How Does the Gender Wage Gap Change with Market Transition in Urban China?

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Abstract

Becker's taste-based discrimination theory claims that in a perfect competitive market environment, discrimination is costly to employers and will not persist in long run. However, the empirical research in this paper indicates that the gender income gap in urban China is wider than it was before. Furthermore, growth in the gender income gap is due to discrimination. The pooled OLS regression data show that international trade and privatization have no casual effect on discrimination.

Keywords: Gender Discrimination, International Trade, Privatization, Income Gap

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For the past 30 years, China has experienced significant economic development. Since economic "reform and opening up" was implemented in the late 1970s, the economic system has moved gradually from a centrally planned economy to a market oriented one. The reform initially targeted the agriculture sector and then expanded into the fields of ownership, price liberalization, international trade, and investment. Furthermore, the country's exports accelerated after China joined the WTO in 2001 and became the world's factory. Because of these consecutive successes in economic reform, China's nominal GDP boosted from USD$154.98 billion in 1987 to USD$10.35 trillion US in 2015, and it ranks as the second largest economy in the world (World Bank). Along with economic transition, China's demographics have also changed significantly. Millions of migrants have relocated to urban areas: the urban percentage of the total population increased from 20.9% in 1982 to 56.1% in 2015 (China Statistic Year Book, 2015). In addition, the gender ratio has also increased significantly from 1.04 in 1976 to 1.18 in 2010 (China Statistic Year Book, 2011).

China's fast economic transition may influence society in various aspects. In Confucian China, male chauvinism is favored through guanxi, a word that literally means connections or relationships and originates from Confucianism. Guanxi emphasizes the importance of associating oneself with others in a hierarchical manner to maintain both social and economic order (Wikipedia, 2016). The man who can more easily broaden his social networks through guanxi than a woman may benefit economically in the long run. Thus, we would expect that the income distribution between males and females would change and take on a certain pattern with economic development and demographic shifts. It is therefore meaningful for us to investigate how the gender income gap and discrimination against women have changed in the past decade.

This paper will analyze how the income gap between males and females in urban China changed along with the economic transition of the 1990s and 2000s. The emphasis will be on decomposing gender income differentials to see whether discrimination against female can explain a larger portion of the changes in wage levels across gender. Finally, a regression model will illustrate whether international trade and the privatization process have a causal effect on the shift in the discrimination situation.

Literature Review

There are many previous studies on the income gap between males and females; however, the conclusions of these studies are not always consistent. In Becker's (1971) work on discrimination, employers have a certain "taste" for discrimination and require a premium to interact with individuals belonging to a certain group, such as women. Therefore, in a perfect competitive market environment, discrimination is costly to employers and will not persist in the long run. That is to say, Becker's work implied that increased competition, such as that resulting from China's "reform and opening up" policy, would eliminate discrimination against women (Becker, 1971). This discrimination theory has been used widely to explain the transformation of income distribution in various countries.

Some researchers verified Becker's (1971) theory by applying a decomposition model in China's environment. Bishop, Luo, and Wang (2005) claimed that, as the income gap between males and females widens, the fraction of discrimination, which is the gender income gap unexplained by differences in individual-characteristic variables , has declined over time, especially for low-earning females. Nevertheless, Li, Song, and Liu (2011) found opposite results. They investigated whether the income gap between males and females widened or narrowed during the period from 1995 to 2007. Their results demonstrated that the gender income gap

increased significantly, particularly in the period from 2002 to 2007. More importantly, the increasing part of the gender income gap was attributed to an increase in unexplained components. This implies that discrimination against women has become more severe in China's urban labor market, which contradicts with Becker's (2005) studies and Bishop et al.' s (2005) conclusion. The results of this paper indicate that the gender income gap widened from 1995 to 2007. And further study decomposing gender differentials will confirm from Li et al.'s (2011) findings. In fact, discrimination against women has increased significantly in China during past two decades.

