Decomposing the Gender Pension Gap in China [*]

Weixin He
weixin.he@duke.edu

Xin Lin
xin.lin053@duke.edu

April 29, 2022

Abstract

This paper studies the determinants of gender pension gap in China, using data from from the China Health and Retirement Longitudinal Study (CHARLS) of 2013 wave and CHARLS Life History Survey of 2014. The Blinder-Oaxaca decomposition shows that of the gender difference in occupational pension income after retirement, the total years of work in pension-eligible sectors explains 0.09 percent of the gender gap. Results also show that the logarithm of average wage before retirement, age, types of pension, and not attending college all reduce the gender difference in pension benefits.

1   Introduction

It has long been observed that men and women received different amount of pension in China. The 2013 wave of China Health and Retirement Longitudinal Study (CHARLS) shows that, on average, the retired women receive 1,800 CNY pension per month while men receive 2302.2 CYN. This coincides with the large gender gap in labor participation and wages found in China.

There are five pension systems in China, including the public sector pension, firm workers pension, urban resident pension, new rural resident pension, and the unified urban and rural resident pension. The first two are occupation pension systems and the others are resident pension system. The occupational system covers those employed by public sectors or firms while the residence pension system covers the unemployed or self-employed residence. For the occupation pension system, the public sector pension are for civil servants and workers government-funded institutions while the firm workers pension are for employees in non-government-funded firms.

The two occupational systems would be pension systems that are considered in this paper. The amount of pension received in these two system are determined by the total years of work, the retirement age, and wages. For the public sector pension system, before retirement, each month, the employer (public sector) will pay 16% of the worker's salary into the pension account and the worker himself will pay 8%. In contrast, for the firm worker pension system, the worker will pay 16% of the average of workers salary and the local average wages, and the worker himself pay 8% of that

---

average. Therefore, different pension program may lead to different pension income. Generally the public pension system is more favorable to the employee since the employer directly pay proportion of the worker's salary, rather than an average of the worker's salary and the local average wages.

After retirement, for both system, the worker will receive monthly pension based on the age that he retires, his total working years, and the amount that he paid for the pension insurance. The later that he retires, or the longer that he works, or the more that he paid, the more pension that he will receive.

The statutory retirement age was set at 60 for men, 50 for blue-collar women workers, and 55 for whitecollar women. These retirement ages remain effective until 2022. To receive pension, a worker has to provide at least fifteen years of service. This requirement will naturally make women earn less working years, together with the observation that women are less enrolled in the public sector pension, may contribute to the gender gap in pension income. Other factor such as gender wage gap may also contribute to the gender pension gap.

To understand how much of the gender pension gap can be explained by those factors, this study will adapt the Blinder-Oaxaca decomposition to decompose the pension difference between gender, Using the 2013 wave of China Health and Retirement Longitudinal Study (CHARLS) and the CHARLS Life History Survey.

The rest of this paper is organized as follows. Section 2 reviews some literature discussing the gender differences in pension income. Section 3 specifies the empirical methods used to analyze the gender gap in pension income. Section 4 describes the data and provides summary statistics. Section 5 presents and interprets the results. Section 6 concludes and discusses some limitations of our studies.

2   Literature Review

Much previous literature has shown that the economic situation in later life is determined by an interplay of individual and institutional factors, and the contributory characteristics of the pension system reproduces the labor market inequalities of both genders Möhring (2015); Vara (2013). In China, there are five different pension programs co-exist in the system and offer different options of pension after retirement. Specifically, the two occupational pension programs (Public Sector Pension and Firm Workers Pension) determine pensions based on employment history, so they might reproduce the labor market inequalities between men and women in retirement benefits. However, the other residential pension programs make 60-year-old-and-above elders immediately eligible for a basic pension benefit without ever contributing. Zhao and Zhao (2018) have shown that about three quarters of gender pension gap can be

explained by the difference in the type of pension program they enroll.

For those who enrolling the occupational pension programs (Public Sector Pension and Firm Workers Pension), their retirement income is primarily determined by their employers' and their own contributions. The government requires employees to contribute 8% of their salary to the system, and their employers are required to contribute 16%. Hence, the gender wage gap would lead to the gender pension gap. There is abundant research documenting the gender difference in labor force participation, employment sectors, and earnings (Blau & Kahn, 2017; Killingsworth & Heckman, 1986; Kunze, 2008). Also, Zhang, Hannum, and Wang (2008) has shown that women are significantly disadvantaged by various measures of human capital, and the gender earning gaps is also substantial in Chinese labor market. Therefore, in addition to enrollment in different pension program, our study will analyze how earnings before retirement would affect the gender pension gap.

