

Volume 40, Issue 3

Is there a wage penalty for occupational feminization? Evidence from Thai labor market

Lusi Liao

University of the Thai Chamber of Commerce

Sasiwimon W Paweenawat

University of the Thai Chamber of Commerce

Abstract

This paper studies how occupational feminization affects wages in the context of a developing country with high female labour force participation. Using the Labour Force Survey of Thailand from 1985 to 2017, we employ a pseudo panel approach considering the unobserved heterogeneity across individuals. The results indicate that the effect of occupational feminization on wages varies by gender and there is a growing wage penalty related to occupational feminization.

Acknowledgement: We would like to thank the National Statistical Office of Thailand, the Research Institute for Policy Evaluation and Design, and the University of the Thai Chamber of Commerce (UTCC), Thailand, for access to the data used in this paper.

Citation: Lusi Liao and Sasiwimon W Paweenawat, (2020) "Is there a wage penalty for occupational feminization? Evidence from Thai labor market", *Economics Bulletin*, Volume 40, Issue 3, pages 2143-2153

Contact: Lusi Liao - lls133202@gmail.com, Sasiwimon W Paweenawat - sasiwimon.warunsiri@gmail.com

Submitted: November 03, 2019. **Published:** August 08, 2020.



Submission Number: EB-19-00979

IS THERE A WAGE PENALTY FOR OCCUPATIONAL FEMINIZATION? EVIDENCE FROM THAI LABOR MARKET

Lusi Liao

*University of the Thai Chamber of
Commerce*

Sasiwimon W Paweenawat

*University of the Thai Chamber of
Commerce*

Abstract

This paper studies how occupational feminization affect wage in the context of a developing country with high female labor force participation. Using the Labor Force Survey of Thailand from 1985 to 2017, we employ a pseudo panel approach considering the unobserved heterogeneity across individuals. The results indicate that the effect of occupational feminization on wage varies by gender and there is a growing wage penalty related to occupational feminization.

Acknowledgement: We would like to thank the National Statistical Office of Thailand, the Research Institute for Policy Evaluation and Design, and the University of the Thai Chamber of Commerce (UTCC), Thailand, for access to the data used in this paper.

Submitted: November 03, 2019.

1. Introduction

The relationship between individual wages and gender composition in occupations has been well established in the empirical studies of developed countries (e.g. O'Neill 1983; Fields and Wolff 1991; Weeden 2004). Those occupations with a larger share of women have fewer wages due to the difference in skills, characteristics of women's jobs and discrimination from employers (England 1992; Cohen and Huffman 2003; Mandel 2013). In addition, the potential factors such as the changing levels of female education, changes in the returns to education over time, and occupational shifts of women, may affect the changes in occupational wages, which have received little attention in the existing studies (Mandel 2018).

In the last three decades, Thailand has undergone rapid social and economic development, accompanied by the improvement of women's education and transformation of work. The female labour force participation rate has been high and stable in Thailand over the last three decades, with the average participation rate for women at around 65 percent, accompanied by an increase in wages and decline of working hours (Paweenawat and McNown 2018). The Labour Force Survey (LFS) of Thailand reveals that a large share of Thai female workers have moved from being unpaid family workers to private or public employees, and from agriculture to the manufacturing and service industries, followed by occupational shifts in employment. Although female education has caught up with male education and the gender wage gap has kept decreasing in Thailand, the high-skilled jobs are still dominated by males, with around a 40% gap in managerial jobs between males and females (Liao and Paweenawat 2019a).

This paper intends to study how occupational feminization affects wages, using a pseudo panel approach to correct for the unobserved individual heterogeneity and controls for the effect of occupational skills, education levels and other related characteristics.

The remainder of the paper is structured as follows. Section 2 discusses related literature. Section 3 and section 4 describe the methodology and data used in the estimation. Section 5 presents the results, and section 6 concludes.

2. Literature review

According to the previous research conducted in developed countries, those occupations with a large share of women pay lower wages (e.g. Gerhart and ElCheikh 1991; England et al. 2007; Mandel 2013). On the one hand, the wage disparities reflect the difference in human capital and productivity between male and female occupations. On the other hand, traditionally, the female dominated occupations suffer from employers' underestimation and discrimination for the skills and characteristics with feminization.