Fournier, Démurger , and Chen (2006) focused on the impact of market liberalization on the gender income gap and discrimination against women in urban China during the 1980s and 1990s. According to the results of their research, the overall gender income gap remained stable between 1988 and 1995. Fournier et al. arrived at two explanations to explain this stability. First, the "reform and opening up" policy brought more competition to China. Such liberalization in the labor market induced a reduction in discrimination against women, no matter whether the enterprise was private or state owned (Fournier et al.). Second, before the economic transition took place, the wage was set under egalitarian wage-setting policies enforced by government (Fournier et al.). After the market-oriented economic reform, the loosening of the government's rules and regulations was expected to offset the reduction in discrimination against women resulting from liberalization. Fournier et al. believed that these two components explain why the gender income gap remained stable between 1988 and 1995.

The second part of this paper will be built on the clues that Fournier et al. (2006) and Becker (1971) mentioned: That is, that economic liberalization and privatization may decrease discrimination. In this paper, a fixed -effect regression model will be set up to determine whether

international trade and the privatization process have had a causal effect on the shift in discrimination in urban China.

Empirical Methodology

This paper contains two steps. First, the decomposition will be performed. Afterwards, a regression mode will be set up to illustrate whether the international trade and privatization process have had a causal effect on the shift in discrimination in China's labor market.

First, the Oaxaca-Blinder decomposition research design will be modified from the original one. In this model, the gender income gap will be decomposed into two parts. One is the explained or endowments part, which represents the contribution to the gender income gap owing to the individual's particular characteristics or experiences, such as education, occupation, and age. Another part is the unexplained or discrimination part of the gender income gap, which cannot be explained by the person's particular endowment.

Original Oaxaca-Blinder decomposition Function:

$$\Delta \overline{Y} = \underbrace{(\overline{X}_A - \overline{X}_B)' \beta_R}_{\text{Explained}} + \underbrace{\overline{X}_A{}' (\beta_A - \beta_R) + \overline{X}_B{}' (\beta_R - \beta_B)}_{\text{Unexplained}}$$

Explained   Unexplained A

Unexplained

The function above shows the original Oaxaca-Blinder decomposition without any modification (Hlavac, n.d.); ΔY is the difference in mean outcomes; X_A and X_B are the characteristics of groups A and B; β_A and β_B represent coefficients of groups A and B; β_r is the reference coefficient. Some modifications are needed, however, to fit the model in the study of gender income gap. First, the difference in mean outcomes on the left-hand side of the equation is converted into logarithmic form, which represents the income change in percentage. Second, groups A and B are set to indicate males and females, respectively. Finally, it is usually assumed

that only females are discriminated. Therefore, the reference coefficient can be set as one of the gender group. That is to say, the discrimination (or advantage) is weighed only in the case of one group instead of worrying whether the two groups are facing discrimination equally. In this paper, the reference coefficient β_r will be set to regress only on male observations. The parameter β_r is equals to β_A or β_m. The modified formula is shown below.

Modified Oaxaca-Blinder decomposition:

$$ln\bar{Y}_m - ln\bar{Y}_f = \beta_m(\bar{X}_m - \bar{X}_f) + \bar{X}_f\left(\beta_m - \beta_f\right)$$

In the new function, X_m and X_f are the characteristics of the male group (Group A) and female group (Group B); β_m and β_f represent coefficients of the groups, male and female. They capture the effect of all characteristics related to monthly incomes for males or females. Overall, the gap of log income $lnY_m - lnY_f$ can be decomposed into two parts. For the first part, $\beta_m(X_m - X_f)$ explains the income gap in terms of differences in characteristics between males and females. For the second part, $X_f\left(\beta_m - \beta_f\right)$ captures the portion of the income gender gap that is unexplained by characteristics. Hence, the second part on right-hand side of the equation illustrates discrimination against females.

