.2
Constants	0.000	−0.154	0.0	−57.1

Source Calculated based on CHIPS2002 and CHIPS2013

Note Decomposition based on the Blinder-Oaxaca decomposition model

the problem of discrimination against women became severe, particularly in the current period.

Second, in general, for the influence of ownership on the gender wage gap, (1) both the gender gap of the proportion of ownership sectors and discrimination against females in the same ownership sector contributed to expanding the gender wage gap in both 2002 and 2013. (2) The contribution rate of the discrimination against female workers in the same ownership sector on the gender wage gap increased from 6.0% (2002) to 24.8% (2013).

Third, the main factors contributing to the gender wage gap differ in these two periods. Concretely, in 2002, the main factors are years of experience (16.2%) and occupation (12.9%) in the explained component, and ethnicity (37.5%) and occupation (21.6%) in the unexplained component in 2013, the main factors are the industry (7.5%) and years of experience (7.2%) in the explained component, and years of experience (77.8%) and education (22.9%) in the unexplained component.

#### ***4.6.3 Does the Impact of Factors on the Gender Wage Gap Differ by Ownership Sector?***

Does the impact of factors on the gender wage gap differ by ownership sector? To answer this question, we employed decomposition analysis based on the Blinder-Oaxaca decomposition model for each ownership sector. These results are summarized in Table 4.6 (government organizations), Table 4.7 (SOEs), Table 4.8 (COEs), Table 4.9 (POEs), and Table 4.10 (self-employed sector). The main results are as follows.

First, in general, in looking at the contributions of the explained component and the unexplained component, it can be seen that the contributions of the unexplained component increased from 2002 to 2013 in each ownership sector. For example, the contribution rates of the unexplained component increased from 40.1 to 68.9% in government organizations, from 64.1 to 105.7% in SOEs, from 48.4 to 109.3% in COEs, from 47.0 to 91.5% in POEs, and from 66.4 to 77.0% in self-employed sector. This indicates that as market-oriented economy reform progressed, the discrimination against female workers increased, and it has become the main factor contributing to the gender wage gap in the 2000s.

Second, in comparing the values of the unexplained component between the public and private sectors in the current period (2013), it can be seen that the contribution rate is greater for the public sector (105.7% for SOEs, 109.3% for COEs) than for the private sector (91.5% for POEs, 77.0% for the self-employed sector), and it is lowest for government organizations (68.9%). This indicates that, in the current period, the discrimination against female workers is greater in the public sector than in the private sector.

The public sector results can be explained by the discrimination hypothesis (Becker 1957). Concretely, it may be due to the fact that, as ownership reform



**Table 4.6** Decomposition results of gender wage gap in government organizations

	Values		Percentage	
	Explained	Unexplained	Explained (%)	Unexplained
<b>[2002]</b>				
Total	0.081	0.057	59.9	40.1
Education	0.022	−0.194	16.5	−142.6
Experience	0.035	−0.167	25.7	−122.9
Health	0.000	0.009	0.0	6.5
Ethnic	0.000	0.049	0.0	36.1
Occupation	0.026	0.005	18.8	3.3
Industry	0.000	0.096	0.0	70.5
Region	−0.002	0.028	−1.1	20.7
Constants	0.000	0.232	0.0	168.4
<b>[2013]</b>				
Total	0.063	0.140	31.1	68.9
Education	−0.017	0.074	−8.2	36.2
Experience	0.07	0.177	34.6	87.2
Health	0.000	−0.063	0.1	−30.8
Ethnic	0.000	0.039	−0.2	19.3
Occupation	0.008	0.008	4.1	4.0
Industry	0.005	−0.030	2.5	−14.8
Region	−0.004	−0.053	−1.8	−26.3
Constants	0.000	−0.012	0.0	−5.9

Source Calculated based on CHIPS2002 and CHIPS2013

Note Decomposition based on the Blinder-Oaxaca decomposition model

progressed in the SOEs, they obtained more authority to decide the wage levels of their employees; therefore, although wage and employment gender equality policies were enforced in the planned economy period, as the influences of these policies controlled by the government decreased, the problem of discrimination against female workers became severe. On the contrary, the results for the private sector can be explained by the human capital theory (Becker 1964; Mincer 1974). For firms in the private sector, the influence of market mechanisms is greater. To maximize profits in the competitive market, firms in the private sector may be likely to determine wage levels based on individual workers' productivity (human capital). Therefore, discrimination against female workers is smaller in the private sector than in the public sector.