The career length might also affect the pension income indirectly through earnings (Zhang et al., 2008) and directly because of the contributory attributes of the occupational pension programs in China. Some literature has examined the effect of retirement age on pensions and shown that women are more likely to be laid off than men to take on family responsibilities such as caring for grandchildren (Mao, Connelly, & Chen, 2018). Furthermore, Chen and Turner (2015) has analyzed the public sector pension in China and shown that the gender pension difference in the public sector is primarily due to that males generally have longer working career and higher wages as a result of their longer careers. Chinese government has different rules on the retirement age for men and women. Women are required to retire at the age of 55, and men are required to retire at the age of 60, though firms have an option of re-hiring. Therefore, we will further examine whether the length of labor force participation lead to the gender differences in pension income.

3   Empirical Strategy

In this paper, we adapt the Blinder-Oaxaca decomposition (Blinder, 1973; Oaxaca, 1973) to analyze the gender differentials in pension incomes. This decomposition method has been widely used as a useful tool to study racial and gender discrimination in the field of labor economics, and it will help us decompose the difference in pension between two gender groups into explainable part caused by individual characteristic difference and explainable part caused by characteristic return difference. Thus we can attribute the explainable part to discrimination.

Here explains how the Blinder-Oaxaca decomposition works in explaining the difference in pension income between men and women. Firstly, we estimate the OLS mul-

tiple regression models of the factors that affect pension income for men and women separately, as specified below:

$$lnY_F = \boldsymbol{X_F'}\boldsymbol{\beta_F} + \epsilon_F$$
$$lnY_M = \boldsymbol{X_M'}\boldsymbol{\beta_M} + \epsilon_M$$

In the OLS regression specified above, lnY is the nature logarithm of pension income, and $\boldsymbol{X}$ includes the individual characteristics, demographic, geographic fixed effects, as well as income before retirement, total years of work, and the type of pension system the individual enrolled in. Next, we evaluate the equation at the mean values of the independent variables $\bar{\boldsymbol{X}}$:

$$ln\bar{Y}_F = \bar{\boldsymbol{X}}_{\boldsymbol{F}}'\hat{\boldsymbol{\beta}}_{\boldsymbol{F}}$$
$$ln\bar{Y}_M = \bar{\boldsymbol{X}}_{\boldsymbol{M}}'\hat{\boldsymbol{\beta}}_{\boldsymbol{M}}$$

Therefore, $\bar{Y}_M$ and $\bar{Y}_F$ are the mean pension income for men and women, and the gender gap in pension income is specified as follows:

$$\Delta ln\bar{Y} = ln\bar{Y}_F - ln\bar{Y}_M = \bar{\boldsymbol{X}}_{\boldsymbol{F}}'\hat{\boldsymbol{\beta}}_{\boldsymbol{F}} - \bar{\boldsymbol{X}}_{\boldsymbol{M}}'\hat{\boldsymbol{\beta}}_{\boldsymbol{M}}$$

We estimate a two-fold Blinder-Oaxaca decomposition and decomposes the mean pension difference with respect to a vector of reference coefficients $\hat{\boldsymbol{\beta}}_{\boldsymbol{R}}$, which is interpreted to be non-discriminatory:

$$\Delta ln\bar{Y} = (\bar{\boldsymbol{X}}_{\boldsymbol{F}} - \bar{\boldsymbol{X}}_{\boldsymbol{M}})'\hat{\boldsymbol{\beta}}_{\boldsymbol{R}} + \bar{\boldsymbol{X}}_{\boldsymbol{F}}'(\hat{\boldsymbol{\beta}}_{\boldsymbol{F}} - \hat{\boldsymbol{\beta}}_{\boldsymbol{R}}) + \bar{\boldsymbol{X}}_{\boldsymbol{M}}'(\hat{\boldsymbol{\beta}}_{\boldsymbol{R}} - \hat{\boldsymbol{\beta}}_{\boldsymbol{M}}) \tag{1}$$

The decomposition then divides the gender gap in mean pension income into two parts: explainable and explainable. The first term in the right side of the equation is the explainable part, which is explained by the cross-group differences in the independent variables in our OLS regressions. The second and the third term in the right side of the equation is the explainable part, which remains unexplained by these differences, and it might be caused solely by gender and attributed to the gender discrimination.

