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# **Parenthood Penalty and Gender Wage Gap: Recent Evidence from Thailand**

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## **Parenthood Penalty and Gender Wage Gap: Recent Evidence from Thailand**

### **Abstract**

This study first examines the evolution of gender wage gap in Thailand, using cross-sectional data from the Labor Force Survey (LFS) for 1985–2017. We find that education, occupation, and industry significantly contribute to gender wage gap convergence in Thailand. Furthermore, for females, the wage gap between mothers and non-mothers has increased over time, while for males, the changes are relatively small. Thereafter, we examine the gender wage gap associated with marriage and parental status, using panel data from the Socio-Economic Survey (SES) for 2005–2012, and find wage penalty for both motherhood and fatherhood in Thailand.

**Keywords:** Gender wage gap; Parenthood penalty; Thailand

**JEL Classification:** J13, J22, J24, J31, D10

## **1. Introduction**

A substantial long-term decline in gender wage gaps has been evidenced in both developed and developing countries in recent years. In particular, developing economies have been experiencing rapid convergence in gender wage gaps owing to labor market transformation, compared with developed countries (Tzannatos 1999). Nopo et al. (2012) concluded that gender wage differences can be attributed to various socioeconomic factors such as personal and job characteristics of women (e.g., education, occupation, and job status), labor market structure (e.g., occupational segregation by gender), as well as institutional, cultural, and social norms.

Thailand is an interesting case study to examine the evolution of gender wage gap. The country has made remarkable progress in social and economic development from 1985 to 2017, transforming from a low-income country to an upper-income country (World Bank, 2018), leading to women's increasing role in the economy and society. However, Thai females still undertake a major share of household responsibilities as well as balance their roles as workers and as mothers. Nevertheless, the female labor force participation rate in Thailand is historically high and stable with the average rate for married women being close to 80% from 1985 to 2016 (Liao and Paweenawat, 2018).

Furthermore, Thailand is one of the developing countries that has been witnessing a steady decrease in gender wage gap from the 1980s to recent years, as evidenced in many studies (Nakavachara 2010; Mutsalklisana 2011; Khorpetch and Kulkolkarn 2011; Bui and Permpoonwiwat 2015; Jithitikulchai 2017). Most of these studies have attributed this

phenomenon primarily to the improvement of Thai women’s education. Specifically, the increase in female human capital accumulation and the improvement in female occupation outlook relative to men explain the wage gap convergence in Thailand (Nakavachara 2010; Mutsalklisana 2011).

Figure 1 shows the percentage of difference in average wages between men and women in Thailand, which has decreased over the last three decades. Figure 2 presents the hourly wage density<sup>1</sup> for men and women in 1985, 1995, 2005, and 2017. The figure indicates that the gender wage gap in the Thai labor market has been reducing continuously in terms of both mean values and the overall wage density.

The first objective of this paper is to examine the evolution of gender wage gap in Thailand by using data from the Labor Force Survey (LFS) for 1985–2017. We apply the Oaxaca-Blinder decomposition (Oaxaca 1973; Blinder 1973) and Juhn-Murphy-Pierce (JMP) decomposition (Juhn et al. 1991, 1993), accounting for not only conventional human capital, but also the industry and occupation factors that contribute to the changes in gender wage gap. Our results confirm the previous findings that education is the major contributor for the convergence of gender wage gap. Furthermore, occupation and industry account for the rapidly diminishing gender wage gap.

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<sup>1</sup> Wage density is estimated as follows:

$$f(y, h) = \sum_{i=1}^n \frac{w_i}{h} K\left(\frac{y - y_i}{h}\right)$$

where  $y_i$  denotes the log hourly wage for men or women,  $n$  represents the number of observations,  $w_i$  denotes the survey weight from the data,  $h$  denotes the bandwidth, and  $K$  represents the kernel function (Silverman 1986).

However, even though Thailand has been experiencing a convergence in the gender wage gap over the last three decades, the gap between mothers/mother-workers and non-mothers/non-mother workers has increased approximately 10% over time, while for males, the changes are relatively small (Figure 3). Several studies in developed countries (e.g., Walffogel 1998; Cools and Strom 2014; Grimshaw and Rubery 2015) have found that the convergence of men's and women's earnings has slowed down in recent years, and this trend has been accompanied by a greater gender wage gap among parents and non-parents, which is also known as the family gap in wages.

Thus, based on our first result, which indicates that the gender wage gap in Thailand has been diminishing over the last three decades, our study will proceed further to better understand wage gap from the perspective of the gender-specific parenthood-based gap. Thus, our second objective is to estimate the wage gap associated with parenthood. We explore the wage gap associated with marriage and parental status for both men and women. To the best of our knowledge, no previous studies have empirically focused on the effect of parenthood on gender wage gap in the Thai labor market. Furthermore, our study is the first to analyze whether parenthood-based gender wage gaps exist and how they evolve over time in Thailand.

Our estimation begins with analyzing data from the LFS for 1985–2017, which provides us with a large number of observations and covers a long time span. However, the results obtained from models using this cross-section data might suffer from individual heterogeneity. To overcome this limitation, besides LFS, we also use panel data from Socio-Economic Survey (SES) for 2005–2012, and compare the results from different models. Then, following Juhn and McCue

(2017), we use the fixed effects model along with the event-study analysis and cohort-specific estimation to explore the wage gap associated with marriage and parenthood. With the increase in single motherhood (Paweenawat 2018) and decline in fertility rates (Hirschman 1994) in Thailand, marriage and parenthood have been increasingly decoupled.

We found wage penalty for both motherhood and fatherhood in Thailand, which contradicts the existing evidence of motherhood penalty and fatherhood bonus in most developed countries. Furthermore, the results are robust when considering married and unmarried gender groups across different birth cohorts under both LFS and SES data. The estimates of the fixed effects model suggest that without taking selection into account, the results will be partially overstated. Our study contributes to the literature, in a wider context than just Thailand. To the best of our knowledge, this is the first study to analyze gender wage gap in the context of developing countries, taking into account the effect of parenthood on the wages of both mothers and fathers.

