The Presence of Child and Spouse in the Household and Labor Market Opportunities of Male and Female Workers in Thailand

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Abstract. Male and female populations are exposed to different life cycle risks that could reduce labor market opportunities. Since one of the main factors affecting the livelihood of the female population is family and childbearing, this study analyzes the effects of having spouse and child presented in the household on the labor market participation and opportunities of female young adults comparing to male young adults in Thailand. As the estimation faces the crucial problem of selection bias, in which women with higher qualifications or a focus on career success are more likely to choose to remain single or not have children, the Multinomial Treatment Model developed by Deb (2009) is adopted to estimate the effects to correct for the sample selection. The results suggest that the presence of a spouse in the household not only does not reduce the likelihood of female young adults entering the labor market or reduce their incomes, but also leads them to work more and earn higher incomes. However, the presence of children reduces the likelihood that women will enter the labor market, reduce their hours of work, and reduce their incomes. For male young adults, the effects of the presence of a spouse and a child in the household are similar to those for women, except for the labor force participation dimension in the case that both the spouse and the child live together in the household. While female workers living with a spouse and a child are less likely to participate in the labor market, male workers are more likely to work.

Keywords: Female labor force participation · Gender income gap · Parenthood penalty · Multinomial Treatment Model · Sample selection

1 Introduction

Economic participation and opportunity directly affect the well-being of the population. The male and female populations experience different life cycle risks that could reduce economic opportunities. Some of the risk factors differ between the

male and female populations. As one of the main factors that affect the livelihoods of the female population is family and childbearing factors, the purpose of this study is to analyze the effects of having spouse and child presented in the household on the labor market participation and opportunities of Thai women compared to Thai men.

For an overview of the male-female inequality in Thailand, the World Economic Forum's Global Gender Gap Index measures gender equality in four areas: Health and Survival, Education Attainment, Economic Participation and Opportunity and Political Empowerment. Thailand's gender inequality is moderate. In 2020, Thailand's Gender Gap Index was 0.71 points, ranked 79th in the world. For the Economic Participation and Opportunity subindex, it is measured by the status in the women's labor market including labor force participation, wage equality for similar work, and estimated earned income, ratio of legislators, senior officials and managers and ratio of professional and technical workers.

In 2019[1], the labor force participation rate for women aged 18–60 was 78.03%. This was lower than the labor force participation rate for men of 90.63%. In terms of income in the labor market, female workers earned an average of 11,864 baht per month, which is lower than the average 13,870 baht per month for male workers. In term of high-skilled positions, the proportion of female workers employed in a professional or technical position was 12.14% of all employed females. This was higher than male workers, where professional or technical positions were accounted for only 7.98% of all employed males. The higher proportion of high-skilled positions of female workers is due to the fact that women in Thailand are more educated than men. Among women aged 18–60, 7.95% had a professional degree and 18.77% had a bachelor's degree or higher, while only 10.73% of men had a professional degree and 12.96% had a bachelor's degree or higher. The gender gap in the participation and economic opportunity sub-index is largely due to the fact that female workers hold fewer management-level positions compared to men. The proportion of female workers in management positions was 2.40% of all employed women. This is less than the male workforce, which accounted for 4.41% of all employed men[2].

Differences between men and women in labor market participation and opportunities can be due to family factors, such as marriage and childbearing. Over the past 50 years, marriage have been viewed as a choice rather than a practice [10] and the marriage rate falls [4]. Becker [1] developed a rational choice theory to explain marriage and childbearing decisions by comparing costs and benefits. Subsequently, Browning, Chiappori and Weiss [4] outlines the benefits of marriage from an economic perspective as a collaboration for the purpose of mutual production in term of division of labor and consumption. The benefits of

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[1] The statistics reported were calculated from the 2019 Socio-Economic Survey (SES) data. The monthly income and proportions of high-skilled positions are the average for all employed workers.

[2] The occupational classification used in this study follows ISCO-08, where Managers are major group 1, Professionals are major group 2 and Technicians and associate professionals are major group 3.

marriage differ across couples and depends on several factors including attitude, culture and economic factors. The main economic factors include education and income [1,10].

For the decision to have children, Hashemzadeh et al. [12] reviewed 53 studies on factors affecting fertility from 1946 to 2021 and found that factors affecting fertility are diverse. There are both personal and family factors. Personal factors include demographic factors, physical and mental health, happiness and desire to have children, and occupational status. Family factors include marital status, marital equality and satisfaction, attitudes toward gender roles, family and friend networks, and living locations and conditions. There are also macro-level factors such as cultural and social principles that influence marriage and childbearing.

Childbearing has been shown in the literature to have negative effects on mothers' labor force participation and opportunities. There are literatures on the costs of childbearing, which is measured by the wage differences between female workers with and without child. Cukrowska-Torzewska and Matysiak [7] reviewed the effects of having children on mothers' wages from 453 studies and found that women in many countries had lower wages after having children and that the average wage gap was 3.6–3.8%. Sabates-Wheeler and Kabeer [18] explains that gender inequality in most labor markets is caused by the division of labor between men and women, with women doing domestic work and men doing labor market work. The division of labor also affect the choice of jobs and career growth of women. In addition, the possibility of childbearing also can cause the discrimination in the labor market against women, especially in cases that pregnancy and child benefits are not well-developed [19].

In Thailand, Bui and Permpoonwiwat [6] examined wage inequality between male and female workers using the Labor Force Survey (LFS) data from 1996, 2006, and 2013. The results show that the gender wage gap in Thailand reduced from 14% in 1996 to % in 2013, mainly due to the higher education and skills improvement of women compared to men. Regarding family factors, Bui and Permpoonwiwat [6]'s regression using the 2013 data shows that marriage has a positive effect on wages for male workers, but a negative effect for female workers. Paweenawat and Liao [17] examined gender wage gap and parenthood wage gap for married and unmarried women using the 1985–2017 cross-sectional LFS and the 2005–2012 panel Socioeconomic Household Survey (SES) data. The fixed-effects estimation using the SES panel data for the study's most recent birth cohort (1985–1994) shows that 15.7% of motherhood penalty for married women and 33.7% penalty for unmarried women. For men, the results show smaller effects, which are 5.2% and 30.% fatherhood penalty for married and unmarried men.