The choice of reference group is arbitrary, so we can either treat the males or females as reference. If we treat the observed pension income of males as the non-discriminatory pension, then the gender gap can be decomposed into the following:

$$\Delta ln\bar{Y} = (\bar{\boldsymbol{X}}_{\boldsymbol{F}} - \bar{\boldsymbol{X}}_{\boldsymbol{M}})'\hat{\boldsymbol{\beta}}_{\boldsymbol{M}} + \bar{\boldsymbol{X}}_{\boldsymbol{F}}'(\hat{\boldsymbol{\beta}}_{\boldsymbol{F}} - \hat{\boldsymbol{\beta}}_{\boldsymbol{M}})$$

Alternatively, if we treat the observed pension income of females as the non-discriminatory

pension, then the gender gap can be decomposed into the following:

$$\Delta ln\bar{Y} = (\bar{X}_F - \bar{X}_M)'\hat{\beta}_F + \bar{X}_M'(\hat{\beta}_F - \hat{\beta}_M)$$

In the two equations above, the first term in the right side of both equations represents the pension difference caused by difference in the individual characteristics controlled in our regressions, that is, the pension difference in the absence of gender discrimination. The second term in the right side of both equations represents the difference in pension income caused by the difference in pension structure between men and women, that is, the difference in pension between men and women with and without discrimination, i.e. pension differentials due to discrimination.

Clearly, different options of reference might result in different decomposition estimates; therefore, we adopt the method used by Cotton (1988) and weight the coefficients by the proportion of observations in the corresponding gender group:

$$\hat{\beta}_R = \frac{n_F}{n_M + n_F}\hat{\beta}_F + \frac{n_M}{n_M + n_F}\hat{\beta}_M$$

In addition, there might be a problem of omitted variables bias in our estimation, which would misplace some of the unexplained part into the explained part of the gap. In order to deal with the problem of OVB, we also adopt Jann (2008)'s method of Blinder-Oaxaca decomposition to analyze the gender pension gap. According to Jann (2008), we estimate a pooled regression over both gender groups but controlling group membership using a dummy variable: $Male$, as following:

$$lnY = X'\beta + \delta \times Male + \epsilon \tag{2}$$

In the pooled OLS regression specified above, X still includes the individual characteristics, demographic, geographic fixed effects, as well as income before retirement, total years of work, and the type of pension system the individual enrolled in. The coefficient effect or unexplained part of the difference is represented by $\hat{\delta}$, which is the coefficient on $Male$ in the polled regression now. Consequently, by observing the change of $\hat{\delta}$ as we add more and more variables in X, we can know how much proportion of the gender gap that each variable is able to explain.

4   Data and Descriptive Statistics

Data source.   Our data comes from the 2013 wave of China Health and Retirement Longitudinal Study (CHARLS) the CHARLS Life History Survey conducted on the same respondent. CHARLS is a notionally longitudinal survey collected by the Insti-

tute of Social Science Surveys of Peking University. This survey has been conducted since 2011. We use the 2013 wave of CHARLS because only in this year that the respondents' working history are also provided. The 2013 wave of the CHARLS survey provides information about pension income, demographic information, individual characteristics, including education, and the type of Hukou. Information about working history such as total years of eligible work and monthly income in the middle of all previous job are provided in the CHARLS Life History Survey.

These two survey covered 18,613 respondents. We restrict our sample to people that are already retired and started receiving pensions. We also restrict our sample to those who enrolled in the occupation pension system but not other pension system because the wage history information are only available for working group. This results in a sample of 1,049 respondents, with 467 women and 582 men.

Included variables. In this study, we include the total years of work, the average monthly income in the middle of all previous jobs, age, highest degree attained, and whether living in the urban area, pension program, and gender as the determinant of pension income. As discussed in the Introduction, the amount of occupational pension is directly affected by the type of pension program, the total years of work, and the wage history, therefore we include them into this study. Since the consumption level varies across provinces and is different in the urban and rural area, therefore we control these geographic characteristics. For the age variable, since our sample restricted to those retired, so age in this model does not measures experience level, instead, it is used for controlling the cohort differences in the pension income. We also include the education level as a measure of human capital that could possibly affect the wage and the length of employment. Last, for the variable hukou, it is a governmental household registration system, which identifies a person as a permanent resident of an area. Since back to 1980s to 2000s in China, whether a person owns an agricultural hukou or non-agricultural hukou could possibly affect the wage and the type of occupation, therefore we take it into consideration.