The remainder of the paper is organized as follows. Section 2 presents a literature review of gender and family wage gaps. Section 3 presents the data and variables used for estimation. Section 4 describes the methodology. Section 5 presents the estimation results. Finally, Section 6 concludes the study.

## **2. Literature review**

Studies on gender wage gap have been abundant in both developed and developing countries. The decreasing trend in gender wage gap has been witnessed worldwide and has been studied for

decades (e.g., Newell and Relly 2001; Dimova and Gang 2004; Goldin 2006; Blau and Khan 2008; Weichselbaumer et al. 2007). The convergence of men and women in human capital factors have been widely known to account for the decrease in gender wage gap (e.g., Altonji and Blank 1999; Goldin et al. 2006; Blau et al. 2014).

Olivetti and Petrongolo (2014) claim that industry structural transformation has had a significant impact on gender wage gap across countries. Recent studies (e.g., Weeden et al. 2016; Blau and Kahn 2017) find that in the US, human capital variables and the different labor market behaviors of men and women explained a small part of the gender wage gap, as women obtain higher level of education than men, while the differences in industry and occupation explained a larger part. Furthermore, the impact of industry on wage disparity has been addressed in the context of developing countries in the literatures (e.g., Taniguchi and Tuwo 2014 for Indonesia; Ismail 2015 for Malaysia; Bui and Permpoonwiwat 2015 for Thailand)

Several studies have investigated the issue of gender wage gap in Thailand. Nakavachara (2010) identified the increase in female education as the main contributor to the decline of gender wage gap from 1985 to 2005, and found that females are in far better positions than 20 years ago. Khorpetch and Kulkolkarn (2011) investigated the gender wage gap across different groups of men and women and found that while female workers were more productive than their male counterparts, they received lower wages because of gender discrimination. Using the Blinder-Oaxaca decomposition, Bui and Permpoonwiwat (2015) find that the gender wage gap in Thailand has decreased from 1996 to 2013, and that there are different degrees of discrimination against females in different industries.



Even though the relevance of the “glass ceiling” effect in the context of gender pay gap has received significant attention in the literatures, the parenthood wage gap has not received much attention, especially in developing countries. Waldfogel (1998) finds that in the US, while the gender wage gap has been narrowing, the motherhood wage gap has been increasing. This phenomenon may be attributed to the institutional structure in the US that emphasizes equal pay but not family-friendly labor market policies, such as maternity leave and childcare. However, in the case of Thailand, high emphasis on maintaining family ties in Thai families and the rapid decline in fertility rate in Thailand (Knodel et al. 1987) might provide a different picture in this regard.

Theoretically, parenthood has a negative effect on labor force supply, considering the time constraint on individuals’ total time (Goldin 1995; Gronau 1988; Glauber 2007). However, the impact of fertility on labor force outcomes differs by gender. In particular, after couples have children, women tend to participate less in the labor market, while men tend to work harder acting as the breadwinner in the family. Thus, the parenthood effect should be negative for women but positive for men (Becker 1981; Killewald and Gough 2013; Mu and Xie 2016).

This hypothesized difference in the fertility effect on women and men is called “motherhood penalty” and “fatherhood premium,” respectively, in the literatures (Angrist and Evans 1998; Neumark and Korenman 1994; Waldfogel 1997; Killewald 2013; Mu and Xie 2016). According to Grimshaw (2015), the existence of motherhood wage gap is universal in both developing and developed countries, but the magnitude varies across different countries. Motherhood wage gap

hinders the progress of gender equality. One possible reason is that women sacrifice the earnings from employment for childbirth and childcare. Another reason is that the motherhood wage gap tends to risk the gender wage gap over the life cycle.

Waldfogel (1998) concluded that besides the difference in human capital, there are three main hypotheses accounting for the family wage gap. First, the unobserved heterogeneity, such as the difference in motivation to work for women with children and for those without children, may affect the wage gap (Neumark and Korenman 1992; Hersch and Stratton 1994). Second, the discrimination against mothers (Waldfogel 1998). Third, the institutional features of the labor market; for example, if women can maintain their employment after childbirth, they will receive a higher pay than those who cannot (Waldfogel 1994, 1997b).

Both motherhood and fatherhood wage gaps have been associated with the difference in working behavior between men and women after they attain parenthood. Women have a greater likelihood to take up part-time jobs after childbirth, while men tend to increase their working hours after they attain fatherhood (Weeden et al. 2016). Bertrand et al. (2010) suggest that the wage gap between men and women increases over time, and the presence of children is the major concurrent factor for the increasing gender wage gap among the highly educated population. The extent to which women are willing or able to substitute for their time that is used for childcare is limited even for those who have made costly investments in skills that are highly valued in market work.

Regarding fatherhood, Killewald (2013) and Budig (2014) find a relatively small wage premium, while Wilde et al. (2010) find little evidence regarding the wage premium. Contrary to most studies (e.g., Lundberg and Rose 2000; Simonsen and Skipper 2008), Cools and Strom (2014) find the presence of fatherhood wage penalty in Norway, indicating men's consistent involvement in child rearing. Juhn and McCue (2017) also suggest that with reduced specialization, fathers also experience a wage penalty. To the best of our knowledge, while most studies have provided evidence of parenthood wage gap for developed countries, none of them have considered the case of developing countries. Thus, our study, which focuses on Thailand, is the first to shed light on the case of a developing country. This is the main contribution of our study.

### **3. Data and variables**

We use two datasets in this study. First, we use the annual Labor Force Survey (LFS) of Thailand from 1985 to 2017, collected by the National Statistical Office (NSO) of Thailand. Following Sussangkarn and Chalamwong (1996), we only use the third quarter of the year to hedge against the immigration of Thai agricultural workers during the dry and rainy seasons, (Lekfuangfu 2017; Paweenawat and McNown 2018).

