Southeast Asian Journal of Economics 2(2), December 2014: 77-102

Labor Supply of Married Couples in the Formal and Informal Sectors in Thailand

Chairat Aemkulwat
Faculty of Economics, Chulalongkorn University,
Bangkok, Thailand
Corresponding author: chairat.a@chula.ac.th

Abstract

This paper estimates multi-sector labor supply and offered wage as well as participation choice functions for married males and females in Thailand with an emphasis on the informal sector in Thailand using Labor Force Survey for 2008. For married males, own account workers are the largest work status; for married women, unpaid family workers are the largest work status. The likelihood of participating in the informal sector as own account workers and unpaid family workers is negatively related with education, urbanity, and being white-collar workers and is positively related to age and presence of children. The wage elasticities are larger for married males than married females even in the informal sector; the wage elasticities of workers in the informal sector are larger than those in the formal sector. The own wage elasticity for male own account workers is 0.23 and that for female unpaid family workers is 0.93; elasticities for male unpaid family workers and female own account workers are insignificant. The cross wage elasticity is negative and significant only for female own account workers. The returns to education for male unpaid family workers and own account workers are 9.4-9.5 percent; those for female are about 7.1-7.3 percent. Surprising, the returns to experience for both male and female workers in the informal sector are negative.

Keywords: Labor Supply, Offered Wage, Labor Force Participation, Informal Sector

1. Introduction

Thailand has a large informal sector in which more than 50 percent of labor force working, although it was declining from 71 percent in 1990. In 2008, unpaid family workers, own account workers and employers are three work statuses in the informal sector comprising about 32, 22, and 3 percent, respectively. (Aemkulwat, 2010) About 46 percent of own account workers employ in agriculture, and 33 percent work in service. About 56 percent of unpaid family workers employ in agriculture, and 33 percent work in service. The National Statistical Office defines workers in the informal sector as those obtaining low and uncertain wages and no social welfare and security and work in establishments with less than 10 workers; as a result, it is very difficult to obtain the offered wage rates for these groups of workers. Although the Labor Force Survey can be used to study characteristics of the informal employment, it still does not provide the wage data for workers in the informal sector.

The study of the informal sector is important for several reasons. First, the labor supply decision to work may have more than two choices. Rather than choosing between working and not working, workers may choose to work in the informal sector as unpaid family workers and own account workers, or to work in the formal sector as private employees, government officials and public enterprise employees, or not to work at all. Second, workers in the informal sector may have more flexible working schedules to care for their children than their counterparts; thus, affecting their labor supply and offer wages. Third, the informal sector plays an important role on absorbing workers who are laid off during economic downturn such as the 1997 Asian Financial crisis erupted in Thailand. Informal activities such as agriculture and household production can be supplemented formal employment in the rural areas and self-employed businesses in the urban area (Boonperm, 2000). Finally, there are no existing studies on multi-sector labor supply, offered wage, and labor choice in Thailand.

There are many studies of multi-sector labor supply response in the developed and developing countries in response to suggested research by Schultz (1990).[2] Hill (1989) laid the foundation for studies of multi-sector labor supply and hours of work equations for Japanese women by dividing workers into three sectors: working in the formal sector, working in the informal sector as family workers, and not participating in the labor force. Tiefenthaler (1999) estimates the multi-sector labor supply equations for married men and married women in Brazil by dividing labor force into formal sector, informal sector, self-employment and nonparticipation. Anderson and Dimon (1999) investigate determinants of female labor force participation in Mexico by allowing workers to choose four choices: going to school, working at home, and working in the formal and informal sectors. Gindling (1991) examines selectivity-corrected estimates of the wage equations in the public sector, private-formal sector and informal sectors in San Jose, Costa Rica.

This paper examines labor supply decisions of both married male and married female in Thailand, where a very large percentage as high as 56 percent of the labor force work in the informal sector. Five work choices are used in this paper to clearly study the formal sector and informal sector. Unpaid family workers and own account workers are in the informal sector, while private employees, government employees and public enterprise[3] employees are in the formal sector. Moreover, determinants of labor force participation as well as factors influencing working hours and wages conditional on the choice of sector are analyzed.