Summary statistics. Among the sample, respondents on average receive 2078.6 CNY pension every month. The average working years is 31.0 and the average monthly payment in the middle of all previous job is 112.6 CNY. Notice that this is much lower compared to the current average salary of workers because of inflation. However, since the pension income will also increase according to the inflation level, so this is not an issue that need to be consider in this paper. The average age in our sample is 65.3, and 83.3 of them living in the urban area while 16.7 of them living in the rural area. 32.9 percent of our sample enrolled in the public sector pension system and 67.1 of them are in the firm worker pension system. Table 1 also provides the percentage

of the highest education degree in our sample.

Summary statistics for both gender are also provided. In terms of working years, men on average work 32.9 years before retirement while women work 28.4 years. This different this may be because statutory retirement age for women is younger or women are more likely to be laid off during their workable age. The lifetime average monthly wage for men is 127.5 while 94 by men. This gap is consistent with previous studies that verify the existence of gender gap in wages. Table 1 also shows there exists substantial difference in terms of the program enrollment. 41.9 percent of men enroll in the public sector pension system while only 21.8 percent of women enroll in it.

Table 1: Summary Statistics

	All	Women	Men
Average monthly pension (CNY)	2078.6	1800	2302.2
Total years of work	31.0	28.4	32.9
Lifetime average monthly wage (CNY)	112.6	94	127.5
Age	65.3	61.8	68.2
Pension system (%)			
Public sector pension	32.9	21.8	41.8
Firm worker pension	67.1	78.2	58.2
Education (%)			
Illiterate	5.5	6.2	5
Elementary school	29.6	23.3	34.7
Middle school	31.3	33.2	29.7
High school	13.6	19.9	8.6
College	7.1	6.9	7.2
Urban	83.3	96.6	72.7
Rural	16.7	3.4	27.3
Observations	1049	467	582

Gender gap in pension. From Table 1, we can see that the mean monthly pension income for Women is 1,800 CNY for women while 2302.2 CNY for men. Clearly there is a gender gap in the mean of pension. To illusrate the gender difference more detailedly, we plot the distribution of monthtly pension income for women and men separately in Figure 1. It shows that the distribution of pension for women is more right-skew and the distribution for men is less right-skew, indicating the existence of gender difference in pension income and men, compared to women, generally receive higher pension. To understand what contributes to such a gender gap, we applied the empirical strategy in Section 3 and the results are shown in Section 5 below.
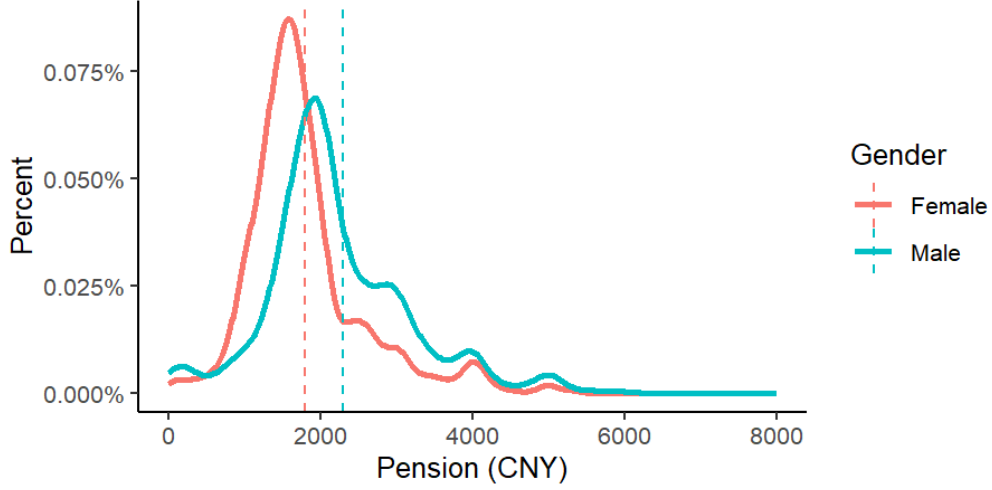
Figure 1: Distribution of Pension

5   Results

As specified in the empirical strategy section, we will use the weighted two-fold Blinder-Oaxaca decomposition method to investigate the causes of the gender pension gap - the difference in pension income between females and males. We run two OLS multiple regressions of pension income for women and men separately. Table 2 presents the OLS regression results, respectively. Column (1) shows the effect of explanatory variables on the pension income for women, and column (2) shows the effect of explanatory variables on the pension income for men. Due to missing life-history information in our data set, we reduced the sample size used in these regression analyses by 1049 people. In line with Equation (1), we generate a reference coefficients using an average of women group and men group coefficients weighted by the number of observations in the two groups, following (Cotton, 1988).