In 2001, NSO defined the labor force population to include any individual aged 15 years or older<sup>2</sup>. In this study, we include individuals aged between 15 and 65 years. Considering that

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<sup>2</sup> Before 2001, individuals aged 13 years and older, who were either employed or unemployed, were defined as the labor force.

hourly wage provides a more appropriate measure of earnings to analyze the wage gap, we calculate the hourly wage<sup>3</sup> using weekly earnings divided by the sum of working hours per week.

We assigned individuals to three mutually exclusive educational groups according to their level of education: primary level (with none, some, or completed primary level education); secondary level (with some or completed secondary level education); and university level (with some or completed university level education). Seven industrial, seven occupational, and five regional dummy variables were generated.

Figure 4 shows the occupational gender differences and the trends of the changes over time. The increasing percentage of women's employment in managerial and professional jobs might indicate the rising human capital achievement of women, reduction in employers' discrimination, or women's labor market commitment. For administration-related jobs, the gender difference is the highest, women's employment rate is higher compared with men and the rate continues to increase over time, while for production-related jobs, the result is opposite. In agricultural-related jobs, the gender difference is relatively small and stable during the period.

Possible complexities need to be addressed when interpreting the results. First, the parental status is measured by the presence of children below the age of 19 years in a household, and is associated with the relation to the head of the household. Children who do not live in the household cannot be identified. In addition, older couples with adult children are not counted as parents. Besides, the marital status is separated into married and unmarried in our analysis. For

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<sup>3</sup> Wages are deflated by the Thailand Consumer Price Index (CPI). The CPI indices (2015 as the base year) are obtained from the Bureau of Trade and Economic Indices, Ministry of Commerce, Thailand.

the unmarried group, the status includes single, widow, divorced, and separated. The parenthood wage gap for this group has a large variation in the number of observations. To mitigate these problems, we re-estimate the model by restricting individuals' age to 25 to 50 years and disaggregating the age groups. The results show a similar pattern compared to the entire sample.

Table 1 presents the summary statistics of LFS. We separate the sample by whether or not individuals have children below the age of 19 years in the household. Labor force participation of men is over 10 percent higher than women for both the groups, with and without children. The participation rate of individuals without children is higher than those with children for both men and women. The average wage for men is higher than for women for the two groups. The without-children group is older and earns higher wages than the with-children group, considering the fact that those who have adult children have already moved out from the household.

Comparing educational attainment, men have an average higher level of education than women. Among the with-children group, 60.9 percent females have attained primary-level education, compared with 56.5% males. The percentage of males who attained secondary level education was higher (36.4%) than that of females (31%), while the percentage of females who obtained university level education was higher than that of males.

Although LFS provides a large number of observations and a longer time span, unobserved individual heterogeneity may cause certain problems. Therefore, to overcome the self-selection bias, we use data from the Thai Socio-Economic Survey (SES) conducted by the NSO in 2005, 2006, 2007, 2010, and 2012, in order to further estimate the earnings gap. The survey comprises

randomly sampled 15,000 individuals and 6,000 households all over the country. It contains both household and individual information, but does not contain information on working hours.

Table 2 shows the summary statistics of the SES panel data. The pattern is similar to LFS data. Although the SES has a shorter time period compared with LFS, a comparison of the two datasets indicates that the labor force participation rate is relatively stable (average 72.1% in LFS and 73.7% in SES for females; 85.5% in LFS and 85.1% in SES for males). However, in SES, the monthly wage is higher, the age of the with-children group is older, and the average education level is higher, compared with LFS.

## **4. Methodology**

### **4.1 Estimating the gender wage gap**

In order to investigate the gender wage gap for both point in time and across time periods, two decomposition methods are applied.

#### 1) Blinder-Oaxaca decomposition

The Blinder-Oaxaca decomposition method has been widely used to analyze the gender wage gap (e.g., Weichselbaumer et al. 2007; Hertz et al. 2008; El-Haddad 2009; Tansel 2004; Blau and Khan 2017). The traditional Blinder-Oaxaca decomposition segregates the difference in log wages into two parts: one component is explained by differences in characteristics and the other

is unexplained (Oaxaca 1973; Blinder 1973). While the unexplained gap has always been interpreted as the extent of discrimination in literature, some scholars argue that the unexplained gap may also suggest the effects of unmeasured productivity, compensating differentials, competitiveness, risk aversion, and glass ceilings (Blau and Khan 2017).

The earnings equations are separated into two groups based on the linear model:

$$Y_i^1 = X_i^1 \beta_i^1 + \varepsilon_i^1 \quad (1)$$

$$Y_i^2 = X_i^2 \beta_i^2 + \varepsilon_i^2 \quad (2)$$

where  $Y_i$  is the log wages of individual  $i$ ,  $X_i$  is the vector of explanatory variables, including education, marital status, number of children, age, age squared, and regional dummies.  $\beta_i$  is a vector of coefficients and  $\varepsilon_i$  is the error term.

The ordinary least squares (OLS) method estimates of the coefficient  $\beta_i$  can be obtained and the mean values of earnings for the two groups can be estimated. By deducting the means of the two groups, we have

$$\bar{Y}^1 - \bar{Y}^2 = \bar{X}^1 \beta^1 - \bar{X}^2 \beta^2 = \beta^1 (\bar{X}^1 - \bar{X}^2) + \bar{X}^2 (\beta^1 - \beta^2) \quad (3)$$

In equation (3), the wage gap consists of two terms: the first term represents the impact of gender difference in explanatory variables, and the second term represents the unexplained differential.

## 2) Juhn-Murphy-Pierce decomposition

While the Blinder-Oaxaca decomposition method measures the mean of the earnings gap caused by the observable characteristics of the two groups and the unobserved part at any point in time, the Juhn-Murphy-Pierce (JMP) decomposition method analyzes the change in the earnings gap across time (Juhn et al. 1991, 1993). JMP decomposition is not based on average workers, as the BO decomposition, but on the distribution of workers under the wage structure (Blau and Khan 1997; Rubery et al. 2002).