Since one of the main explanations for the wage gap in marriage and childrearing is the division of labor between housework (including childcare) and labor market work, this study examines the effects of the presence of a spouse and child in the household on women's labor market opportunities. Specifically, women and men are classified into four groups including (1) single/no spouse and no child presented in the household (No spouse, no child: NS-NC), (2) single

parent (No spouse, with child: NS-WC), (3) spouse presented in the household but no child presented in the household (With spouse, no child: WS-NC) and (4) both spouse and child presented in the household (With spouse, with child: WS-WC). This study then compares the labor market opportunities, including labor force participation, likelihood of working in a high-skilled job, monthly income and working hours, among the four groups of people with different household structures.

In this study, cross-sectional data from the 2019 Socio-Economic Survey (SES) by Thailand's National Statistical Office are used for analysis. An advantage of the SES over the Labor Force Survey (LFS) is that the SES collects monthly income data for all work statuses including employers, own account workers, contributing family workers, members of producers' cooperative and employees. The LFS has more observations per year, but only collects income data for wage employees. Because the effects of the presence of a spouse and a child in the household on parents' income differs for wage earners and the self-employed [5], this study chooses the SES data to also capture the income of non-employees.

In estimating the effects of the presence of a spouse and child in the household on labor market opportunities, a crucial selection bias problem arises because women with higher qualification or a focus on career success are more likely to choose to remain single or not have children. As these women are more likely to work and earn higher income, the estimated impact can be overestimated [20]. For this reason, this study adopted the Multinomial treatment model by Deb [8] as the model can correct the selection bias. Because the effects of marriage and childbearing on labor force participation and opportunities for women are generally higher in the years of marriage and childbearing or for younger mothers [15,17], this study focuses on examining the effects on young female adults aged 18 to 35 years old[3]. In addition, this study also compares the effects of the presence of a spouse and a child in the household on women's labor market opportunities with those of men.

2   Methodology

As the estimation of the effects of the presence of a spouse and child in the household on labor market opportunities faces the bias due to women and men's selection into living with their spouses and children, this study adopts the multinomial treatments and continuous, count and binary outcomes model or the multinomial treatment model (MTM) by Deb [8]. The MTM model estimates the treatment effects of multinomial treatments on the outcome variable by

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[3] An additional reason for the scope to only study young adults is the data limitation. We can only observe parent-child relationships if the child is still living in the same household as his/her parents (See the data section for more details). As children are more likely to leave home after a certain age, the bias from the unobserved parent-child relationship increases, this study only focuses on young adults aged 18–35 years old.

using a system of two equations consisting of (1) the multinomial treatments selection equation and (2) the outcome equation. The MTM model was chosen for this study for two main reasons, namely because the treatment effects are corrected for the sample selection problem and because the models can be used with different types of outcome variables, including continuous, counting, and binary variables. In addition, although recommended, the MTM model does not require exclusion restrictions [8].

2.1   The Multinomial Treatments Selection Equation

For the multinomial treatments selection, each individual i can choose a household structure j from the following four choices: (1) single/no spouse and no child presented in the household (No spouse, no child: NS-NC), (2) single parent (No spouse, with child: NS-WC), (3) spouse presented in the household but no child presented in the household (With spouse, no child: WS-NC) and (4) both spouse and child presented in the household (With spouse, with child: WS-WC). From the choice, the individual will receive the unobserved utility V_{ij}^*:

$$V_{ij}^* = z_i^{'}\alpha_j + \delta_j l_{ij} + \eta_{ij} \tag{1}$$

where z_i is the exogenous variable affecting the presence of a spouse and child in the household, l_{ij} is the unobserved variables affecting, V_{ij}^*, α_j and δ_j are parameters for each choice j and η_{ij} is the error term.

Let $\mathbf{d}_i = (d_{i1}, d_{i2}, ..., d_{ij})$ be a vector of the dummy variable for each choice j and $\mathbf{l}_i = (l_{i1}, l_{i2}, ..., l_{ij})$ be a vector of unobserved variables affecting V_{ij}^*. The probability of an individual i choosing each choice is given by:

$$\Pr\left(\mathbf{d}_i \,|\mathbf{z}_i \mathbf{l}_i\right) = g\left(\mathbf{z}_i^{'}\alpha_1 + \delta_1 l_{i1}, \mathbf{z}_i^{'}\alpha_2 + \delta_2 l_{i2}, ..., \mathbf{z}_i^{'}\alpha_j + \delta_j l_{ij}\right) \tag{2}$$

where g is the Mixed multinomial logit (MMNL) distribution.

2.2   The Outcome Equation

This study examines effects of the presence of a spouse and child in the household on labor market outcomes y_k in four dimensions as follows:

The expected outcome y_k is

$$E\left(y_{ik} \,|\mathbf{d}_i, \mathbf{x}_i, \mathbf{l}_i\right) = \mathbf{x}_i^{'}\beta_k + \sum_{j=0}^{J} \gamma_{jk} d_{ij} + \sum_{j=0}^{J} \lambda_{jk} l_{ij} \tag{3}$$

where $\mathbf{x}_i$ is the exogenous factors affecting the labor market outcomes, λ_{jk} are the factor-loading parameters capturing the correlation of the treatment and outcome variables through unobserved characteristics and γ_{jk} are the treatment effects of the household structure choice d_j on the labor market outcome y_k (Table 1).

Table 1. Outcome variables

	Outcome	Description	Type of variable	Distributional assumption
y_1	Labor force participation	= 1 if in the labor force, = 0 otherwise	Binary variable	Logistic
y_2	High-skill job	= 1 if work in professional or technical jobs, = 0 otherwise	Binary variable	Logistic
y_3	Monthly income	nln(Monthly income)	Continuous variable	Normal
y_4	Working hour	ln(Working hour per month)	Continuous variable	Normal

Note: nln(Income) = sign(Income)*ln(abs(Income)+1) is the negative logarithm function, which is the logarithm transformation for both positive and negative values [14].