From the results of OLS, we can find that the average wage in pension-eligible sectors before retirement promotes the pension income for both men and women. For women, a one percent increase in the average wage before retirement increases the pension benefit by 5.98 percent; for men, one percent increase in the average wage before retirement increases the pension benefit by 7.15 percent. However, our results indicate that total years of work in pension-eligible sectors have different effects on women and men. For women, one year increase in labor participation length decreases the pension benefit by 0.67 percent; for men, one year increase in labor participation length increases the pension benefit by 0.26 percent, which suggests that it would be of better interest for men to work a longer year or to be rehired after retirement. Still, women might want not to retire just after 55 (government-required retirement age). Living in urban areas is similar to both men's and women's pension income. Living in

Table 2: Weighted Two-fold Blinder-Oaxaca decomposition

	Estimated Coefficients (standard error)			Mean Values		
	(1) Women	(2) Men	(3) Weighted Reference	(4) Women	(5) Men	(6) Difference
(Intercept)	7.0791*** (0.2795)	6.7887*** (0.03234)	6.9180			
Total years of work in pension-eligible sectors	-0.0067** (0.0023)	0.0026 (0.0024)	-0.0015	2.61	3.22	-0.61
Logarithm of average wage in pension-eligible sectors	0.0598** (0.0209)	0.0715** (0.0219)	0.0663	3.94	4.10	-0.16
Age	0.0053 (0.0030)	0.0102** (0.0385)	0.0080	61.83	68.16	-6.33
Live in an urban area	0.1563 (0.1209)	0.1752** (0.0557)	0.1668	0.97	0.73	0.24
Have an agriculture Hukou	-0.5818*** (0.1000)	-0.6595*** (0.0732)	-0.6249	0.05	0.13	-0.08
Enrolled in the public pension program	0.1171* (0.0522)	0.0034 (0.0523)	0.0540	0.22	0.42	-0.20
Education (Base: College)				0.07	0.07	-0.00
Illiterate	-0.0370 (0.0876)	-0.1145 (0.1142)	-0.0799	0.06	0.05	0.01
Elementary school	-0.4928*** (0.0858)	-0.3759*** (0.0994)	-0.4279	0.30	0.40	-0.10
Middle school	-0.4387*** (0.0826)	-0.2738** (0.0999)	-0.3472	0.33	0.30	0.03
High School	-0.3909*** (0.0874)	-0.1771 (0.1201)	-0.2723	0.20	0.09	0.11
Vocational School	-0.0103 (0.0938)	-0.0197 (0.1069)	-0.0155	0.11	0.15	-0.04
Province FE	Yes	Yes	Yes			
Observations	467	582				
Adjusted R-squared	0.3093	0.2556				

Notes: ***, **, * denote statistical significance at the 1, 5, and 10 percent levels, respectively.

an urban area would promote women's average pension by 15.63 percent and men's by 17.52 percent. Having an agriculture Hukou would decrease women's average pension by 58.18 percent and men's by 65.95 percent. Also, the effects of enrolling in the public pension program on the amount of pension income received by women and men are very different in scale. Registering the public pension would boost women's pension income by 11.71 percent, but it only increases men's pension income by 0.34 percent. Lastly, the effects of receiving education on the amount of pension income received by women and men are aligning. Not attending college would decrease both men's and women's average pension income.

Because sample means are also used in the Blinder-Oaxaca decomposition method, we also report sample mean values of explanatory variables by gender as shown in Table 2, column (4) and (5), and their difference in column (6). The differences in the sample mean values of explanatory variables reveal the expected patterns: women have shorter labor participation years and earn far less income than men before retirement. Notice that the women's sample average monthly wage before retirement is about 16 percent, or 502 CYN, lower than the men's. Therefore, we expect the difference in average monthly wage before retirement to be the main reason of the gender pension gap in retirement pension income between men and women. In addition to income, from the sample mean value of enrollment in the public pension program, we notice that women are underrepresented in the public sectors with higher pay and benefits, thus not enrolling in the public pension program. Our sample indicates that more men than women work in the public sector and enroll in the public pension program - 42 percent versus 22 percent. This might also explain why women receive lower pension income on average than men. We skip the discussion of gender differences in age, education as they are similar to those reported in the summary statistics as shown in Table 1.