The JMP method begins with the standard wage equation, replacing the typical residual,  $\varepsilon_{it}$ , into a standardized residual  $\theta_{it}$ , with a mean of zero and variance of one for each year.

$$Y_{it} = X_{it}\beta_t + \sigma_t\theta_{it} \quad (4)$$

where  $Y_{it}$  is the log wages for individual  $i$  in year  $t$ ;  $X_i$  is the vector of explanatory variables; and  $\sigma_t$  is the residual standard error of the baseline group's wages at time  $t$ . The lower value of  $\sigma_t$  indicates a lower earnings inequality.

The change in the gender wage gap between two time points ( $t=0,1$ ) can be decomposed into

$$\Delta\bar{Y}_1 - \Delta\bar{Y}_0 = (\Delta\bar{X}_1 - \Delta\bar{X}_0)\beta_1 + \Delta\bar{X}_0(\beta_1 - \beta_0) + \sigma_1(\Delta\bar{\theta}_1 - \Delta\bar{\theta}_0) + \Delta\bar{\theta}_0(\sigma_1 - \sigma_0) \quad (5)$$



The first term on the right-hand side is the observed X effect, indicating the changes in the quantities of observable characteristics over time. The second term is the observed price effect, which is associated with the changes in the net wage returns to each observed characteristic over time. The third term is the unobserved quantity effect, and the fourth term is the unobserved price effect. The impact of changes in the observed effect and those in the unexplained gap together sum up to constitute the observed change in the total wage gap.

#### **4.2 Estimating the parenthood wage gap**

The estimation of parenthood wage gap begins with the normal Blinder-Oaxaca decomposition (equation 3) using LFS, concerning the effects of marriage and the presence of children. Owing to individual heterogeneity, our results from LFS suffer from the self-selection bias. For example, poor or less motivated women are more likely to marry and have children. Moreover, the change in earnings may cause marriage or parenthood, rather than the other way around. For example, women may choose to have children after getting a demotion or they may decide to marry if they receive a promotion.

Thus, we shift our focus to the SES panel data and apply the fixed effects model. As suggested by Juhn and McCue (2017), the fixed effects model cannot solve the selection bias entirely, as the selection is based on differences in expected earnings trajectories rather than in the level of earnings. Therefore, considering these possible problems, we conduct an event-study analysis, estimating the earnings trajectories before and after the event, in particular, marriage and the presence of children, using SES panel data (Juhn and McCue 2017).

We formulate the fixed effects model as follows:

$$Y_{it} = \beta X_{it} + \gamma M_{it} + \delta K_{it} + \alpha_i + \varepsilon_{it}$$

where  $M$  is a marriage dummy variable, which equals 1 if the individual is married, and zero otherwise;  $K$  is a parenthood dummy variable, which equals 1 if the individual has at least one child;  $\alpha_i$  is the unobserved component of individual characteristics that affect the earnings; and  $X$  refers to other controlling variables, including education, age, age squared, and regional dummies. The results are showed in Table 7.

The fixed effects model, which estimates the earnings gap for the same individuals before and after marriage and having children, yields persistent results in the mean earnings between single and married women, as well as mothers and non-mothers. Juhn and McCue (2016) suggest that the selection effects applying the fixed effects model using panel data are closely related to the cross-sectional results.

As suggested by Weeden et al. (2016), much of the literature on family wage gaps relies on longitudinal data from a single cohort, and is less concerned with trends. Exceptions are Goldstein and Kenny (2001) and Isen and Stevenson (2010), who argue that the most educated women are less likely to marry in earlier cohorts but more likely to marry in recent cohorts.

Pal and Waldfigel (2016) find a decline in motherhood wage gap from 6 percent to 1 percent during 1993–2013, while Avellar and Smock (2003) do not find any changes in the motherhood wage gap.

Women in later cohorts obtaining more education are less likely to be affected by marriage and the presence of children (Goldin 2006). Juhn and McCue (2017) suggest that in the US, the selection of women into motherhood may become more positively correlated with income and education over time. We estimate the parenthood gap by comparing the cohorts born between 1955 and 1994.

## **5. Results**

### **5.1 Gender wage gap**

Table 3 shows the Blinder-Oaxaca decomposition results for men and women. The positive total difference indicates higher average wages for men than for women. For each year—1985, 1995, 2005, and 2017—we find a positive wage gap, and the gap continues to decrease over time, from 0.344 to 0.033. The explained gap decreases over time and becomes increasingly negative, which indicated that females, on average, have more favorable observed characteristics (Nakavachara 2010). For details of explained part, education plays a significant role in the explained gap. In 1985, education only accounted for a small positive part (0.008), while in 2017, it shows a significant influence on the wage gap (-0.079).

Our results are consistent with Phananimai (1993) and Nakavachara (2010), the contribution of education indicates the superior schooling for women in the wage sector. The magnitude of education increases rapidly in the first two decades, and thereafter, the pace becomes slower in

the most recent decade. Compared to education, other factors have a relatively smaller impact on the gender wage gap. However, the impact of industry and occupation variables shows an increasing trend (0.009 to -0.012; 0.039 to -0.027). According to Blau and Kahn (2017), the overall wage structure can affect the gender wage gap, as men and women have different skills and they work in different occupations and industries.

Table 4 shows the Juhn-Murphy-Pierce decomposition results. We divide the data into three time periods: 1985–1995, 1995–2005, and 2005–2017<sup>4</sup>. The negative change in the total difference represents the reduction in the gender wage gap between men and women, which is consistent with the result of the Blinder-Oaxaca decomposition. The wage gap decreases by 20.3% during 1985–1995, 3.5% during 1995–2005, and 7.3% during 2005–2017. The decline in the change in explained part has increased over time (0.002 during 1985–1995; 0.016 during 1995–2005; and 0.021 during 2005–2017).

Specifically, regarding the changes in the explained part, each of the factors contributes to the changes in quantities and changes in price (equation 5). In the first two time periods, the change in quantities contributes more to the change in total difference (73.25% during 1985–1995; 54.88% during 1995–2005). The education factor in quantities accounts for a large part during the first two periods, but decreases substantially during the last period (24.85% during 1985–1995; 52.92% during 1995–2005; and 7.96% during 2005–2017). Industry and occupation variables also contribute to the convergence of gender wage gap.