To determine whether each explanatory variable significantly determines the outcome, the Bayes factor upper bound (BFUB) is used instead of the traditional p-value. As stated in Halsey [11], the BFUB is the upper bound of the odds in favor of the alternative hypothesis ($H_a : \beta, \gamma \neq 0$) relative to the null hypothesis ($H_0 : \beta, \gamma = 0$). In particular, the BFUB can be written as a function of the p-value (p) as follows:

$$BFUB = \frac{-1}{e \cdot p \cdot \ln(p)}.$$ (4)

It should be noted that, the BFUBs that exceed 999 are reported as 999 in this study. The BFUB equals to 999 means that the odds in favor of the (H_a) relative to the (H_0) is 999 to 1, which should be considered as a strong enough evidence to support that the explanatory variable significantly determines the outcome. For the comparison purpose, the p-value of 0.01 corresponds to a BFUB of only 8.13 [3].

3   Data

To study the effects of having child and spouse presented in the household on labor market opportunity of workers in Thailand, this study uses work, individual and household characteristics data of male and female young adult aged 18–35 years old from the 2019 Socio-Economic Survey (SES). The 2019 SES is a comprehensive cross-sectional data by Thailand's National Statistical Office with a total sample of 124,874 individuals, 22,599 of whom are between the age of 18–35 years old.

The limitation of the SES data is that there is no variable for the relationship between parent and child. Only the variable for the relationship to the head of household is provided. Since the parent-child relationship is required for the

estimation, only the samples where the parent-child relationship can be matched are included in this study. The matching of parent and child can be done in two cases. The first case is when the parent is the head of the household or spouse of the head of household. In this case, the child can be identified directly from the relationship to the head of household variable. The second case is when the parent is the child of the head of household. In this case, the child can be identified as the grandchildren of the head of household. The parent-child matching in the second case is complicated as the head of household may have several children. For this issue, the parent-child relationship is identified by the order of data entry in the SES survey, in which the children of each child of the head of household are entered directly after their parents. It should be noted that parents and children can only be matched if they live in the same household. If the child moves out of the household, the person is classified as having no child. For this reason, the study focuses on the effects of having a child presented in the household, rather than the effects of having children in general.

The description and basic statistics of all variables used in this study are shown in Table 2.

4   Results and Discussion

The MTM model uses the cross-sectional data from the 2019 SES survey to simultaneously estimate a system of two equations, the multinomial treatment and outcome equations. Therefore, the results are presented in two parts. Part 1 discusses the factors that influence the decision to live with a spouse or a child, and Part 2 examines the effects of having a spouse and a child in the household on the labor market opportunities of young female and male adults aged 18 to 35 years old.

4.1   Factors Affecting the Decision to Live with a Spouse or a Child

The factors affecting the decision to live with a spouse or a child is examined from the multinomial treatment equation, in which an individual can choose a household structure from the four choices including (1) single/no spouse and no child presented in the household (No spouse, no child: NS-NC), (2) single parent (No spouse, with child: NS-WC), (3) spouse presented in the household but no child presented in the household (With spouse, no child: WS-NC) and (4) both spouse and child presented in the household (With spouse, with child: WS-WC). The MTM estimation provides slightly different coefficients for the multinomial treatment equations under four different outcome equations. Because the MTM assumes a logistic distribution, the results presented in this part show the fixed effects from the multinomial logit model.

In the case of young female adults in Thailand, when considering the factors with high BFUBs, education is the main factor affecting the decision to live with a spouse, while household income and living in an urban area are the main factors affecting the decision to live with a child. Specifically, individuals with a

Table 2. Variable description

Variables	Description	Female			Male		
		N	mean	SD	N	mean	**SD**
Household structures							
NS-NC	No spouse, no child in household	9,630	0.387	0.487	9,744	0.570	0.495
NS-WC	No spouse, with child in household	9,630	0.116	0.320	9,744	0.053	0.224
WS-NC	With spouse, no child in household	9,630	0.165	0.371	9,744	0.139	0.346
WS-WC	With spouse, with child in household	9,630	0.332	0.471	9,744	0.238	0.426
Work characteristics							
LFP	Labor force participation	9,630	0.730	0.444	9,744	0.854	0.353
High skilled	Professional or technical job	7,030	0.164	0.371	8,320	0.081	0.273
Income	Monthly income	7,030	11,313	12,873	8,320	10,996	14,195
Hour	Working hours per month	4,727	194	47.30	5,499	192	49.71
Individual and household characteristics							
Age	Age	9,630	27.64	5.052	9,744	27.46	5.158
High school	High school degree	9,630	0.243	0.429	9,744	0.217	0.412
Vocational	Vocational degree	9,630	0.057	0.231	9,744	0.068	0.252
Higher vocational	Higher vocational degree	9,630	0.065	0.247	9,744	0.080	0.271
College	College degree or above	9,630	0.262	0.440	9,744	0.143	0.350
Urban	Living in urban area	9,630	0.576	0.494	9,744	0.555	0.497
Region: BMA	Living in Bangkok Metropolitan Area	9,630	0.073	0.260	9,744	0.070	0.254
Region: Central (No BMA)	Living in the central region outside of the Bangkok Metropolitan Area	9,630	0.320	0.467	9,744	0.330	0.470
Region: North	Living in the northern region	9,630	0.193	0.394	9,744	0.177	0.381
Region: Northeast	Living in the northeastern region	9,630	0.211	0.408	9,744	0.214	0.410
Region: South	Living in the southern region	9,630	0.203	0.402	9,744	0.210	0.407
Household size	Household size	9,630	3.779	1.772	9,744	3.626	1.792
Mother in HH	Mother presented in the household	9,630	0.561	0.496	9,744	0.624	0.484
Father in HH	Father presented in the household	9,630	0.452	0.498	9,744	0.517	0.500
High income HH	Household income per member is in the 4th or 5th quintile	9,630	0.350	0.477	9,744	0.053	0.119

Source: Calculated from SES 2019 using the sample under the scope of this study.

higher education degree are less likely to get married and live with their spouse. In addition, individuals from a high-income household (household income per household member is in the 4th and 5th quantiles) who live in an urban area are less likely to have their children presented in the household.