There are a number of researches on labor supply and offered wage in Thailand. Using data from the Labor Force Survey for Thailand, Hawley (2004) and Moenjak and Worswick (2003) examine earning functions to examine returns to education in Thailand. Moenjak and Worswick correct the wage equation for sample selectivity bias while Hawley does not; nevertheless,

---

[2] As pointed out by Hill (1989) and Tiefenthaler (1999), Schultz (1990) suggests that the future research should "explain the allocation of labor supply by family members among alternative types of jobs, such as wage employment, self-employment, and family unpaid work."

[3] Public enterprises are companies that the government owns more than half of the companies' shares.

they found additional year of education increases earnings approximately 10-11 percent.

Poaponsakorn (1979), Schultz (1990) and Sirilerdpitak (2008) study both wage and labor supply equations; the latter two attempt to correct for sample selectivity bias while Poaponsakorn does not. Using 1977 Survey of Labor, Poaponsakorn (1979) studies labor supply of married couples of paid employees in Thailand, estimated by a two-stage least squares method, and finds that for both married male and female, the own and cross wage effects are positive. Schultz (1990) studies whether wage and non-wage income affect labor supply for husbands and wives using the Socioeconomic Survey of Thailand for 1980-81 and found that the own and cross-compensated wage effects on labor supplies of husbands and wives are negative. Sirilerdpitak (2008) studies the effect of wages on labor supply classified by occupations in non-agricultural sector estimated by two stage least squares using Labor Force Survey in 2005 and finds that own wage effects are positive in all occupations other than group 1 comprising legislators, senior officials, and managers. Both Schultz (1990) and Sirilerdpitak (2008) as well as Moenjak and Worswick (2003) correct for selectivity bias using the Mill's ratio correction for probit choice models that divides labor into two groups: paid workers in the formal sector as participation in labor force and workers not in the labor force including those who are not working by ignoring those whose wages are unpaid or unknown, especially in the informal sector. Moreover, these researchers do not separate the sample by type of work status to account for differences among workers in the sectors.

This paper extends the work on labor supply decisions and offered wages in Thailand. Multi-sector labor participation model for married male and married female will be estimated to find response probabilities and sample selectivity corrections. A system of wage and hours of work equations accounting for selectivity corrections will be estimated for five types of jobs in the formal and the informal sectors. The paper is divided into five sections. Section II provides models of choice of wage status, offered wage and labor supply. Section III explains data and characteristics for Thai labor force employing in the formal and informal sector. Section IV analyzes results from multinomial logit model and a system of wages hours of work equations. Section V offers the conclusions.

2. Models of Work Choice, Offered Wage and Labor Supply

This section contains two models. The first model is the simultaneous system of two equations – labor supply equation and offered wage equation. The second model is the multi-sector participation model. The model builds upon the work of Hill (1983, 1989), Tiefenthaler (1999) and Schultz (1990) to analyze labor supply decisions in the economies with large informal sectors, which is particularly true for developing countries like Thailand. The model assumes that an individual may select among five mutually exclusive types of jobs: working in the informal sector as own account workers (*o*) or unpaid family workers (*u*), working in the formal sector as private employees (*p*), government employees (*g*) and public enterprise employees (*pe*). The sum of probabilities of work choices is equal to one. Since the analysis involve two genders and five work statuses, there are 10 systems of two equations for a combination of gender and work status and 8 participation equations for male and female as the work choice as own account workers is used as the base work status.