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<sup>4</sup> Each of the periods contains major economic events, including the Asian financial crisis in 1997, global financial crisis in 2008, Thailand floods in 2011, and Eurozone crisis in 2012. Similar patterns are shown for the time periods taking the crises into consideration.

The results are consistent with those in other developing countries. For example, industry accounts for nearly one-fourth of the explained part of wage gap in Malaysia (Ismail 2015), and the significance of educational attainments and industry category for the gender wage gap is found in Indonesia (Taniguchi and Tuwo 2014).

The results of the two decomposition methods suggest that the gender wage gap in Thailand has witnessed a decreasing trend over the last 32 years, and the wages of men and women almost converge on each other. Thus, we move to examine the parenthood wage gap, considering whether marriage and having children causing the gender wage inequality.

Figure 3 shows the percentage of difference in average wage between women (men) without children and women (men) with children in Thailand. The positive number indicates that childless women (men) earn more than mothers (fathers). We do not observe the fatherhood premium from the figure. For women, the gap has increased approximately 10% over the last three decades, while for men the changes are relatively small.

## **5.2 Parenthood wage gap**

Overall, the parenthood wage gap for both mothers and fathers over the three decades show wage penalty. Table 5 show the Blinder-Oaxaca decomposition for the motherhood earnings gap for both married and unmarried women, specified in four cohorts and two age groups. The negative results indicate that those without children earn a higher wage than those with children for both the married and unmarried groups, suggesting a negative impact of motherhood on women's

wages. The result is consistent with previous studies on motherhood penalty (Becker 1981, 1985; Waldfogel 1997; Glauber 2008; Juhn and McCue 2017).

To explain the motherhood wage gap, Becker (1985) hypothesizes that women with children are less motivated or put less effort in the labor market. Later studies have provided support for this hypothesis (Hersch and Stratton 1994; Neumark and Korenman 1994; Waldfogel 1997). Besides, the discrimination against women with children in the labor market has also been found to explain the motherhood penalty (Goldin 1990). Moreover, Waldfogel (1998) suggests that the lack of institutional support for mother-workers in the labor market, such as job-protected maternity leave, generates barriers for women with children in employment.

The negative effect of motherhood varies substantially across the cohorts and does not show a monotonic pattern. In general, for the married group, the gap has declined across cohorts (-0.257 to -0.103; -0.209 to -0.063; -0.096 to -0.02). For the overall sample, the unmarried group shows a larger wage gap compared with the married group. For those aged 30–35 years, the married group has a smaller gap compared with those aged 25–29 years, while for the unmarried group, the results are the opposite.

Previous studies on the parenthood wage gap mainly focus on developed countries. The magnitude of motherhood wage gap varies based on different sample selections and methodologies. Waldfogel (1997) finds that women with one child pay a 6% wage penalty and a 13% wage penalty for those with two children, using hourly wage. Budig and England (2001) suggest a 5% motherhood wage penalty considering the mother fixed effect. Using the annual

earnings information, Juhn and McCue (2017) find a 35% motherhood wage penalty for married women with children aged below 6 years, and a 17% wage penalty for those with children aged between 6 and 17 years, taking into account the selection bias from marriage and parenthood.

Table 6 presents the results for the motherhood wage gap using SES panel data. The left-hand column uses OLS estimation and the right-hand column applies the fixed effects model. Consistent with the LFS results, the estimates for both models show negative values, indicating the motherhood penalty for each cohort. Moreover, the married group has a smaller motherhood gap than the unmarried group.

When we take the selection into consideration, especially for the younger-aged children group, the motherhood gap is usually smaller than that obtained from the OLS estimation. The gap for the younger-aged children group has decreased across cohorts (married: -0.375 to -0.162; unmarried: -0.527 to -0.376), but the gap for the older-aged children group has not decreased.

The results suggest that the motherhood effect on wages in LFS may be somewhat overestimated if we consider the selection. The findings are similar to Juhn and McCues (2017), which compared the motherhood effect using Current Population Surveys (CPS) data without solving for the selection with that using the Survey of Income and Program Participation (SIPP) panel data using the fixed effects model.

Similarly, Table 7 shows the Blinder-Oaxaca decomposition results for fatherhood using LFS data, conditioning on marital status. The negative results indicate the existence of fatherhood

penalty across each cohort and age group, which is distinct from the fatherhood bonus found in developed countries.

An exception in the literature on fatherhood wage gap is Cools and Strom (2014), who find wage penalty for fathers in Norway, indicating men's increasing involvement in child rearing and a large share of fatherhood penalty can be explained by the duration of parental leave.

With the rapid progress in social and economic development, the role of women in Thailand has undergone a transformation. Furthermore, there is more support for women, particularly married women, in the labor market. Consequently, married men are expected to share more household responsibilities, including childcare, compared to their wives (Yoddumnern-Attig 1992, Pinyuchon and Gray 1997). Policies promoting men to participate in childbearing and child rearing encourage Thai fathers to be more involved in their wives' pregnancy and childcare (Tanasirijiranont 2016).

However, according to the Ministry of Labor in Thailand (2017), women are entitled to 90 days of maternal leave. Currently, working fathers are not entitled to paternal leave in the private sector. Moreover, in the public sector, working fathers are only entitled to 15 days parental leave, which is much shorter compared with developed countries. For example, in Sweden, both parents are offered 480 days of parental leave. The insufficient supports for fathers in the labor market and the needs of fathers in household chores put them into an embarrassing situation in Thailand.



Overall, the fatherhood wage gap for the married group across cohorts decreases over time (-0.28 to -0.082), while it increases for the unmarried group (-0.26 to -0.37). The unmarried fatherhood gap is larger than the married one, which is similar to what we have found in the case of motherhood. Compared with the motherhood wage gap, the magnitude and trend of fatherhood wage gap does not exhibit any significant difference.