When considering the impact of various factors on each type of the four household structures, it was found that women with higher education (high school, vocational, higher vocational or bachelor's degree or higher) and live in high-income households in an urban area outside of the northern region are more likely to have no spouse and child presented in the household (NS-NC group). Second, women from low-income households in a rural area in the northern or northeastern regions are more likely to be single mothers (NS-WC group). There is no strong evidence suggesting that education affects the likelihood to be a

Table 3. Factors determining the decision to live with spouse and have children

	(F1 mfx) NS-NC	(F2 mfx) NS-WC	(F3 mfx) WS-NC	(F4 mfx) WS-WC	(M1 mfx) NS-NC	(M2 mfx) NS-WC	(M3 mfx) WS-NC	(M4 mfx) WS-WC
College or	0.307	0.013	-0.123	-0.198	0.128	-0.020	-0.053	-0.055
higher	(999.0)	(1.5)	(999.0)	(999.0)	(999.0)	(3.8)	(999.0)	(888.2)
Higher	0.099	0.031	-0.082	-0.048	0.022	0.017	-0.042	0.004
vocational	(999.0)	(4.8)	(999.0)	(6.4)	(1.0)	(2.4)	(14.2)	(2.5)
Vocational	0.165	0.013	-0.100	-0.078	0.059	-0.005	-0.064	0.010
	(999.0)	(1.0)	(999.0)	(999.0)	(83.7)	(1.1)	(999.0)	(1.1)
High school	0.148	0.007	-0.093	-0.063	0.061	0.006	-0.048	-0.019
	(999.0)	(1.0)	(999.0)	(999.0)	(999.0)	(1.0)	(999.0)	(2.0)
Age	-0.139	-0.007	0.039	0.107	-0.170	0.014	0.052	0.104
	(999.0)	(1.0)	(999.0)	(999.0)	(999.0)	(4.6)	(999.0)	(999.0)
Age2	0.002	0.000	-0.001	-0.002	0.003	0.000	-0.001	-0.001
	(999.0)	(1.3)	(434.5)	(999.0)	(999.0)	(2.2)	(999.0)	(999.0)
Urban	0.038	-0.019	0.011	-0.030	0.008	-0.013	0.012	-0.008
	(999.0)	(14.9)	(1.2)	(68.1)	(1.0)	(10.8)	(1.6)	(1.0)
Region: Central	-0.016	0.016	0.011	-0.011	-0.035	0.009	0.014	0.012
(Not BMA)	(1.0)	(1.0)	(1.0)	(1.2)	(1.7)	(1.1)	(1.0)	(1.1)
Region: North	-0.032	0.039	-0.071	0.064	-0.036	0.011	-0.045	0.071
	(1.6)	(3.1)	(999.0)	(15.7)	(1.5)	(1.0)	(20.8)	(51.0)
Region:	-0.025	0.080	-0.092	0.038	0.026	0.028	-0.081	0.026
Northeast	(1.2)	(999.0)	(999.0)	(1.7)	(1.1)	(2.8)	(999.0)	(1.1)
Region: South	0.012	-0.011	-0.052	0.050	-0.005	-0.004	-0.040	0.050
	(1.1)	(1.2)	(68.1)	(4.1)	(2.2)	(1.8)	(11.0)	(4.6)
High income HH	0.163	-0.097	0.103	-0.169	0.162	-0.059	0.064	-0.167
	(999.0)	(999.0)	(999.0)	(999.0)	(999.0)	(999.0)	(999.0)	(999.0)
Observation	9,630				9,744			
	AIC = 20962, BIC = 21242, McFadden's R2 = 0.153, McFadden's Adjusted R2 = 0.149				AIC = 18853, BIC = 19133, McFadden's R2 = 0.118, McFadden's Adjusted R2 = 0.114			

Note: (1) Bayes factor upper bound (BFUB) in parentheses. (For BFUB higher than 999, the value 999 is reported.) (2) Results shown are marginal effects from the multinomial Logit regression. (3) The education variables consist of 4 dummy variables with the base group being junior high school or lower. (4) The region variables consist of 4 dummy variables with the base group being the Bangkok and Metropolitan Area (BMA).

single mother, except in the case of higher vocational education, which increases the likelihood of being a single mother.

Third, women with low education who live in high-income households in the Bangkok metropolitan area or other provinces in the central region are most likely to live with a husband but have no children (WS-NC group). Finally, women with low education who live in low-income households in a rural area in the north, northeast or south of Thailand are likely to live with a husband and have children (WS-WC group).

For young male adults, factors affecting the decision to live with a spouse and a child does not differ from those affecting women. That is, education has the greatest impact on the decision to live with a spouse, while household income and living in an urban area have the greatest impact on the decision to live with their children. However, the sizes of the effects are smaller than those of women.

4.2 The Effects of the Presence of a Spouse and Child in the Household on Labor Market Opportunities

This section compares the labor market opportunities of male and female young adults in four dimensions including (1) labor force participation (LFP), (2) working in a high skill job, (3) monthly income, and (4) working hours using the SES 2019 data. For the sample used in this study, female young adults were less likely to be in the labor force compared to male. However, among those who were employed, a higher proportion of females held higher-skilled jobs (professional and technical occupations) and earned higher average incomes compared to males. This could be the effect of education. While there was a higher proportion of male young adults with vocational and higher vocational degrees, there was a higher proportion of female young adults with college degrees (See Table 2). It should be noted that, for the overall working age population, male workers still earned higher monthly income than female workers. For working hours, there were no major differences between male and female workers in terms of working hours.