The strong relationship between the gender compositions of occupation and earnings has provided measures to improve the pay gap through the policies related to improvement of education and anti-discrimination. However, empirical consensus has not moved further beyond exploring the earning disparities over time from the increasing proportion of women in an occupation (Addison et al. 2018; Mandel 2018).

The conventional approach to estimate the relationship of gender composition and wages is a fixed effect model to correct for unobserved individual heterogeneity (e.g. Gerhart and El

Cheikh 1991; Macpherson and Hirsch 1995). However, these studies are limited by using short term span data and restricting to young people. Several studies in developed countries have further investigated the effect of occupational feminization on wages, using updated longitudinal data with fixed effect model controlling variables that influence the wage and its development (e.g. Levanon et al. 2009; Murphy and Oesch 2016; Addison et al. 2018). Unfortunately, for developing countries with a limitation on longitudinal data, little scholarly attention has been drawn on the association between occupational percentage of women and wages, in spite of the significant economic transformation over the last few decades with different cultural backgrounds as compared to developed countries. As a result, this study adopts a pseudo panel approach to correct for the unobserved individual heterogeneity, as suggested by Warunsiri and McNown (2010).

3. Methodology

We consider the following models of Macpherson and Hirsch (1995) to identify the impact of occupational feminization on wages.

$$y_i = \beta_0 + \beta_1 \text{fem}_i + \beta_2 X_i + \varepsilon_i \quad (1)$$

where y_i is the natural logarithm of real hourly wage for individuals i . fem_i is the share of women in an occupation for individual i . X_i is a vector of controlling variables, including age, age square, education, occupational skill levels, marital status, and five regional dummies. ε_i is the random error term e.g., the individual ability and preference, which may affect women's share in occupation and wages.

Using the simple OLS estimation yields biased and inconsistent results. Thus, we construct a pseudo panel using the LFS to address the unobserved heterogeneity across individuals. Deaton (1985) mentions that using the time invariant characteristics for individuals i.e., the year of birth as the basis to divide the sample into cohorts allows us to estimate the fixed effect model from cross-sectional data. Thus, the pseudo panel constructed here is based on the birth year and age, interacting with the time periods (Blundell et al. 1998; Banks et al. 1994; Propper et al. 2001).

The observations are the average of each cohort in the pseudo panel:

$$\overline{y}_{ct} = \beta_0 + \beta_1 \overline{\text{fem}}_{ct} + \beta_2 \overline{X}_{ct} + \overline{\alpha}_{ct} + \overline{\varepsilon}_{ct} \quad (2)$$

where \overline{y}_{ct} is the mean of natural logarithm of hourly wages for individuals in cohort c at time t . and $\overline{\alpha}_{ct}$ is the average fixed effect for the individual in cohort c at time t . $\overline{\alpha}_{ct}$ may correlate with $\overline{\text{fem}}_{ct}$ in small samples that can bias the results. However, if the cohort sizes are large enough, in that it is greater than 100 observations, the bias will be small (Verbeek and Nijman 1992). Considering LFS has a large number of observations, allowing us to fit the Type 1 asymptotics (Verbeek 2008) means that the fixed effects estimator from the pseudo panel is consistent (Moffit 1993; Verbeek and Vella 2005). Because $\overline{\alpha}_{ct} \approx \alpha_c$,

$$\overline{y}_{ct} = \beta_0 + \beta_1 \overline{\text{fem}}_{ct} + \beta_2 \overline{X}_{ct} + \alpha_c + \overline{\varepsilon}_{ct} \quad (3)$$

To account for the heteroscedasticity of different observations in each cohort, weighted least squares are applied (Pencavel 1998; Warunsiri and McNown 2010).