Third, the influences of factors on the gender wage gap differ by ownership sectors. For example, in 2013, (1) for government organizations, the gender gaps of years of experience in the explained component (34.6%) and the unexplained component

**Table 4.7** Decomposition results of gender wage gap in state-owned enterprises (SOEs)

	Values		Percentage	
	Explained	Unexplained	Explained (%)	Unexplained (%)
<b>【2002】</b>				
Total	0.061	0.111	35.9	64.1
Education	−0.004	−0.131	−2.1	−75.3
Experience	0.018	−0.006	10.5	−3.3
Health	−0.001	0.028	−0.6	16.0
Ethnic	0.000	0.082	0.1	47.2
Occupation	0.032	0.000	18.7	−0.3
Industry	0.010	0.021	5.6	12.0
Region	0.006	0.024	3.7	13.7
Constants	0.000	0.094	0.0	54.1
<b>【2013】</b>				
Total	−0.010	0.188	−5.7	105.7
Education	−0.023	−0.282	−12.8	−158.3
Experience	0.015	0.027	8.6	15.1
Health	−0.003	0.169	−1.5	95.1
Ethnic	0.000	0.566	−0.3	317.6
Occupation	−0.014	0.065	−8.1	36.2
Industry	0.018	−0.005	10.2	−2.6
Region	−0.003	0.072	−1.8	40.2
Constants	0.000	−0.423	0.0	−237.7

Source Calculated based on CHIPS2002 and CHIPS2013

Note Decomposition based on the Blinder-Oaxaca decomposition model

(87.2%) are the main factors. This is because the seniority wage system is implemented in most government organizations. In government organizations, the average length of years of experience is longer for males than for females, and the longer years of work experience are evaluated to be at a higher level for males than for females; thus, the influence of years of experience is greater. (2) For SOEs, the gender differences of proportions of industry sectors (10.2%) in the explained component and ethnicity (317.6%) and health status (95.1%) in the unexplained component are the main factors. This indicates that the wage gap between a monopoly industry sector and a competitive industry sector may greatly affect the gender wage gap for workers in state-owned enterprises. (3) For COEs, the gender gap of the proportions of occupations (2.0%) in the explained component and the proportion of industry sectors (49.6%) in the unexplained component are the main factors contributing to the gender wage gap. (4) For POEs, the gender gap in the proportions of industry sectors (6.6%) in the explained component and the years of experience (83.4%) in the unexplained component are the main factors contributing to the wage gap. (5) For the

**Table 4.8** Decomposition results of gender wage gap in collectively owned enterprises (COEs)

	Values		Percentage	
	Explained	Unexplained	Explained (%)	Unexplained (%)
【2002】				
Total	0.055	0.052	51.6	48.4
Education	0.004	−0.193	4.1	−179.8
Experience	0.014	0.485	12.6	451.4
Health	−0.001	0.064	−1.3	59.1
Ethnic	0.004	0.311	3.8	289.3
Occupation	0.035	−0.053	32.7	−49.7
Industry	0.002	0.008	2.3	7.5
Region	−0.003	−0.088	−2.6	−82.2
Constants	0.000	−0.480	0.0	−447.3
【2013】				
Total	−0.025	0.294	−9.3	109.3
Education	−0.011	−0.046	−4.0	−17.1
Experience	−0.017	−0.178	−6.2	−66.3
Health	0.000	0.047	0.1	17.6
Ethnic	0.000	−0.166	−0.1	−61.9
Occupation	0.005	−0.204	2.0	−75.8
Industry	−0.004	0.133	−1.6	49.6
Region	0.001	−0.075	0.5	−28.0
Constants	0.000	0.782	0.0	291.1

Source Calculated based on CHIPs2002 and CHIPs2013  
Note Decomposition based on the Blinder-Oaxaca decomposition model

self-employed sector, the gender gap of the proportions of industry sectors (12.4%) in the explained component and occupation (167.8%) as well as education (95.3%) in the unexplained component are the main factors. This indicates that discrimination against female workers even exists within a group with the same educational attainment level and the same occupation, and the influence of these discriminations is greater for the self-employed sector than for other ownership sectors.

### 4.7 Conclusions

Using data of the Chinese Household Income Project surveys (CHIPs) conducted in 2003 and 2014 (CHIPs 2002 and CHIPs 2013), this study explores the determinants of gender wage gaps of five kinds of ownership sectors—government organizations, state-owned enterprises (SOEs), collectively owned enterprises (COEs), privately

**Table 4.9** Decomposition results of gender wage gap in privately owned enterprises (POEs)

	Values		Percentage	
	Explained	Unexplained	Explained (%)	Unexplained (%)
<b>[2002]</b>				
Total	0.093	0.083	53.0	47.0
Education	−0.005	0.018	−2.7	10.4
Experience	0.069	0.123	39.2	70.1
Health	−0.001	−0.028	−0.3	−15.9
Ethnic	0.000	0.036	−0.1	20.7
Occupation	0.024	0.199	13.4	113.1
Industry	0.004	0.028	2.0	15.9
Region	0.003	−0.009	1.6	−5.0
Constants	0.000	−0.286	0.0	−162.2
<b>[2013]</b>				
Total	0.020	0.217	8.5	91.5
Education	−0.004	0.014	−1.8	5.9
Experience	0.014	0.198	6.1	83.4
Health	−0.003	−0.132	−1.1	−55.5
Ethnic	0.000	0.113	0.2	47.5
Occupation	−0.004	−0.089	−1.7	−37.5
Industry	0.016	0.003	6.6	1.3
Region	0.001	0.021	0.2	8.7
Constants	0.000	0.090	0.0	37.7

Source Calculated based on CHIPs2002 and CHIPs2013

Note Decomposition based on the Blinder-Oaxaca decomposition model

owned enterprises (POEs), and the self-employed sector—from 2002 to 2013 in urban China. A decomposition analysis of the gender wage gap is employed. Several major conclusions emerge.