All the characteristics in which women have disadvantages can raise the probability of receiving an occupational pension. Next, we can plug coefficients and sample mean values in Table 2 into Equation (1) to demonstrate these correlations and decompose their effects on the gender pension gap. Accordingly, gender difference in pension income can be decomposed into two parts: explained and unexplained. The explained is the portion that can be explained by cross-group differences in the explanatory variables, and the unexplained is the remaining part that is explainable by differences in the explanatory variables we include in our OLS regressions. It may result from the influence of unobserved variables, the omitted variable bias, or it may be attributed to gender discrimination.

Table 3: Weighted Two-fold Blinder-Oaxaca decomposition

| | Proportion of Gap (percent) | | | |
	Explained	Unexplained	Unexplained Women	Unexplained Men
Total years of work	0.09	-2.69	-1.35	-1.34
Logarithm of average wage	-1.07	-4.68	-2.55	-2.13
Age	-5.08	-32.04	-17.00	-15.04
Geographic location (urban or rural)	3.99	-1.62	-1.01	-0.61
Current Hukou type	4.71	0.68	0.23	0.45
Types of pension	-1.08	3.49	1.38	2.11
Education (Base: College)				
Illiterate	-0.10	0.44	0.27	0.17
Elementary school	-4.34	-3.98	-1.92	-2.06
Middle School	-1.20	-5.22	-3.04	-2.18
High School	-3.08	-3.18	-2.36	-0.82
Vocational School	0.07	0.12	0.05	0.07

The decomposition results are presented in Table 3. Overall, only a very small percent of the gender gap in pension income is explained by the gender difference in observed characteristics (available in our data set). There are some characteristics that exaggerate the gender gap, while some characteristics help reduce the gender gap in pension income between women and men. Of the gender difference in occupational pension income after retirement, the total years of work in pension-eligible sectors explains 0.09 percent of the gender gap, the geographic location (living in urban area) and current Hukou type (have an agriculture Hukou) explain 3.99 percent and 4.71 percent of gender gap in pension income respectively. However, the logarithm of average wage before retirement, age, types of pension, and not attending college all reduce the gender difference in pension benefits. It suggests that if women earn a higher income before they retire or attend college, their pension benefits would be greater compared to the men's.

The unexplained portion can either be attributable to discrimination or the influence of unobserved variables not included in our OLS regressions. Therefore, to deal with the omitted variable bias, we are going to adopt Jann (2008)'s Oaxaca-Blinder decomposition method by estimating Equation (2) in the pooled regression. By observing the change of δ as we add more and more variables in X, we can roughly know how many proportions of the gender gap each variable is able to explain.

Table 4: Decomposition of Gender Pension Gap

	Estimated Coefficients (standard error)							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(Intercept)	7.3967*** (0.0272)	7.3993*** (0.0277)	7.0089*** (0.0679)	6.1336*** (0.1984)	5.9108*** (0.1972)	6.2310*** (0.1869)	6.3633*** (0.1877)	6.734*** (0.2028)
Male	0.1807*** (0.0365)	0.1813*** (0.0366)	0.1661*** (0.0360)	0.0832* (0.0398)	0.1684*** (0.0410)	0.1962*** (0.0385)	0.1895*** (0.0382)	0.1950*** (0.0373)
Total years of work in pension-eligible sectors		-0.0010 (0.0019)	-0.0026 (0.0019)	-0.0005 (0.0019)	-0.0002 (0.0019)	0.0006 (0.0018)	-0.0004 (0.0018)	-0.0007 (0.0017)
Logarithm of average wage in pension-eligible sectors			0.1001*** (0.0159)	0.1303*** (0.0170)	0.1138*** (0.0169)	0.0930*** (0.0159)	0.0835*** (0.0159)	0.0697*** (0.0155)
Age				0.0121*** (0.0026)	0.0116*** (0.0025)	0.0106*** (0.0024)	0.0080*** (0.0024)	0.0087*** (0.0025)
Live in an urban area					0.3321*** (0.0495)	0.1893*** (0.0480)	0.2180*** (0.0480)	0.1803*** (0.0467)
Have an agricultural Hukou						-0.6950*** (0.0582)	-0.7006*** (0.0577)	-0.6346*** (0.0565)
Enrolled in the public pension program							0.1603*** (0.0365)	0.0439 (0.0375)
Education (Base: College)								
Illiterate								-0.0817 (0.0732)
Elementary school								-0.4202*** (0.0676)
Middle school								-0.3397*** (0.0667)
High School								-0.2847*** (0.0743)
Vocational School								-0.0180*** (0.0732)
Province FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1049							
Adjusted R-squared	0.0219	0.0212	0.0559	0.0745	0.1119	0.2182	0.2316	0.2850