In step two, the model was developed to illustrate how changes in international trade and the privatization process affected society-wide discrimination in China. The regression can be set using the following fixed effects model:

$$\textbf{unexplained}_{it} = \beta_0 + \beta_1\textbf{\textit{Trade}}_{it} + \beta_2\textbf{\textit{Privatization}}_{it} + \beta_3\text{Year}_t + \beta_4\text{Province}_i$$
$$+ \beta_5\text{GDP} + \varepsilon_{it}$$

i= provinces   t= year

The unexplained $_{it}$ on the left-hand side of the equation represents the unexplained part of the gender wage gap. It is equals to β_m-β_f for each specific province and year. On the right-hand side, the variable Trade$_{it}$ represents international trade volume. In this paper, the volume of imports and exports for a particular province each year are used as observation of trade variables. Then, Privatization$_{it}$ represents the portion of people working in privately owned enterprises. In addition, the time-specific and location-specific time-invariant effects are also controlled. The variable Year$_t$ captures a year-fixed effect, while Province$_i$ captures the locale-specific effects. The GDP variable represents log GDP per capita for each province.

Research Data and Summary Statistics

To perform the Oaxaca-Blinder decomposition of the income gender gap in urban China, the datasets must contain information of incomes and personal characteristics for each individual from different provinces. The timeline was set to the decades of the 1990s and 2000s, which represent the main transition period of the "reform and opening up" policy in China. Personal characteristics, such as occupation, status of job, and job industry, should be included in the dataset as well because they are correlated with incomes and should be considered as endowments of individuals.

The Chinese Household Income Project (CHIP) is one of the datasets that may fit the Oaxaca-Blinder decomposition model. This project was initiated by Australian National University and Beijing Normal University and supported by the China National Bureau of Statistics (NBS). The CHIP survey consists of three parts: the Urban Household Survey, the Rural Household Survey, and the Migrant Household Survey. In this paper, only the urban part of income survey will be used. CHIP was conducted by questionnaire for the years of 2007, 2002,

1998 (labeled as 1999), 1995, and 1988. This paper will be based on the cohorts of 1995, 1999, 2002, and 2007. The year 1988 was left out because the Chinese government officially declared to support the transition from a "planned economy" to a "market economy" in 1992. Even though economic reform started in 1978, supporting and encouraging private enterprises only became politically correct after 1992. Thus, the data after 1992 are more credible than those before that year considering that CHIP was supported by the China National Bureau of Statistics.

Among all of the variables provided by CHIP, eight variables are needed for the purposes of this research: monthly income, age, province, education level, occupation, ownership of enterprise, job industry, and status of job. For each cohort, age is limited to the range from 25 to 65, which eliminates most people who are not working. Furthermore, the different cohorts include different provinces. For the decomposition analysis, all of the provinces are included in each cohort, which will not affect the results because the decomposition will be conducted within each year's cohorts separately. The education levels include the categories from elementary school to 4 years of college. Occupations for each individual are coded as different categories for each year's cohort. Additionally, one of the most important variables is the ownership of an enterprise. It decomposes the income gender gap between stated-owned and private enterprises. Finally, the job industry indicates the sector in which a person works (e.g., manufacturing, government agents, and so on); and the status of job indicates whether a job is permanent or temporary.

The CHIP data may have some limitations in that they do not include the data cohort for every year and all provinces. Thus, the results may not be valid because of the limited number of provinces and only 4 different years. Furthermore, only two provinces, Henan and Jiangsu, were included in all 4-year cohorts. Therefore, in the regression part, pooled OLS will be used with the fixed effect variables.

Additionally, the provincial-level statistics yearbooks provide the macrodata that will be used in the regression function. The provincial-level statistics yearbooks were gathered by each province's bureau of statistics. Specifically, we can find each provincial level's macrodata relating to GDP per capita, total value of imports and exports, and percent of people who worked in private sector for the years 1995, 1998, 2002, 2007.