Table 8 shows the results for the fatherhood wage gap using SES panel data, with a comparative analysis of the OLS and fixed effect model. Robust results for the fatherhood penalty have been found in both estimation models, which is consistent with LFS data estimation.

The fatherhood wage gap has also decreased across the cohorts for the married group (-0.243 to -0.065). The results for the married fatherhood wage gap are lower than the unmarried group, which is consistent with previous findings. The gaps under the fixed effects model are lower compared to OLS, indicating that the fatherhood effect may also be partially overstated in LFS after solving for selection bias.

## **6. Conclusion**

This study explores the gender wage gap in Thailand from 1985 to 2017. Using two decomposition methods, we find a continuous decline in wage gap. Education has accounted for the largest part in explaining the convergence in gender wage gap over time, followed by the industry and occupation. However, this convergence has slowed down in recent years, and the wage gap is greater among parents and non-parents. We quantify the wage effects of parenthood

and find a wage penalty for both motherhood and fatherhood in Thailand, which is contrary to the findings in most developed countries.

Moreover, population aging is underway aggressively in Thailand. The UN projections indicate that the share of the elderly population will exceed that of children aged below 15 years in just a few years (Knodel and Teerawichitchainan 2017). The Office of the National Economic and Social Development Board (NESDB 2013) has predicted that the total fertility rate (TFR) will drop from 1.62 to 1.3 children from 2010 to 2040. The percentage of nuclear families without children has increased from 5.6 percent to 16.2 percent for all households from 1987 to 2013 (United Nations Population Fund Thailand 2015). This finding has raised a concern that Thai couples tend to be childless by choice.

The government should strive to lower the cost of child rearing, considering that there is a parenthood penalty for both mothers and fathers. For example, the Thai government could implement appropriate policies such as offering subsidies for newborn child, providing paid and adequate maternity leave, family leave, following majority of OECD countries, where egalitarian tax and benefit status are applied among household partners to promote greater gender equality and employment prospects among parents (Jaumotte 2003, Grimshaw and Rubery 2015).

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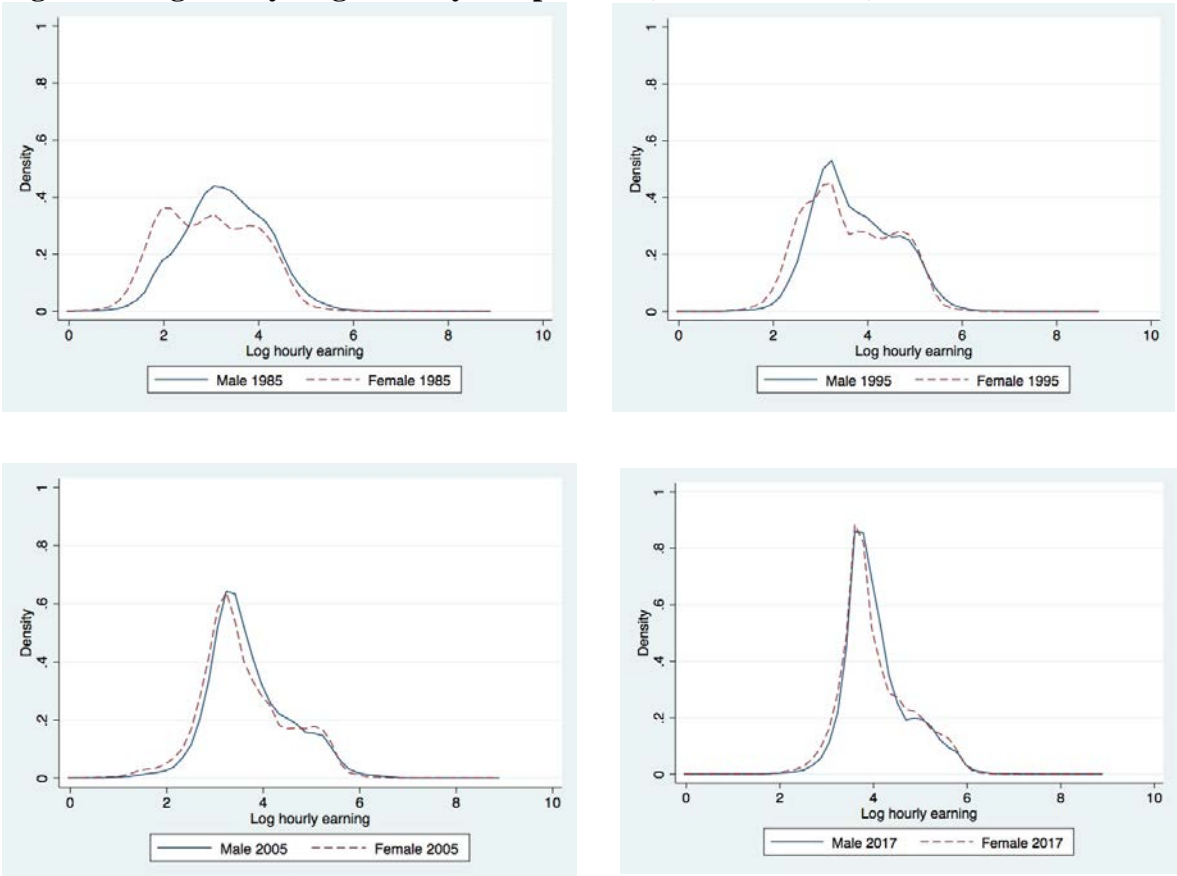
**Figure1. Gender wage gap in Thailand (1985-2017)**



Source: Authors' Calculation from LFS (1985-2017)