Notes: ***, **, * denote statistical significance at the 1, 5, and 10 percent levels, respectively.

The new decomposition results are presented in Table 4. We can focus on the coefficient on $Male$ to determine the explained portion of the gender pension gap for each explanatory variable. Of the gender difference in occupational pension income after retirement, the total years of work in pension-eligible sectors, live in an urban area, have an agriculture Hukou all help explain the gender difference in pension income.

In adddition, we run the quantile regression using variables as in regression (8) in Table 4, ranging from 0.10 to 0.90 for log of pension. Figure 2 illustrates plots the coeffcient of the variable *male, lifetime average wage* and *total years of work*. Confidence interval (shaded area) are at the 5 percent condidence interval.

Gender

Lifetime average wage

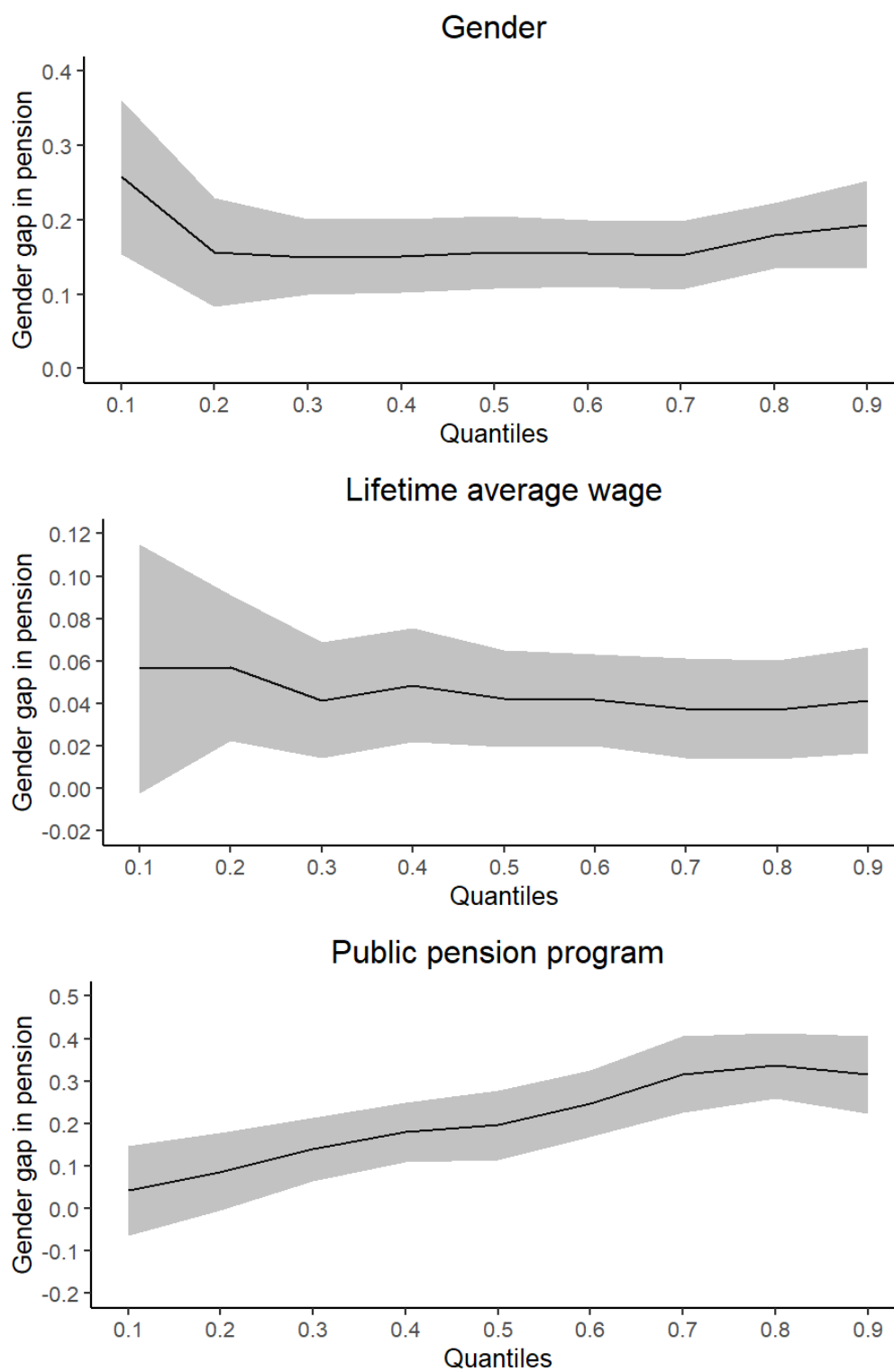
Public pension program

Figure 2: Percentiles of the Gender Gap in Pension Explained by Each Determinant

Figure 2 shows that the remaining gender pension gap is largest at the 10th and 90th percentile, indicating that possible gender discrimination is more severe in groups with extremely high or extremely low pension income. It also shows that the part explained by lifetime average wage stays stable at all quantile of pension. For the part explained by the type of pension pograme, it keeps increasing as the quantile increases. This indicates that the public pension program is more beneficial compared to the firm worker pension programe when it is at a higher pension quantile.

6   Conclusions

Empirical evidence suggests that there exists a gender gap in pension income in China. Using data from the China Health and Retirement Longitudinal Study (CHARLS) of 2013 wave and CHARLS Life History Survey of 2014, this study decomposes the determinants of pension income. Results shows that of the gender difference in occupational pension income after retirement, the total years of work in pension-eligible sectors explains 0.09 percent of the gender gap, the geographic location (living in urban area) and current Hukou type (have an agriculture Hukou) explain 3.99 percent and 4.71 percent of gender gap in pension income respectively. However, the logarithm of average wage before retirement, age, types of pension, and not attending college all reduce the gender difference in pension benefits.