Table 1
Summary Statistics

		2007	2002	1998	1995
Age	Min.	25	25	25	25
	Median	39	42	44	40
	Mean	39.83	41.59	44.09	40.02
	Max.	64	65	65	65
Log Income	Min.	4.09	2.81	1.61	1.83
	Median	7.38	6.53	6.31	6.1
	Mean	7.44	6.52	6.26	6.04
	Max.	10.73	8.81	8.6	8.44
Occupation	Head of institution	147	363	825	865
	Manager (Owner) of private firm	NA	346	84	66
	Office staff	731	716	1122	2081
	Other	301	91	92	394
	Professional	766	701	1512	2364
	Skilled worker	750	1291	1810	2094
	Unskilled worker	1171	1417	1249	1622
Ownership	collective	372	519	832	6721
	joint or foreign	246	152	94	79
	other	178	676	152	27
	private or self-employed	1888	977	172	18
	state-owned	1182	2601	5444	2641
Nature of job	long term	1742	1468	1094	1697
	non-contract	380	446	97	NA
	permanent	870	1907	5244	7607
	Private business or self-employed	468	505	137	16
	short term	406	599	122	166

Education level	2-year college	613	930	1202	1452
	4-year College and above	413	282	592	749
	Elementary school	461	191	347	516
	Junior middle school	983	1671	2158	2990
	Senior middle school	1062	1851	1573	2277
	Technical secondary school	334	NA	822	1502
Province	anhui	432	406	NA	678
	chongqing	319	224	NA	NA
	guangdong	588	522	NA	786
	henan	427	505	1148	768
	hubei	282	462	NA	1031
	jiangsu	458	599	1109	1021
	shanghai	466	NA	NA	NA
	sichuan	420	470	1302	1170
	zhejiang	474	NA	NA	NA
	beijing	NA	403	993	647
	gansu	NA	274	1002	501
	liaoning	NA	661	1140	1034
	shanxi	NA	399	NA	899
	yunnan	NA	NA	NA	951
Sample Size	Male	2197	2845	3451	4944
	Female	1669	2080	3243	4542

The chart of summary statistics demonstrates that private-ownership jobs increased from 18 in 1995 to 1888 in 2007. Collective ownership jobs declined from 6721 in 1995 to 372 in 2007. The number of people who worked in state-owned companies first increased, then dropped to 1182. Regarding the nature of jobs, long-term contract jobs remained stable around 1600, while permanent jobs decreased from 7607 in 1995 to 870 in 2007. Given that the sample size of year 1995 (9486) is over two times the sample size for 2007 (3866), the increased number of people working in the private sector shows that economic privatization and liberalization is notable and significant.
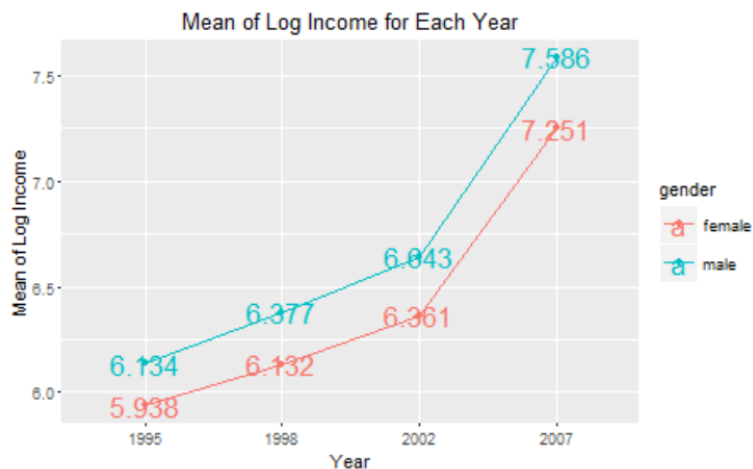
Figure 1