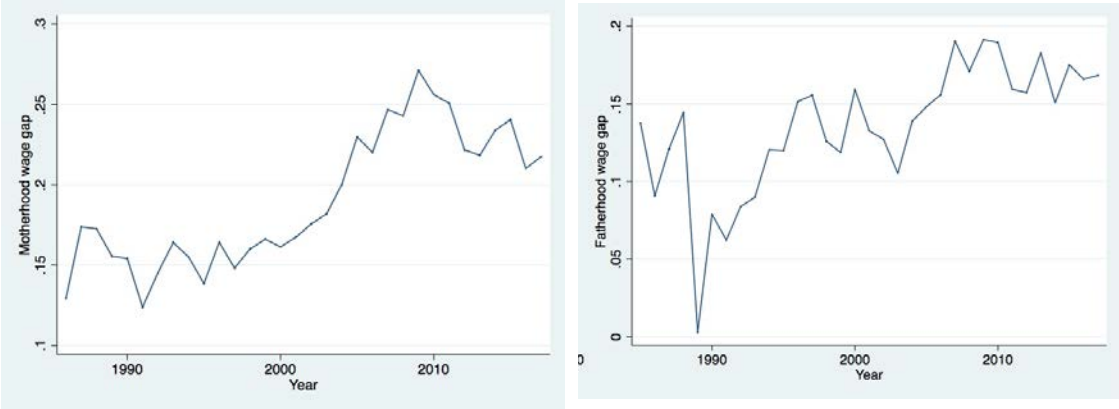


Figure 2. Log hourly wage density comparison (male VS female)



Source: Authors' Calculation from LFS (1985-2017)

**Figure3. Motherhood &Fatherhood wage gap in Thailand (1985-2017)**



Source: Authors' Calculation from LFS (1985-2017)

**Figure4. The changes of percentage in gender difference in occupations**

<b>Year</b>	<b>Men</b>	<b>Women</b>	<b>Difference</b>
<b>Managerial jobs and related</b>			
1985-1995	75.50%	24.50%	51.00%
1996-2006	70.87%	29.13%	41.74%
2007-2017	69.30%	30.70%	38.59%
<b>Professional jobs and related</b>			
1985-1995	65.29%	34.71%	30.57%
1996-2006	52.95%	47.05%	5.91%
2007-2017	48.66%	51.34%	-2.67%
<b>Administration jobs and related</b>			
1985-1995	42.97%	57.03%	-14.05%
1996-2006	36.08%	63.92%	-27.84%
2007-2017	30.84%	69.16%	-38.32%
<b>Production jobs and related</b>			
1985-1995	58.07%	41.93%	16.14%
1996-2006	61.92%	38.08%	23.83%
2007-2017	70.30%	29.70%	40.61%
<b>Agricultural jobs and related</b>			
1985-1995	50.51%	49.49%	1.03%
1996-2006	52.99%	47.01%	5.97%
2007-2017	54.17%	45.83%	8.34%

**Table1. Summary statistics for LFS 1985-2017, men and women**

	With children		Without children	
	Female	Male	Female	Male
Mean of labor force participation	0.679	0.838	0.764	0.872
Log hourly wage	3.563	3.693	3.831	3.859
Log monthly wage	8.805	8.959	9.076	9.125
Age	36.509	36.529	42.909	41.357
Education:				
Primary level	0.609	0.565	0.570	0.499
Secondary level	0.310	0.364	0.261	0.359
University level	0.074	0.063	0.152	0.125
Observations	1,365,789	1,180,178	667,066	597,201

**Table2. Summary statistics for SES panel 2005-2012, men and women**

	With children		Without children	
	Female	Male	Female	Male
Mean of labor force participation	0.709	0.846	0.766	0.855
Log monthly wage	10.138	10.303	10.485	10.496
Age	37.371	37.128	42.215	40.872
Education:				
Primary level	0.514	0.483	0.481	0.452
Secondary level	0.268	0.334	0.208	0.326
University level	0.218	0.183	0.310	0.222
Observations	21,339	18,768	10,496	9,370

**Table3. Blinder-Oaxaca results (Men and Women)**

	1985		1995		2005		2017	
<b>Total Difference</b>	0.344		0.141		0.105		0.033	
<b>Unexplained</b>	0.162		0.200		0.183		0.134	
<b>Explained</b>	0.182		-0.059		-0.077		-0.101	
Explained details:								
<i>Education:</i>	0.008	2.26%	-0.043	-30.52%	-0.071	-67.81%	-0.079	-243.52%
Primary level	0.004		0.001		-0.004		-0.050	
Secondary level	0.015		0.008		0.020		-0.052	
University level	-0.012		-0.052		-0.088		0.022	
<i>Age&amp;Age square:</i>	0.106	30.74%	0.053	37.90%	0.011	10.70%	0.015	46.17%
Age	0.308		0.136		0.031		0.024	
Age squared	-0.203		-0.082		-0.020		-0.009	
Industry variables	0.009	2.55%	-0.003	-1.81%	-0.002	-2.37%	-0.012	-35.99%
Occupation variables	0.039	11.24%	-0.072	-51.20%	-0.018	-17.04%	-0.027	-82.46%
Regions	-0.012	-3.52%	-0.007	-4.77%	-0.003	-3.18%	-0.001	-3.36%

**Table4. Juhn-Murphy-Pierce results (Men and Women)**

	1985-1995		1995-2005		2005-2017				
<b>Change in total difference (dT)</b>	-0.203		-0.035		-0.073				
<b>Change in unexplained part</b>	0.002		-0.019		-0.051				
<b>Change in explained part</b>	-0.002		-0.016		-0.021				
	Q	P	Q	P	Q	P			
Change in explained details:									
Total	-0.205	-0.149	-0.057	-0.016	-0.019	0.003	-0.021	0.001	-0.022
(% of dT)	73.25%	27.81%			54.88%	-8.80%		-1.15%	30.56%
<i>Education:</i>	-0.045	-0.051	0.006	-0.029	-0.019	-0.011	-0.010	-0.006	-0.005
(% of dT)	24.85%		-2.83%		52.92%	30.71%		7.96%	6.26%
Primary level	-0.006	-0.009	0.003	-0.001	0.001	-0.001	-0.046	-0.002	-0.043
Secondary level	-0.005	-0.005	0.000	0.015	0.033	-0.018	-0.071	-0.003	-0.068
University level	-0.034	-0.036	0.002	-0.043	-0.052	0.008	0.106	-0.001	0.107
Age	-0.155	-0.092	-0.062	-0.092	-0.082	-0.011	-0.003	0.019	-0.022
Age square	0.104	0.048	0.056	0.051	0.042	0.009	0.006	-0.011	0.017
Industry variables	-0.261	0.767	0.202	0.053	0.036	0.017	0.000	-0.003	0.003
Occupation variables	-0.089	-0.047	-0.043	0.004	0.008	-0.004	-0.013	0.001	-0.014
Change in unexplained details:	0.002	0.019	-0.017	-0.019	-0.023	0.004	-0.051	-0.028	-0.023
(% of dT)	-9.31%	8.25%			66.29%	-12.37%		39.02%	31.57%