4. Data

This study uses the annual LFS of Thailand from 1985 to 2017, which is collected by the National Statistical Office (NSO). The data contains a large number of observations and covers the individuals' information including age, marital status, education, working hours, income, occupations, and household information, which allows us to provide an overview of changes in the occupational feminization overtime, and to estimate the impact of the changes on wages. We only use the third quarter data considering the seasonal migration of labour (Sussangkarn and Chalamwong 1996; Paweenawat and McNown 2018).

The occupational groups are harmonized based on the International Standard Classification of Occupations 2008 (ISCO-08). The occupations are assigned to three levels of skills dummies: managers and legislators, professionals and technicians (high skill); clerks, service workers, plant and machine workers (middle skill); craft workers, agricultural workers, and unskilled workers (low skill)¹.

The sample is restricted to age 19 to 60. The hourly wage is constructed by using the recorded monthly wage and sum of working hours. The real wage is deflated by the Thailand Consumer Price Index (CPI), with the base year 2015. We obtain 1,145,123 observations to construct the pseudo panel. The sample is assigned to five-year age groups. The birth year ranges from 1925 to 1998, which is also assigned to five-year birth cohorts. To see the gender difference, we estimate males and females separately. The 488 observations are available for each gender in the pseudo panel. The cell size in each observation of the pseudo panel is 3,712 observations on average (with min 71 observations and max 7,691 observations).

Figure 1 shows the average share of women by occupational skill levels over time. The share of women in both high skill and middle skill occupations has increased (29.12% to 49.16%; 35.48% to 53.23%), while it has decreased for low skill occupations (57.75% to 37.47%).

5. Results

Table 1 shows the results based on the pseudo panel approach. The negative coefficient of fem in the first column suggests that there is a wage penalty for feminizing jobs. The effect of fem is -0.9 percent for the overall sample, which is generally less than the developed countries, in which Murphy and Oesch (2016) shows the effect of fem ranges from -3 percent to -15 percent for Britain, Germany, and Switzerland using the fixed effect after controlling for occupational skills.

Column 2 and 3 presents the results for men and women separately. For men, the effect of fem is -1.26 percent, indicating there is a wage penalty associated with fem for male, which is larger than the effect of the overall sample, while for women, as opposed to developed countries, it shows a positive effect, 1.13 percent, indicating fem increases the wage of women. Addison et al. (2018) suggest a negative effect of fem using the cross-sectional model; -7 percent to -21 percent for women and -4 percent to -28 percent for men under different specifications.

However, by using the panel model to probe the unobserved factors, the effect for women has

¹ The classification of skills follows Autor (2019).

changed to a positive and much smaller number, which has suggested that the gender difference in preference or taste, unobserved productivity is significant in explaining the effect of gender composition on wages.

During the last three decades, Thailand has undergone economic expansion and transformed from a low-income country to high-middle income country. The increase in education and modernization accounts for the main factor that reduces the gender wage gap (Nakavachara 2010). The extent of gender segregation is moderate in Thailand compared to other countries in the region (Cameron et al. 2001). According to Rendall (2013), Thailand has experienced a quick transformation of women from low to medium brain employment and men and women are presented equally in agriculture, manufacturing, and service. During the structural shift in Thailand, women benefit more from the change in demand of occupational skills from brawn to brain in the way of occupational match and returns.

As changes occur in gender composition of occupations and expansion of education, we further investigate the trends of the effect of feminization on wages over time. We divide the data into three time periods, 1985-1996, 1997-2007, and 2008-2017². During the boom period, 1985 to 1996, an immense structural change has took place in Thailand with over a million people migrating from rural to urban occupations in order to obtain higher wages, which resulted in a rapid rising wage rate (Phongpaichit and Baker 2008). After the 1997 crisis, the economic growth and structural change slowed down. The education gap between men and women was narrowed dramatically as the result of modernization, and over time women's education surpassed men's (Nakavachara 2010).

Table 2 presents the estimation results for the three time periods. The positive effects are presented in the first time period, the economic boom decade. Comparing men and women, the fem does not have significant impact on men, but it is significant for women. The recent two decades show a negative effect of fem on wages, in which the effect becomes stronger in the third time period (-0.5% to -1.6%; -0.9% to -4.9%; -0.52% to -2.2%), indicating a growing wage penalty for occupational feminization.