Mean of Long Income by Gender

Figure 1 shows the mean of log income constantly increased for both males and females over time. However, Figure 2 shows how the gender income gap widened over time. This plot illustrates that the gap of log monthly income between males and females increased from 0.196 in 1995 to 0.335 in 2007. In the next section, CHIP data will be fitted into the decomposition function, and the results will show how much of the income gap can be viewed as discrimination.
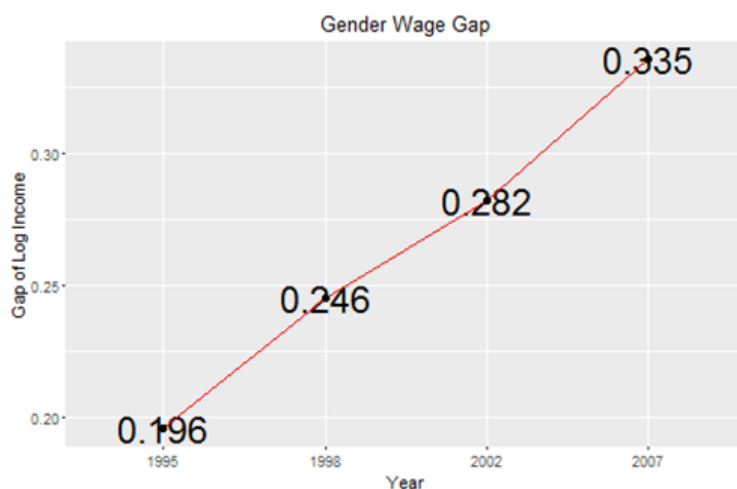

Figure 2

Gender Wage Gap

Empirical Results for Oaxaca-blinder Decomposition

In this section, the dataset from CHIP will be fitted in the Oaxaca-Blinder function to decompose the gender income gap between males and females in urban China.

Table 2
Oaxaca-blinder Decomposition (in percentage)

	Oaxaca-blinder Decomposition	
	Explained	Unexplained
1995	42.7	57.3
1998	33.3	66.7
2002	31.8	68.2
2007	23.1	76.9

In Table 2, the value from the unexplained part $(X_f (\beta_m - \beta_f))$ is transferred into the unexplained percentage, or discrimination, of the gap in log income between males and females:

That is, the percent of discrimination in gender income gap is equal to $\frac{(X_f (\beta_m - \beta_f))}{ln\bar{Y}_m - ln\bar{Y}_f}$. Hence the results in Table 2 reveal that 42.7% of the log income gap in 1995 can be explained by differences in the endowments or characteristics between male and female candidates, while 57.3% of the log income gap is due to discrimination against women. In 1998, the discrimination portion of log income gap between males and females increased to 66.7%. Furthermore, the discrimination continued to increase in the new millennium, rising to 68.2% and 76.9% in 2002 and 2007, respectively. In 2007, only 23.1% of the gender income gap can be explained by a person's characteristics and experiences. This is shockingly small. And discrimination seems not to be diminishing, as Becker (1971) posited.

Explained & Unexplained Percentage of Log income

Figure 3

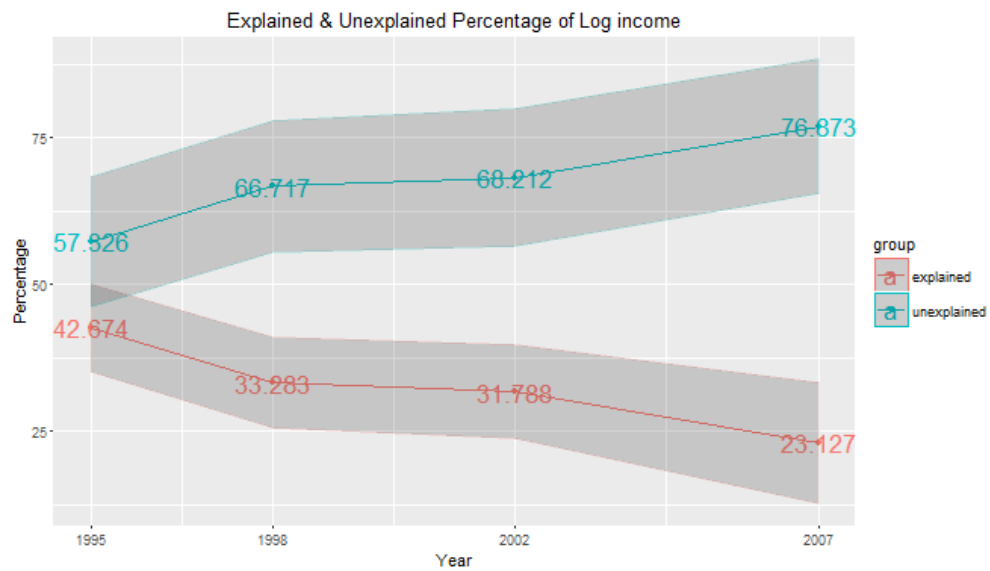*Explained and Unexplained Percent of Gender Income Gap*