The occupational pension system only covers a small fraction of Chinese population. Future research could extend this topic by analysing the determinants of the gender pension gap in the residence pension system. We also understand that our results might have selection problem, future research could apply the Heckman selection model if there are datasets that contains information that exogenous determines the enrollment in the pension system.

References

Blau, F. D., & Kahn, L. M. (2017). The gender wage gap: Extent, trends, and explanations. *Journal of economic literature*, *55*(3), 789–865.

Blinder, A. S. (1973). Wage discrimination: Reduced form and structural estimates. *The Journal of Human Resources*, *8*(4), 436–455. Retrieved 2022-04-25, from `http://www.jstor.org/stable/144855`

Chen, T., & Turner, J. A. (2015). Gender and public pensions in china: Do pensions reduce the gender gap in compensation? *Sustainability*, *7*(2), 1355–1369.

Cotton, J. (1988). On the decomposition of wage differentials. *The review of economics and statistics*, 236–243.

Jann, B. (2008). The blinder–oaxaca decomposition for linear regression models. *The Stata Journal*, *8*(4), 453–479.

Killingsworth, M. R., & Heckman, J. J. (1986). Female labor supply: A survey. *Handbook of labor economics*, *1*, 103–204.

Kunze, A. (2008). Gender wage gap studies: consistency and decomposition. *Empirical Economics*, *35*(1), 63–76.

Mao, S., Connelly, R., & Chen, X. (2018). Stuck in the middle: Off-farm employment and caregiving among middle-aged rural chinese. *Feminist Economics*, *24*(2), 100–121.

Möhring, K. (2015). Employment histories and pension incomes in europe: A multilevel analysis of the role of institutional factors. *European Societies*, *17*(1), 3–26.

Oaxaca, R. (1973). Male-female wage differentials in urban labor markets. *International Economic Review*, *14*(3), 693–709. Retrieved 2022-04-25, from `http://www.jstor.org/stable/2525981`

Vara, M. J. (2013). Gender inequality in the spanish public pension system. *Feminist Economics*, *19*(4), 136–159.

Zhang, Y., Hannum, E., & Wang, M. (2008). Gender-based employment and income differences in urban china: Considering the contributions of marriage and parenthood. *Social Forces*, *86*(4), 1529–1560.

Zhao, R., & Zhao, Y. (2018). The gender pension gap in china. *Feminist economics*, *24*(2), 218–239.