The multinomial logit model is used to estimate multi-sector labor supply participation for married male (M) and married female (F). Superscripts, M and F, are suppressed where there is no confusion. The general form for individual *i* can be written as

$$\log\left(\frac{P_{ij}}{P_{io}}\right) = \pi_0 + \pi_1 X_j + u_{ij} \tag{1}$$

where $j = u, p, g$ and pe *and* u_{ij} is the error term. P_{oi} is the probability that a person i is an own account worker (o). P_{ij} is the probability that a person i is either u, p, g or pe. Equation (1) can be for married male or married female. The vector of explanatory variables X comprises individual variables including education and age, household variables including the number of children under six and the number of children age 6-14, the residence or urban dummy, and the occupation variables including dummies for white-collar, high skilled and low-skilled workers where blue-collar workers are the base category.

A system of hours of work and wage equations for married male can be written as

$$h_{ij}^{M} = \beta_0 + \beta_1 Z_j^{M} + \beta_2 \log(w_{ij}^{M}) + \beta_3 \log(w_{ij}^{F}) + \beta_4 \lambda_{ij}^{M} + \varepsilon_{hij}^{M} \tag{2}$$

$$\log(w_{ij}^{M}) = \alpha_0 + \alpha_1 Y_j^{M} + \alpha_4 \lambda_{ij}^{M} + \varepsilon_{wij}^{M} \tag{3}$$

The model for married female is simply replacing F for M. is the number of hours worked per month for an individual *i* in sector *j* where *j = o, u, p, g* or *pe*. $\log(w_{ij}^{M})$ is the predicted logarithmic hourly wage rate for married male, w_{ij}^{F} is that for the female. *Z* is the vector of non-wage variables, which is the same as the vector *X* excluding age and urban variables. *Y* is the vector of independent variables including years of education and experience and residence variable.[4] ε_{hij} and ε_{wij} are the error terms. λ_{ij} is the selection correction variable included both in the hour and wage equations. The system of these two equations for a combination of gender and work choice is estimated by the three-stage least squares method.[5]

The selection correction variable is needed to estimate labor supply and wage equations because each equation includes workers who work positive hours and wage rates in that sector attributable to nonrandom sub-sample.[6] Estimation without correcting for selectivity will lead to sample selection bias occurring when the probability that a worker employs in a certain work status is correlated with wages and hours of work. Correcting for selectivity can be done in two steps. First, a multinomial logit participation model is run to obtain logit estimates and response probabilities in order to calculate selection corrections.[7] Second, offered hourly wage rates are

---

[4] The participation equation or equation (1) must be identified if at least one variable included in equation (1), age in our model, is not included in the system of wage and hours of work equations.

[5] In terms of statistical efficiency, the three-stage least squares are more efficient than the two-stage least squares. The efficiency increases with the strength of the interactions among the error terms. Belsley (1988) found that when there is a system of two equations and errors are pairwise correlated, the use of the three stage least squares is warranted.

[6] Selection corrections are necessary to obtain consistent estimates if $E(u_{ij}, \varepsilon_{hij}) \neq 0$ or $E(u_{ij}, \varepsilon_{wij}) \neq 0$. (Hill, 1989) This implies that workers in a given work status do not constitute a random subset of the population.

[7] The formula to find selectivity correction is

$$\lambda_{ij} = \frac{6}{\pi^2}(-1)^{J+1}\left[\sum_{k \neq j}\frac{1}{J}\frac{p_{ki}}{1-p_{ki}}\log(p_{ki}) + \frac{J+1}{J}\log(p_{ki})\right]$$

where *J* is the total number of alternatives and p_{ij} is the selection probability for the j^{th} alternative. It is derived by Hay (1980) who extends the work of Heckman (1979) on Mill's ratio correction for probit choice model. (Hill, 1983, 1989)

estimated for married male and female, correcting for the selective sample of workers. Finally, a system of hours of work and wage equations with selection corrections included is estimated using three stage least squares.