6. Conclusion

This paper investigates the effect of occupational feminization on wages. The conventional method to analyse this effect in developed countries is by using longitudinal data with a fixed effect model. As lack of longitudinal data in developing countries, occupational feminization gets little attention. In order to solve for the individual heterogeneity that may bias the estimates, we employ a pseudo panel approach. The findings have suggested a different impact of occupational feminization for men and women on wages indicating that gender composition and job characteristics are affected by the difference in job preferences, and a growing wage penalty related to occupational feminization.

As women are still mainly responsible for the childcare and household chores in the family in Thailand, they may not choose the male dominated jobs even they are qualified. This study provides insightful evidence on the wage disparity for occupational feminization in the

² The first time period, 1985 to 1996 is the fastest growth period before the financial crisis. In the second period, 1997 to 2007, Thai economy has affected severely by the financial crisis, which has stagnated the growth of wage. The third time period, 2008 to 2017, includes global financial crisis in 2008, floods in 2011 and the Euro zone crisis in 2012, relatively smaller effect on the wage growth, comparing with financial crisis in 1997.

context of developing countries. Distinct from developed ones, under the recent structural change and improvement of women's economic and social status in Thailand, we show a diverse effect of occupational feminization on wages.

Policies related to increasing the presence of females in male dominated jobs balance the merits that the female dominated occupations offer with the male dominated occupations through providing more assistance for women on childbearing and childrearing in the workforce, and these should be considered.

References

- Addison, T., D. Ozturk and S. Wang (2018) “The Occupational Feminization of Wages” *ILR Review* Vol. 71 Issue1. <https://doi.org/10.1177/0019793917708314>
- Autor, D. (2019) “Work of the Past, Work of the Future” *American Economic Association: Papers and Proceeding*, May 2019, 109(5), 1–32
- Banks, J., R. Blundell and I. Preston (1994) “Life-Cycle Expenditure Allocations and the Consumption Costs of Children” *European Economic Review*, 38, 1391–1410.
- Blundell, R., A. Duncan and C. Meghir (1998) “Estimating Labor Supply Responses Using Tax Reforms” *Econometrica*, 66, 827–861.
- Cameron, L. A., J. M. Dowling and C. Worswick (2001) “Education and Labor Market Participation of Women in Asia: Evidence from Five Countries” *Economic Development and Cultural Change* 49(3), 459-477.
- Cohen, P. N., and M. L. Huffman (2003) “Individuals Jobs and Labor Markets: The Devaluation of Women’s Work” *American Sociological Review* 68(3):443-63.
- Deaton, A. (1985) “Panel data from a time series of cross-sections” *Journal of Econometrics*, 30, 109–126.
- England, P. (1992) “Comparable Worth: Theories and Evidence” *Aldine de Gruyter*. 2001. “Gender and Feminist Studies.” Pp. 5910-15. *International Encyclopedia of the Social and Behavioral Sciences* Volume 4. Neil J. Smelser and Paul B. Baltes, editors. Elsevier.
- England, P., P. Allison and Y. Wu (2007) “Does Bad Pay Cause Occupations to Feminize, Does Feminization Reduce Pay, and How Can We Tell with Longitudinal Data?” *Social Science Research* 36(3):1237–56.
- Fields, J. and E. N. Wolff (1991) “The Decline of Sex Segregation and the Wage Gap, 1970-80” *Journal of Human Resources* 26 (Fall 1991): 608-22.
- Gerhart, B. and N. El Cheikh (1991) “Earnings and Percentage Female: A Longitudinal Study” *Industrial Relations* 3(1): 62-78.
- Levanon, A., P. England and P. Allison (2009) “Occupational feminization and pay: Assessing causal dynamics using 1950–2000 U.S. census data” *Social Forces*, 88, 865–892.
- Liao, L. and S. Paweenawat (2019a) “Parenthood Penalty and Gender Wage Gap: Recent Evidence from Thailand” *PIER Discussion Papers* 102, Puey Ungphakorn Institute for Economic Research.
- Macpherson, A. and T. Hirsch (1995) “Wages and Gender Composition: Why Do Women’s Jobs Pay Less?” *Journal of Labor Economics* 13(3): 426-471.
- Mandel, H. (2013) “Up the down staircase: Women’s upward mobility and the wage penalty for occupational feminization” 1970–2007. *Social Forces*, 91, 1183–1207.
- Mandel, H. (2018) “A Second Look at the Process of Occupational Feminization and Pay Reduction in Occupations” *Demography* (2018)55:669-690. <https://doi.org/10.1007/s13524-018-0657-8>
- Moffitt, R. (1993) “Identification and Estimation of Dynamic Models with a Time Series of Repeated Cross-Sections” *Journal of Econometrics*, 59, 99–123.
- Murphy, E. and D. Oesch (2016) “The Feminization of Occupations and Change in Wages: A Panel Analysis of Britain, Germany and Switzerland” *Social Forces* Vol.94 Issue 3, p1221-1255. <https://doi.org/10.1093/sf/sov099>
- Nakavachara, V. (2010) “Superior female education: Explaining the gender earnings gap trend in Thailand” *Journal of Asian Economics* 21: 198–218. DOI: 10.1016/j.asieco.2009.09.006