Table 4. Labor market statistics for male and female young adults

Group	Female				Male			
	LFP	High skilled	Income	Hour	LFP	High skilled	Income	Hour
1. NS-NC	68.07%	27.04%	12,810	193	76.94%	10.12%	10,240	189
2. NS-WC	74.44%	13.01%	10,153	191	88.22%	4.38%	8,620	183
3. WS-NC	85.60%	10.51%	11,662	205	97.20%	6.82%	12,177	205
4. WS-WC	71.98%	9.51%	9,875	186	98.06%	5.76%	12,207	189
Total	73.00%	16.44%	11,313	193	85.39%	8.09%	10,996	192

Source: Calculated from SES 2019 using the sample under the scope of this study (described in the data section).

For the MTM regressions, the results in this section illustrate the effects of the presence of a spouse and child on (1) labor force participation (LFP), (2) working in a high skill job, (3) monthly income, and (4) working hours of Thai young adults. The model compensates for the bias caused by the selection into living with a spouse and a child using the variables listed in the selection equation (see Table 3).

This study provides estimates of the effects in three models- Model (a), (b) and (c)- with a different set of independent variables as shown in Table 5. The results show a small difference in the estimates of the effects in all four dimensions indicating that the estimations are quite robust to the choice of controlled variables. Moreover, in Model (b), which includes the urban and region dummies as independent variables, shows that not all urban and region dummies are statistically significant in most of the outcome models. As the urban and region dummies are included in the selection equation of all models, the variables may act as exclusion restrictions in these models[4].

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[4] Although recommended, the MTM model does not require exclusion restrictions [8].

For the results, the coefficients measuring the effects of having a spouse and a child in the household shown in Table 5 and 6 are to be compared with the base group, which is the no spouse- no child (NS-NC) group. Overall, the results show that, controlling for education, age and the selection bias, there are strong evidence suggesting that the presence of a spouse and child in the household affects both men and women's labor force participation, monthly income, and

Table 5. Factors affecting the economic participation and opportunity of female young adults (age 18–35).

	LFP			High skill job		
	F1(a)	**F1(b)**	**F1(c)**	**F2(a)**	**F2(b)**	**F2(c)**
Effects of presence of spouse or child in the household						
(2) NS-WC	0.03	-0.09	0.02	0.00	-0.01	-0.01
	(999.0)	(1.5)	(1.3)	(1.0)	(1.0)	(1.0)
(3) WS-NC	0.13	0.14	0.13	0.00	0.00	0.00
	(59.4)	(999.0)	(135.1)	(1.3)	(1.6)	(1.3)
(4) WS-WC	-0.27	-0.26	-0.28	-0.01	-0.01	-0.01
	(11.0)	(43.4)	(15.4)	(1.0)	(1.0)	(1.0)
Effects of individual and household characteristics						
College	0.09	0.10	0.09	0.44	0.45	0.44
or higher	(482.1)	(999.0)	(314.1)	(999.0)	(999.0)	(999.0)
Higher	0.00	0.00	-0.01	0.05	0.05	0.05
vocational	(2.7)	(55.8)	(2.0)	(1.1)	(1.1)	(1.1)
Vocational	0.08	0.08	0.07	0.22	0.24	0.23
	(729.8)	(999.0)	(434.5)	(7.6)	(11.9)	(8.1)
High school	-0.03	-0.02	-0.03	0.01	0.01	0.01
	(1.5)	(1.5)	(1.7)	(1.0)	(1.0)	(1.0)
Age	0.21	0.20	0.21	0.00	0.00	0.00
	(999.0)	(999.0)	(999.0)	(1.0)	(1.0)	(1.0)
Age2	0.00	0.00	0.00	0.00	0.00	0.00
	(999.0)	(999.0)	(999.0)	(1.0)	(1.0)	(1.0)
Urban		-0.03			0.00	
		(30.5)			(1.6)	
Region: Central		0.05			0.00	
(not BMA)		(8.8)			(1.0)	
Region:		0.04			0.00	
North		(1.9)			(1.0)	
Region:		0.08			0.00	
Northeast		(999.0)			(1.0)	
Region:		0.00			0.00	
South		(3.2)			(1.0)	
Father in			-0.02			0.00
HH			(2.3)			(2.0)
Mother in			0.04			0.00
HH			(14.5)			(1.2)
Constant						
Observations	9,630	9,630	9,630	7,030	7,030	7,030
AIC	30,313	30,270	30,309	20,304	20,298	20,308
BIC	30,686	30,679	30,696	20,661	20,688	20,678

Table 5. (*continued*)

	nln(Income)			ln(Hour)		
	F3(a)	**F3(b)**	**F3(c)**	**F4(a)**	**F4(b)**	**F4(c)**
Effects of presence of spouse or child in the household						
(2) NS-WC	-0.83	-0.69	-0.84	-0.15	-0.12	-0.16
	(10.5)	(1.5)	(165.3)	(999.0)	(108.0)	(999.0)
(3) WS-NC	0.81	0.47	0.61	0.00	-0.03	0.00
	(999.0)	(2.6)	(14.8)	(9.1)	(1.0)	(8.4)
(4) WS-WC	-0.98	-0.64	-0.64	-0.21	-0.17	-0.21
	(32.8)	(1.3)	(3.7)	(999.0)	(999.0)	(999.0)
Effects of individual and household characteristics						
College	0.76	0.78	1.00	0.66	0.67	0.65
or higher	(999.0)	(999.0)	(999.0)	(999.0)	(999.0)	(999.0)
Higher	0.50	0.47	0.63	0.35	0.34	0.34
vocational	(12.2)	(8.8)	(110.1)	(999.0)	(999.0)	(999.0)
Vocational	0.65	0.65	0.79	0.32	0.33	0.32
	(999.0)	(888.2)	(999.0)	(999.0)	(999.0)	(999.0)
High school	-0.03	0.00	0.05	0.20	0.20	0.20
	(2.0)	(14.3)	(1.2)	(999.0)	(999.0)	(999.0)
Age	0.39	0.36	0.32	0.05	0.05	0.05
	(224.9)	(68.1)	(26.7)	(2.2)	(2.4)	(2.4)
Age2	-0.01	-0.01	-0.01	0.00	0.00	0.00
	(56.1)	(25.5)	(15.6)	(1.0)	(1.0)	(1.0)
Urban		-0.06			-0.02	
		(1.0)			(1.0)	
Region: Central		-0.38			-0.18	
(not BMA)		(6.8)			(999.0)	
Region:		-0.85			-0.34	
North		(999.0)			(999.0)	
Region:		-1.43			-0.28	
Northeast		(999.0)			(999.0)	
Region:		-0.48			-0.28	
South		(15.9)			(999.0)	
Father in			-0.20			0.02
HH			(3.4)			(1.0)
Mother in			-0.58			0.00
HH			(999.0)			(15.1)
Constant	2.08	3.26	3.68	2.78	3.00	2.75
	(1.3)	(4.0)	(8.4)	(999.0)	(999.0)	(999.0)
Observations	7,030	7,030	7,030	4,687	4,687	4,687
AIC	51,674	51,549	51,598	18,951	18,854	18,954
BIC	52,038	51,947	51,976	19,293	19,229	19,309