Empirical Results from Regression

As Table 2 indicates, the Oaxaca-Blinder function decomposes the gender income gap into explained and unexplained (attributed to discrimination) parts for each year. As a result, we are able to attain discrimination data for each year and make a comparison of them for different provinces.

Figure 4

Provinces Coefficients with 95 percent confidence interval
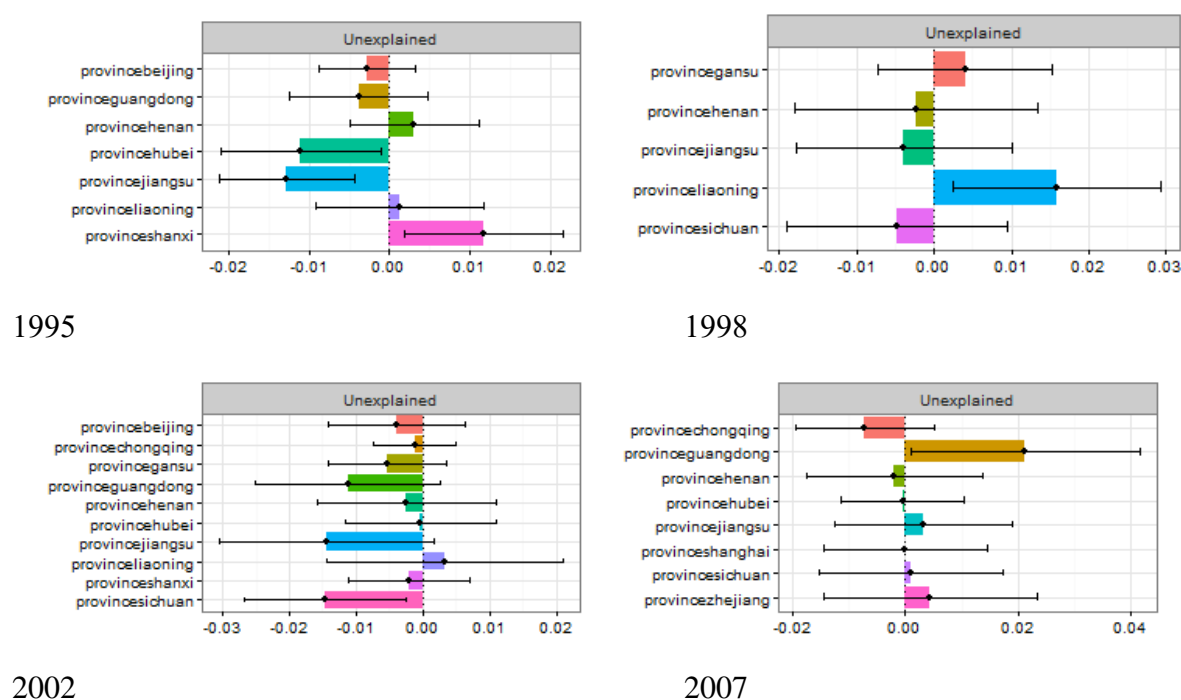

1995 1998

2002 2007

Figure 4 shows the provinces' coefficients from the Oaxaca-Blinder decomposition model. The 95% confidence interval is conducted based on 100 bootstraps. Most of the provinces' coefficients are insignificant, although there are some exceptions. For 1995, the Hubei, Jiangsu, and Shanxi provinces' coefficients are significant. For 1998, Liaoning's coefficient is positively significant. Furthermore, Sichuan and Guangzhou have significant coefficients in years 2002 and 2007, respectively. More important, the 95% standard interval is quite large compared to the

magnitude of the coefficients. Thus it cannot be concluded that women were facing the same degree of discrimination across all provinces in urban China.