**Table5. Motherhood earning gap by birth cohort and marital status using LFS**

Birth cohort	Overall		Age 25-29		Age 30-35	
	Married	Unmarried	Married	Unmarried	Married	Unmarried
1955-1964	-0.257 (0.008)	-0.399 (0.010)	-0.209 (0.026)	-0.326 (0.023)	-0.096 (0.022)	-0.410 (0.024)
1965-1974	-0.094 (0.006)	-0.555 (0.007)	-0.242 (0.011)	-0.345 (0.013)	-0.192 (0.012)	-0.395 (0.015)
1975-1984	-0.042 (0.005)	-0.485 (0.006)	-0.170 (0.008)	-0.233 (0.010)	-0.088 (0.009)	-0.325 (0.012)
1985-1994	-0.103 (0.007)	-0.435 (0.008)	-0.063 (0.011)	-0.175 (0.013)	-0.020 (0.028)	-0.217 (0.043)



**Table6. Motherhood earning gap by birth cohort and marital status using SES panel**

Birth cohort	OLS		Fixed effect	
	Married	Unmarried	Married	Unmarried
Overall				
1955-1964	-0.158 (0.057)	-0.331 (0.081)	-0.119 (0.070)	-0.321 (0.103)
1965-1974	-0.257 (0.050)	-0.472 (0.054)	-0.282 (0.061)	-0.504 (0.073)
1975-1984	-0.310 (0.035)	-0.331 (0.039)	-0.324 (0.046)	-0.322 (0.046)
1985-1994	-0.196 (0.058)	-0.348 (0.058)	-0.157 (0.066)	-0.337 (0.061)
Child<6				
1955-1964	-0.452 (0.076)	-0.558 (0.122)	-0.375 (0.089)	-0.527 (0.146)
1965-1974	-0.124 (0.059)	-0.484 (0.071)	-0.120 (0.069)	-0.524 (0.088)
1975-1984	-0.295 (0.038)	-0.374 (0.053)	-0.314 (0.048)	-0.348 (0.060)
1985-1994	-0.198 (0.061)	-0.383 (0.073)	-0.162 (0.068)	-0.376 (0.077)
Child 6-17				
1955-1964	-0.042 (0.062)	-0.230 (0.091)	-0.017 (0.075)	-0.212 (0.115)
1965-1974	-0.323 (0.053)	-0.467 (0.063)	-0.341 (0.064)	-0.490 (0.082)
1975-1984	-0.343 (0.047)	-0.299 (0.048)	-0.344 (0.057)	-0.305 (0.057)
1985-1994	-0.191 (0.085)	-0.322 (0.068)	-0.165 (0.094)	-0.314 (0.072)

**Table7. Fatherhood earning gap by birth cohort and marital status using LFS**

Birth cohort	Overall		Age 25-29		Age 30-35	
	Married	Unmarried	Married	Unmarried	Married	Unmarried
1955-1964	-0.280 (0.006)	-0.263 (0.011)	-0.192 (0.020)	-0.228 (0.023)	-0.168 (0.015)	-0.283 (0.025)
1965-1974	-0.122 (0.005)	-0.442 (0.007)	-0.205 (0.010)	-0.274 (0.012)	-0.178 (0.009)	-0.293 (0.015)
1975-1984	-0.057 (0.005)	-0.396 (0.005)	-0.134 (0.008)	-0.231 (0.009)	-0.092 (0.008)	-0.217 (0.012)
1985-1994	-0.082 (0.007)	-0.372 (0.006)	-0.048 (0.010)	-0.181 (0.011)	-0.017 (0.019)	-0.199 (0.028)

**Table8. Fatherhood earning gap by birth cohort and marital status using SES panel**

Birth cohort	OLS		Fixed effect	
	Married	Unmarried	Married	Unmarried
Overall				
1955-1964	-0.243 (0.044)	-0.397 (0.103)	-0.222 (0.053)	-0.465 (0.123)
1965-1974	-0.217 (0.040)	-0.178 (0.062)	-0.239 (0.049)	-0.137 (0.079)
1975-1984	-0.175 (0.033)	-0.244 (0.042)	-0.174 (0.041)	-0.241 (0.050)
1985-1994	-0.065 (0.062)	-0.309 (0.045)	-0.052 (0.069)	-0.306 (0.048)
Child<6				
1955-1964	-0.445 (0.054)	-0.553 (0.160)	-0.388 (0.064)	-0.606 (0.195)
1965-1974	-0.179 (0.045)	-0.250 (0.086)	-0.189 (0.055)	-0.266 (0.108)
1975-1984	-0.172 (0.035)	-0.272 (0.055)	-0.174 (0.042)	-0.277 (0.060)
1985-1994	-0.032 (0.063)	-0.354 (0.062)	-0.009 0.070	-0.357 (0.066)
Child 6-17				
1955-1964	-0.157 (0.047)	-0.347 (0.111)	-0.139 (0.056)	-0.381 (0.128)
1965-1974	-0.247 (0.043)	-0.138 0.073	-0.263 (0.052)	-0.097 (0.088)
1975-1984	-0.182 (0.046)	-0.221 (0.053)	-0.179 (0.050)	-0.216 (0.063)
1985-1994	-0.184 (0.109)	-0.287 (0.048)	-0.172 (0.113)	-0.286 (0.052)