Note: (1) Bayes factor upper bound (BFUB) in parentheses. (For BFUB higher than 999, the value 999 is reported.) (2) The results were estimated using the multinomial treatments model, which adjusted for the selection into living with spouse and having a child. (3) nln(Income) and nln(Hour) was calculated using negative log function, which is $nln(X) = sign(X)*ln(abs(X)+1)$. (4) Working hour is only observed for government, state enterprise and private employees. (5) The skill position, wage and working hour estimations were not corrected for the selection into the labor force and, thus, the results should be interpreted for the employed population (or employees for the working hour regression) rather than the working-age population. (6) The high skilled position is defined as occupations with professional and technical skills (Skill class 2 and 3 in the ISCO-08 classification).

working hours. However, the household structure does not directly affect an opportunity to work in a high skill job for both men and women. From Model F2 and M2 in Table 5 and 6, only a higher educational degree significantly improves the opportunity to work in a high skill job.

Consider the MTM results for labor force participation, monthly income and working hours in the case of women in Table 5 (Model F1(c), F3(c) and

Table 6. Factors affecting the economic participation and opportunity of male young adults (age 18–35).

	LFP			High skill job		
	M1(a)	M1(b)	M1(c)	M2(a)	M2(b)	M2(c)
Effects of presence of spouse or child in the household						
(2) NS-WC	0.00	0.00	0.01	0.00	0.00	0.00
	(1.9)	(2.9)	(1.1)	(1.1)	(1.6)	(1.1)
(3) WS-NC	0.07	0.07	0.07	0.00	0.00	0.00
	(999.0)	(999.0)	(999.0)	(1.1)	(1.0)	(1.3)
(4) WS-WC	0.07	0.07	0.07	0.00	0.00	0.00
	(542.4)	(999.0)	(235.9)	(1.0)	(1.0)	(1.0)
Effects of individual and household characteristics						
College	0.00	0.00	0.00	0.22	0.23	0.22
or higher	(1.2)	(1.3)	(1.2)	(235.9)	(621.4)	(155.3)
Higher	-0.09	-0.09	-0.09	0.00	0.01	0.00
vocational	(999.0)	(999.0)	(999.0)	(1.0)	(1.0)	(1.0)
Vocational	0.03	0.03	0.03	0.03	0.04	0.02
	(58.8)	(190.2)	(68.9)	(1.1)	(1.4)	(1.1)
High school	-0.05	-0.04	-0.05	0.00	0.00	0.00
	(999.0)	(999.0)	(999.0)	(1.0)	(1.0)	(1.0)
Age	0.07	0.07	0.07	0.00	0.00	0.00
	(999.0)	(999.0)	(999.0)	(1.0)	(1.0)	(1.0)
Age2	0.00	0.00	0.00	0.00	0.00	0.00
	(999.0)	(999.0)	(999.0)	(1.0)	(1.0)	(1.0)
Urban		-0.03			0.00	
		(999.0)			(1.0)	
Region: Central		0.01			0.00	
(not BMA)		(1.7)			(1.0)	
Region:		0.00			0.00	
North		(1.7)			(1.0)	
Region:		0.00			0.00	
Northeast		(2.3)			(1.0)	
Region:		0.02			0.00	
South		(5.5)			(1.0)	
Father in			0.01			0.00
HH			(1.0)			(1.1)
Mother in			-0.02			0.00
HH			(47.9)			(1.0)
Constant						
Observations	9,744	9,744	9,744	8,320	8,320	8,320
AIC	24,651	24,607	24,644	20,689	20,666	20,690
BIC	25,025	25,016	25,032	21,054	21,066	21,069

Table 6. (*continued*)

	nln(Income)			ln(Hour)		
	M3(a)	**M3(b)**	**M3(c)**	**M4(a)**	**M4(b)**	**M4(c)**
Effects of presence of spouse or child in the household						
(2) NS-WC	-0.27	-0.11	0.07	-0.11	-0.07	-0.09
	(1.2)	(1.2)	(1.7)	(8.1)	(1.8)	(2.9)
(3) WS-NC	0.92	0.63	0.50	0.11	0.05	0.10
	(999.0)	(888.2)	(70.5)	(294.3)	(1.6)	(43.4)
(4) WS-WC	-0.81	-0.74	-0.80	-0.11	-0.06	-0.10
	(999.0)	(999.0)	(999.0)	(999.0)	(6.8)	(729.8)
Effects of individual and household characteristics						
College	0.49	0.47	0.58	0.62	0.61	0.63
or higher	(999.0)	(999.0)	(999.0)	(999.0)	(999.0)	(999.0)
Higher	0.37	0.33	0.43	0.23	0.23	0.24
vocational	(6.9)	(4.0)	(19.5)	(999.0)	(999.0)	(999.0)
Vocational	0.55	0.61	0.65	0.35	0.37	0.36
	(999.0)	(999.0)	(999.0)	(999.0)	(999.0)	(999.0)
High school	-0.17	-0.09	-0.10	0.17	0.19	0.17
	(2.2)	(1.0)	(1.1)	(999.0)	(999.0)	(999.0)
Age	0.46	0.45	0.38	0.07	0.07	0.07
	(999.0)	(999.0)	(999.0)	(66.6)	(125.5)	(46.2)
Age2	-0.01	-0.01	-0.01	0.00	0.00	0.00
	(999.0)	(999.0)	(888.2)	(6.0)	(8.5)	(5.2)
Urban		-0.25			0.01	
		(160.1)			(1.2)	
Region: Central		-0.52			-0.20	
(not BMA)		(165.3)			(999.0)	
Region:		-1.08			-0.36	
North		(999.0)			(999.0)	
Region:		-1.76			-0.44	
Northeast		(999.0)			(999.0)	
Region:		-0.70			-0.27	
South		(999.0)			(999.0)	
Father in			-0.47			0.01
HH			(999.0)			(1.9)
Mother in			-0.78			-0.05
HH			(999.0)			(7.6)
Constant	1.02	2.03	3.09	2.68	-16.10	2.75
	(1.0)	(2.0)	(12.6)	(999.0)	(999.0)	(999.0)
Observations	8,320	8,320	8,320	5,392	5,392	5,392
AIC	59,169	58,930	58,924	20,149	19,922	20,144
BIC	59,541	59,338	59,310	20,498	20,304	20,506