Therefore, discrimination (unexplained) on the left-hand side of the regression must be restricted to each particular province. The regression can be expressed as following:

$$(\beta_m - \beta_f)_{it} = \beta_0 + \boldsymbol{\beta_1 Trade_{it}} + \boldsymbol{\beta_2 Privatization_{it}} + \beta_3 Year_t + \beta_4 Province_i + \beta_5 GDP + +\varepsilon_{it}$$

Table 4
Pooled OLS Regression

	(1)	(2)	(3)	(4)	(5)
logtrade	-0.009	-0.117**	-0.038	-0.005	0.016
	(0.031)	(0.034)	(0.066)	(0.036)	(0.069)
private	0.238**	-0.056	0.098	-0.099	-0.001
	(0.074)	(0.086)	(0.150)	(0.067)	(0.167)
loggdp		0.339***	0.358**	0.038	0.486
		(0.072)	(0.110)	(0.090)	(0.708)
Province controls	No	No	Yes	No	Yes
Year controls	No	No	No	Yes	Yes
N	37	37	37	37	37
adj. R-squared	0.192	0.499	0.655	0.703	0.689

Table 4 shows the results from pooled OLS regression data including all 14 provinces in the CHIP dataset. The first column does not control GDP and fixed effects for each province and every year. The coefficient of privatization is positively significant. But when log GDP per capita is controlled in the second column, the positive significance of privatization became insignificant. In addition, international trade became negatively significant, indicating that international trade can decrease discrimination against women. The GDP are positively significant, implying that the economic development can increase discrimination against women. It seems like these results may verify Fournier's (2006) theory in which two opposite effects can offset each other so that the gender income gap remains stable.

However, the results from the first two columns still seem suspicious. China's coastal areas are more developed than inland areas. The cities located in coastal areas may experience a locale-specific migrant flow from inland and rural areas. Such a migrant flow may increase competition and decrease (or increase) discrimination. Thus, the local-specific time invariant effect and year dummy variables must be included in the regression. The result in the third column controlled the province fixed effect; then international trade became insignificant. GDP may still be positively significant if the year fixed effect is not controlled. When we control the year fixed effect, none of the estimated coefficients remain significant. Moreover, the adjusted-R square reaches its highest point of 0.703 when the year fixed effect is controlled (column 4). Overall, Becker's theory cannot be confirmed in this empirical research. The results of Table 4 imply that neither international trade nor the privatization process can decrease discrimination against women in urban China.

Conclusion

This paper confirmed that the gender income gap increased in the 1990s and 2000s in urban China. Even worse, the log income gap due to discrimination increased from 57.3% in 1995 to 76.9% in 2007. In other words, a vast portion of the growth of gender income differentials is due to discrimination. Then the discrimination part of the gender income gap was regressed on international trade and privatization. If the province and year fixed effect are not controlled, the international trade coefficient is negatively significant and the GDP coefficient is positively significant. However, as the fixed effect is added into the regression model, both international trade and GDP become insignificant. Hence, there is no evidence that international trade or the

privatization process decreases gender discrimination. This empirical result contradicts Becker's taste-based discrimination theory.

The dataset brought certain limitations to this research. First, only 4 years of data are available from the past decade; it would be better to use a dataset that contains observations for every year. Second, only two provinces appear in all 4 years. So it is only possible to perform pooled OLS with an unbalanced panel data set. And because there are only 37 observations in pooled OLS regression, it is impossible to reduce the unbalanced panel data to balance otherwise the number of variables will exceeds the number of observations. For future study, the Urban Household Survey conducted by National Bureau of Statistics of China may be more suitable than CHIP data. UHS data contain a balanced panel data with year-by-year observations. In addition, future study can focus on identifying the real reasons behind the increase in gender discrimination; the one-child policy and high-speed urbanization may be potential reasons for gender discrimination.

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