First, the gender wage gap exists. When all factors including the human capital factor and ownership dummy variables are held constant, the gender wage gap persisted in both 2002 and 2013, and the gender wage gap expanded from 2002 to 2013.

Second, both the gender differences of human capital and discrimination against female workers contribute to the gender wage gap; the influence of the unexplained part (e.g., discrimination against female workers) increased in each ownership sector from 2002 to 2013. The range of increase of the influence of the unexplained part is greater for firms in the public sector than for those in the private sector.

Third, the influence (contribution rate) of factors on the gender wage gap differs by ownership sectors. Concretely, (1) years of work experience in the explained component and work experience years in the unexplained component are the main

**Table 4.10** Decomposition results of gender wage gap in self-employed sector

	Values		Percentage	
	Explained	Unexplained	Explained (%)	Unexplained (%)
<b>[2002]</b>				
Total	0.098	0.194	33.6	66.4
Education	0.009	0.031	3.2	10.8
Experience	0.005	−0.365	1.8	−124.9
Health	0.004	0.001	1.3	0.2
Ethnic	−0.001	0.070	−0.4	24.0
Occupation	0.011	0.663	3.8	227.0
Industry	0.056	−0.251	19.3	−86.1
Region	0.013	−0.067	4.6	−22.9
Constants	0.000	0.112	0.0	38.4
<b>[2013]</b>				
Total	0.086	0.288	23.0	77.0
Education	0.013	0.357	3.4	95.3
Experience	0.006	0.309	1.6	82.5
Health	0.004	0.003	1.1	0.7
Ethnic	0.000	−0.112	0.0	−30.0
Occupation	0.011	0.629	3.0	167.8
Industry	0.046	0.197	12.4	52.7
Region	0.006	−0.014	1.5	−3.8
Constants	0.000	−1.080	0.0	−288.2

Source Calculated based on CHIPs2002 and CHIPs2013.

Note Decomposition based on the Blinder-Oaxaca decomposition model

factors for government organizations; (2) industry sector in the explained component and ethnicity and health status in the unexplained component are the main factors for SOEs; (3) occupation in the explained component and industry in the unexplained component are the main factors for COEs; (4) industry in the explained component and the years of experience in the unexplained component are the main factors for POEs; (5) industry sector in the explained component and the occupation as well as education in the unexplained component are the main factors for the self-employed sector.

These findings indicate that as market-oriented economy reforms progress, the problem of discrimination against female worker is becoming severe, particularly for SOEs and COEs in the public sector. In order to reduce the gender wage gap, employment equality laws and an equal pay for equal work policy should be implemented and enforced by the Chinese government.

## Notes

1. Based on the classification that is utilized in most of the previous studies, in this study, the period from 1949 to 1977 is called “the planned economy period,” in which the Chinese government tried to establish a management economy system based on the Soviet Union’s socialist nation management model, and the period after 1978 is called “the market-oriented reform period.”
2. Based on data of the third CFSSS, the female labor participation rate decreased from 87.1% in 1990 to 60.8% in 2010.
3. Although Reimers (1983), Cotton (1988), Neumark (1988), Oaxaca and Ransom (1994), and Fortin (2008) argued that there is an “index number” problem in the basic Blinder-Oaxaca decomposition model, the classifications of the unexplained component and the unexplained component in these studies are similar to those of Blinder (1973) and Oaxaca (1973). Two decompositions based on Eqs. (4.2.1) and (4.2.2) are employed, and these results are almost identical. Thus, only the results based on Eq. (4.2.1) are shown in this chapter.
4. In order to simplify the expression of equations following, all constant items are omitted.
5. In the public sector, the legal retirement age is 50 for female workers (blue collar workers), 55 for female cadres (white collar workers), and 60 for male workers and male cadres.
6. That variable values are not in the range of “mean value  $\pm$  three times S.D.” is defined as an abnormal value here.
7. In CHIPs 2002, the sample of workers in foreign-owned enterprises is relatively smaller and cannot be analyzed in the decomposition analysis; workers in privately owned enterprises or foreign-owned enterprises are combined into one group.
8. Years of experience = age-6-years of schooling.
9. The number of industry categories is 16 in CHIPs 2002, and 50 in CHIPs 2013.

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