Note: (1) Bayes factor upper bound (BFUB) in parentheses. (For BFUB higher than 999, the value 999 is reported.) (2) The results were estimated using the multinomial treatments model, which adjusted for the selection into living with spouse and having a child. (3) nln(Income) and nln(Hour) was calculated using negative log function, which is nln(X) = sign(X)*ln(abs(X)+1). (4) Working hour is only observed for government, state enterprise and private employees. (5) The skill position, wage and working hour estimations were not corrected for the selection into the labor force and, thus, the results should be interpreted for the employed population (or employees for the working hour regression) rather than the working-age population. (6) The high skilled position is defined as occupations with professional and technical skills (Skill class 2 and 3 in the ISCO-08 classification).

F4(c))[5]. After controlling for educational level, age and the presence of parents in the household and correcting for the selection to living with a spouse or a child, single mothers (NS-WC) are not more likely to enter the labor market compared with the base group (NS-NC). Female young adults living with their spouse but without child (WS-NC) are 13% more likely and women living with their spouse and child (WS-WC) are 28% less likely to be in the labor market. It can be noticed that the effects of the household structure on labor force participation estimated using the MTM model is smaller than suggested by the raw data calculation. From Table 3, all three groups- NS-WC, WS-NC and WS-WC- participate in the labor market more than the NS-NC group by 6.37%, 17.53% and 3.91%, respectively. This shows that an estimate without controlled variables or sample selection correction would be upward bias.

Regarding monthly income and working hours, female young adults who live with their spouse but do not have a child (WS-NC) earn 61% higher monthly income compared to the base group (NS-NC), but do not have evidence to support that they have higher working hours. That is, living with a spouse without a child influents women to participate more in the labor force and also increase female workers' income. For female workers who have a child in the household (NS-WC and WS-WC), they work significantly fewer hours and earn significantly lower monthly income. Female workers with a child and no spouse in the household (NS-WC) face 84% lower income and female workers with a spouse and a child (WS-WC) face 64% lower income. The results suggest that the division of labor, in which women do more household work and men do more labor market work, only affect women's participation and opportunities in the labor market only when they have a child.

The child effect results are partly consistent with Paweenawat and Liao [17]'s finding that unmarried women face a higher parenthood penalty compared to married women. However, the size of the income gap is significantly higher in this study. This is potentially because Paweenawat and Liao [17] analyze parenthood penalty using hourly wage gap, while this study uses monthly income gap and the monthly income contains the working hour effect. In particular, female workers with children are likely to work fewer hours and, thus, reduce their monthly income but not their hourly wage. Moreover, this study covers all types of employment status and not just employees. As the parenthood penalty is potentially higher for self-employed workers than for wage employees [5], the effects in this study are expected to be higher. In addition to the differences due to the choice of measurement and the scope of the study, there is also a difference in the estimation methods to control for endogeneity bias due to ability or other labor market qualifications of women who have and do not have children. While Paweenawat and Liao [17] uses fixed effects for the 2005–2012 SES panel data,

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[5] Although Models F1(b), F2(b), F3(b) and F4(b) with regions as controlled variables in the outcome equations have lower AIC and BIC, Models F1(c), F2(c), F3(c) and F4(c) are chosen for the analysis for the purpose of leaving region variables as exclusion restrictions. It should be noted that there is no sign difference in the estimates across the models and the effect sizes only vary slightly.

this study uses 2019 cross-sectional data with the MTM model to correct for the selection to have and live with children (or spouse)[6]. With this cross-sectional limitation, the MTM model only can account for the selection bias and not all other ability bias, which can cause an upward bias.

Effects of the presence of a spouse and child in the household on labor force participation, monthly income and working hours for male are shown in Table 6 (Model M1(c), M2(c) and M4(c))[7]. For men, single fatherhood (NS-WC) does not affect any dimensions of participation and opportunity in the labor market, except that they work slightly fewer hours comparing to the base group (NS-NC). Similar to the case for women, male workers living with spouse but no children (WS-NC) tend to participate in the labor force more and earn higher income compared to the base group (NS-NC). However, in the case of WS-WC, the results are different between men and women. While female workers living with a spouse and child are less likely to participate in the labor market, male workers are more likely to work. Both male and female workers living with a spouse and child have lower working hours and lower incomes.

For other factors affecting participation and opportunities in the labor market, education is the most important factor. Higher education leads women to work more in the labor market, but has less impact on men's labor market entry, as Thai men have a higher labor force participation rate regardless of education level. In addition to the labor force participation dimension, higher education provides both male and female workers with the opportunity to learn a highly skilled job and increase their income and working hours.

For family factors, living with the father or mother has different effects on male and female labor force participation. Living with the father has no effect on men's labor market entry, but leads to lower participation among women. Living with the mother allows more women to enter the labor market but leads to lower labor force participation for men. There is no evidence suggesting that living with a parent has an effect on hours worked, but there are quite strong evidence that it causes both women and men to have lower monthly incomes.