- O'Neill, J. (1983) "The Determinants and Wage Effects of Occupational Segregation" Working paper. Washington, DC: Urban Institute, March 1983.
- Paweenawat, S., and R. McNown (2018) "A Synthetic Cohort Analysis of Female Labour Supply: The Case of Thailand" *Applied Economics*, Volume 50(5): 527-544.
- Pencavel, J. (1998) "The market work behavior and wages of women" *Journal of Human Resources* 33 (Autumn): 771–804.
- Phongpaichit, P., and C. Baker (2008) "Thai Capital After the 1997 Crisis" Silkworm Books.
- Propper, C., H. Rees and K. Green (2001) "The Demand for Private Medical Insurance in the UK: A Cohort Analysis" *The Economic Journal*, 111, C180–C200.
- Rendall, M. (2013) "Structural Change in Developing Countries: Has it Decreased Gender Inequality?" *World Development* Vol. 45, pp. 1–16, 2013.
- Sussangkarn, C., Y. Chalamwong (1996) "Thailand Development Strategies and Their Impacts on Labour Markets and Migration" In *Development Strategy, Employment, and Migration*, edited by D. O'Connor and L. Farsakh. Paris: OECD.
- Verbeek, M. and T. Nijman (1992) "Can cohort data be treated as genuine panel data?" *Empirical Economics*, 17, 9–23.
- Verbeek, M. and F. Vella (2005) "Estimating Dynamic Models from Repeated Cross-Sections" *Journal of Econometrics*, 127, 83–102.
- Verbeek, M. (2008) "Pseudo-Panels and Repeated Cross-Sections" In: Mátyás L., Sevestre P. (eds) *The Econometrics of Panel Data. Advanced Studies in Theoretical and Applied Econometrics*, vol 46. Springer, Berlin, Heidelberg.
- Warunsiri, S., and R. McNown (2010) "The Returns to Education in Thailand: A Pseudo Panel Approach" *World Development* 38(11): 1616–1625.

Figure 1. Share of women by occupational skill levels:

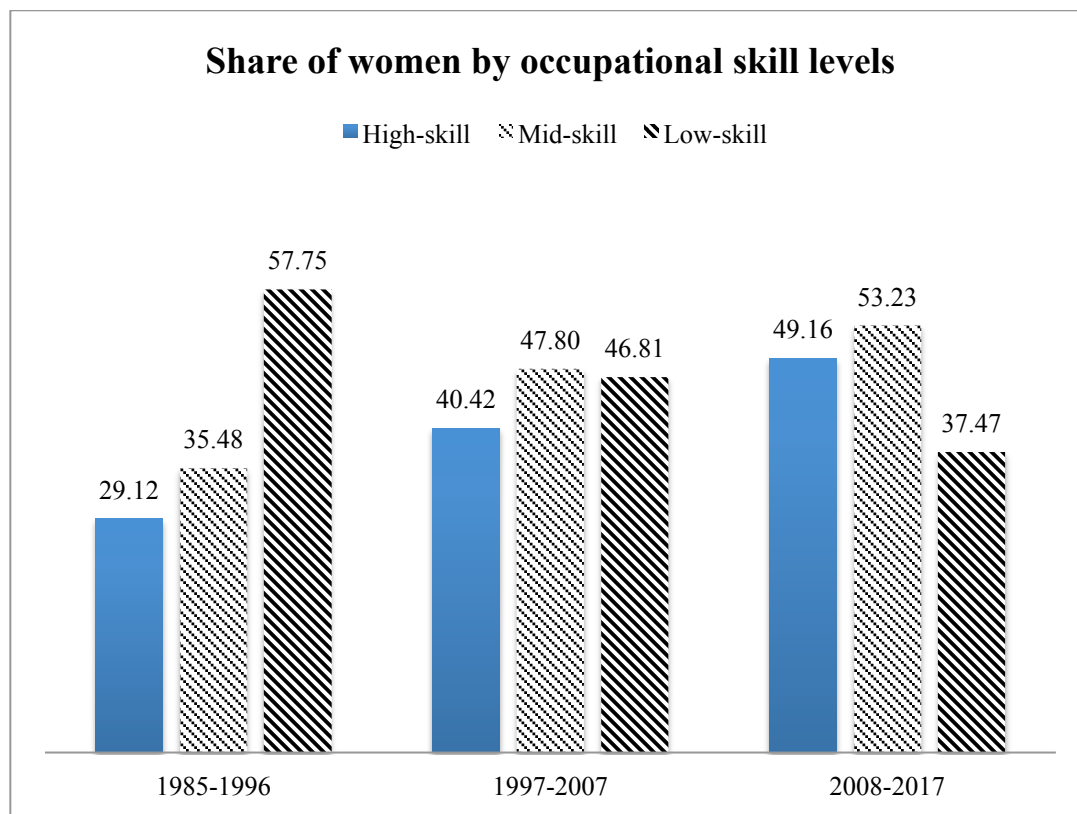


Table 1. The effect of occupational feminization on wage, 1985-2017

	(1)	(2)	(3)
	Overall	Men	Women
fem	-0.00898*** (0.001)	-0.0126*** (0.003)	0.0113*** (0.003)
Age	0.0905*** (0.005)	0.0454*** (0.011)	0.0661*** (0.008)
Age square	-0.000643*** (0.000)	-0.000224* (0.000)	-0.000436*** (0.000)
Number of children	-0.0267 (0.020)	-0.0646** (0.027)	-0.00848 (0.033)
Control marital status	Yes	Yes	Yes
Control skills	Yes	Yes	Yes
Control Education	Yes	Yes	Yes
Control regions	Yes	Yes	Yes
Observations	976	488	488
R-squared	0.89	0.914	0.892

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 2. The effect of occupational feminization on wage in three time periods

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	1985-1996			1997-2007			2008-2017		
	Overall	Men	Women	Overall	Men	Women	Overall	Men	Women
fem	0.00447** (0.002)	0.00686 (0.005)	0.0116*** (0.003)	-0.00518*** (0.002)	-0.00938* (0.005)	-0.00526 (0.006)	0.0163*** (0.003)	0.0490*** (0.008)	0.0218* (0.011)
Age	0.0925*** (0.011)	0.0944*** (0.016)	0.0840*** (0.014)	0.107*** (0.008)	0.0963*** (0.016)	0.0474*** (0.010)	0.00355 (0.011)	-0.00912 (0.021)	0.00342 (0.018)
Number of children	-0.0661*** (0.025)	-0.130*** (0.031)	-0.0971** (0.046)	0.0731** (0.031)	0.0305 (0.041)	-0.0147 (0.045)	-0.120*** (0.044)	-0.144** (0.072)	-0.159* (0.082)
Control marital status	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Control skills	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Control Education	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Control regions	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	360	180	180	328	164	164	288	144	144
R-squared	0.912	0.946	0.894	0.928	0.958	0.935	0.872	0.928	0.829

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1