5   Conclusion

This study examines the effects of the presence of a spouse and child in the household on women's labor market opportunities, including labor force participation, likelihood of working in a high-skilled job, monthly income and working hours. The results of the basic statistics (Table 4) show that women who are single or do not live with their spouses and have no children are more likely to participate in the labor force, work in high-skilled positions and have high income. In contrast,

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[6] To the best of authors' knowledge, there is no SES panel data in recent years. Without the panel data, the fixed effects model cannot be estimated.

[7] Similar to the case of female regressions, Models M1(c), M2(c), M3(c) and M4(c) are chosen for the analysis for the purpose of leaving region variables as exclusion restrictions. There is also no sign difference in the estimates across the models and the effect sizes only vary slightly.

men who live with their spouses are more likely to participate and have a higher opportunity in the labor market.

Adopting the Multinomial Treatment Model (MTM) to correct for the selection to live with a spouse and a child, the results suggest that the division of labor, in which women do more work in the household and men do more work in the labor market, only affects women's labor market participation and opportunities if they have a child. The presence of a spouse in the household not only does not reduce the likelihood of female young adults entering the labor market or reduce their incomes, but also leads them to work more and earn higher incomes. However, the presence of children reduces the likelihood that women will enter the labor market, reduce their hours of work, and reduce their incomes. For the opportunity to work in a high skill job, only education is found to be a significant factor. That is, for both male and female young adults, the household structure does not directly affect an opportunity to work in a high skill job. For men, the effects of the presence of a spouse and child in the household are similar to those for women, except for the labor force participation dimension in the WS-WC case. Specifically, while female workers living with a spouse and a child are less likely to participate in the labor market, male workers are more likely to work.

The difference between the MTM results and basic statistics highlights the importance of including controlled variables and correcting for selection bias when estimating the effects of household structure. This indicates that the differences in the participation and economic opportunities for women with different family structure are partially caused by third factors and the selection to live with a spouse or child. This study found that the most important factor is education. Women with children tend to have lower education and, thus, face a lower opportunity in the labor market. Consequently, the key policy recommendation from this study is that, regardless of family structure, it is important to build human capital through education for female adolescents to enhance skills and improve opportunities in the labor market.

It should be noted that the MTM only corrects for selection bias and cannot fully control for ability bias. In addition, due to data limitations, this study focuses only on the short-term effects of household structure on labor market participation and opportunities for young adults. For young adults, earlier labor market entry and higher earnings do not necessarily guarantee better labor market outcomes later in life. This is mainly because those who enter the labor market early are also more likely to leave the school system early. Therefore, it is necessary to also examine the longer-term or lifetime effects.

References

1. Becker, G.S.: A theory of marriage: Part I. J. Polit. Econ. **81**(4), 813–846 (1973)
2. Becker, G.S.: A theory of marriage: Part II. J. Polit. Econ. **82**(2), S11–S26 (1974)
3. Benjamin, D.J., Berger, J.O.: Three recommendations for improving the use of p-values. Am. Stat. **73**(sup1), 186–191 (2019)
4. Browning, M., Chiappori, P.A., Weiss, Y.: Economics of the Family. Cambridge University Press, Cambridge (2014)
5. Budig, M.J.: Gender, self-employment, and earnings: the interlocking structures of family and professional status. Gender Soc. **20**(6), 725–753 (2006)
6. Bui, M.T.T., Permpoonwiwat, C.K.: Gender wage inequality in Thailand: a sectoral perspective. J. Behav. Sci. **10**(2), 19–36 (2015)
7. Cukrowska-Torzewska, E., Matysiak, A.: The motherhood wage penalty: a meta-analysis. Soc. Sci. Res. **88**, 102416 (2020)
8. Deb, P.: MTREATREG: Stata module to fits models with multinomial treatments and continuous, count and binary outcomes using maximum simulated likelihood. Stat. Softw. Components (2009)
9. Deb, P., Trivedi, P.K.: Maximum simulated likelihood estimation of a negative binomial regression model with multinomial endogenous treatment. Stand. Genomic Sci. **6**(2), 246–255 (2006)
10. Duvander, A.Z., Kridahl, L.: Decisions on marriage? Couples' decisions on union transition in Sweden. Genus **76**(1), 1–21 (2020)
11. Halsey, L.G.: The reign of the p-value is over: what alternative analyses could we employ to fill the power vacuum? Biol. Let. **15**(5), 20190174 (2019)
12. Hashemzadeh, M., Shariati, M., Mohammad Nazari, A., Keramat, A.: Childbearing intention and its associated factors: a systematic review. Nurs. Open (2021)
13. ILO. UN Women & Women Count. The Impact of Marriage and Children on Labour Market Participation (2020). https://sustainabledevelopment.un.org/content/documents/2701theimpactofmarriageandchildrenonlabourmarketparticipationen.pdf
14. John, J.A., Draper, N.R.: An alternative family of transformations. J. Roy. Stat. Soc.: Ser. C (Appl. Stat.) **29**(2), 190–197 (1980)
15. Loughran, D.S., Zissimopoulos, J.M.: Why wait? The effect of marriage and childbearing on the wages of men and women. J. Hum. Resour. **44**(2), 326–349 (2009)
16. Mincer, J.A.: Schooling, Experience, and Earnings. NBER Press (1974)
17. Paweenawat, S.W., Liao, L.: Parenthood penalty and gender wage gap: recent evidence from Thailand. J. Asian Econ. **78**, 101435 (2022)
18. Sabates-Wheeler, R., Kabeer, N.: Gender equality and the extension of social protection (2005)
19. Waldfogel, J.: Understanding the 'family gap' in pay for women with children. J. Econ. Perspect. **12**(1), 137–156 (1998)
20. Wilde, E.T., Batchelder, L., Ellwood, D.T.: The mommy track divides: the impact of childbearing on wages of women of differing skill levels (No. w16582). National Bureau of Economic Research (2010)