3. Data and Characteristics of Thai Informal and Formal Labor Market Sector

The data for this analysis comes from the Labor Force Survey[8] for 2008. It is divided into the formal sector and the informal sector. In 2008, a quite large informal sector consisted of 56 percent of the total labor force – own account workers accounted for 32 percent; unpaid family worker, 22 percent; and employer, 2.6 percent. In the formal sector, private employees constitute 35 percent; government employees, 8 percent; and public enterprise employees, 1 percent.[9] (Aemkulwat, 2010)

For this analysis, the sample is restricted to 37,966 married couples with husband or wife present. Households in which both husband and wife are 60 or older or 20 or younger are also not included in the analysis. Employers and workers classified as not working are excluded from the analysis. Moreover, data are further restricted to married female who have spouse working. This restriction is not for married male to allow for housewives.[10] Thus, 37,966 married men and 21,757 married women are used in the analysis. For married male, out of 100 workers, 9.6, 42.3, 31.7, 14.5 and 1.9 persons are unpaid family workers, own account workers, private employees, government employees, and public enterprise employees, respectively; for female, 44.5,

---

[8] The survey has been conducted by the National Statistical Office of Thailand since 1963. The sample has been randomly drawn from different households throughout the country. Since 2001, the survey has been conducted on a monthly basis. The objective is to estimate the number and the characteristics of the labor force of Thailand.

[9] Aemkulwat (2010) found that over 1990-2008, the formal sector consisting of the public sector and large private firms had become more dominant sector increasing from 29 percent to 44 percent while the informal sector such as unpaid family member and own account workers reduced from 71 percent to 56 percent

[10] Schultz (1990) examines Thailand's Socioeconomic Survey in 1980-81 and reports that 83 percent of women age 25 to 54 are in the labor force whereas 28 percent are in the formal or wage-employment sector. Moreover, 98 percent of men in these groups are in the labor force, and 57 percent are in the formal sector.

17.9, 26.8, 10.2 and 0.6 persons, respectively. Both married male and female are predominantly private employees in the formal sector. Unpaid family workers are the largest work status for married female and own account workers for married male. Note that most own account workers and unpaid family workers employ in agriculture and service.[11] In the informal sector, there are more female than male. The ratio of workers in the informal sector to those in the formal sector for male is 52:48; the ratio for married female is 62:38. The ratio difference is due to preferences of women to producing goods at home, and the need of flexible working schedules to care for children, or simply discrimination in the labor market.

For estimation, explanatory variables include education, age, the number of children under six, the number of children aged 6-14 , urban/rural area, and occupations such as white-collar high-skilled workers and white-collar low-skilled workers using blue-collar workers as a benchmark. White collar high skilled workers include (1) legislators, senior officials, and managers, (2) professionals, and (3) technicians and associate professionals. White-collar low-skilled workers include (1) clerks (2) service workers and shop and market sales workers. Blue collar workers include (1) skilled agricultural and fishery workers, (2) craft and related trade workers, (3) plant and machine operators and assemblers, and (4) elementary occupations. Moreover, the predicted logarithmic market wages are assumed to be functions of years of education, past years of labor market experience, urban/rural area, and sample selection variable obtained from the multi-sector participation model. These predicted logarithmic wages for workers in five sectors classified by gender are estimated from equation (3).

[11] See Table A3 for cross tabulation between work status and occupation.

Table 1. Variables and Their Means (Standard Deviations) for Married Male

	Unpaid Family Workers	Own Account Workers	Private Employees	Government Employees	Public Enterprise Employees
Monthly hours worked	207.7385	205.8469	208.8423	171.1308	177.8986
	(66.6491)	(66.8833)	(50.3505)	(41.2497)	(38.1350)
Log hourly wage	1.2678	1.4539	1.8063	3.1243	2.2721
	(0.6169)	(0.5609)	(0.8617)	(1.4625)	(1.0269)
Log spouse hourly wage	0.2730	0.7868	0.7640	1.3457	1.1391
	(0.7007)	(0.7746)	(1.0903)	(1.7873)	(1.6111)
Age	39.4790	45.2227	38.3334	44.6544	44.2078
	(10.4355)	(9.1123)	(9.6452)	(8.6210)	(8.6720)
Years of Education	7.5379	6.5452	7.9853	12.7052	12.5375
	(3.7816)	(3.6282)	(4.0985)	(4.2021)	(3.7798)
Labor Market Experience	26.3100	32.6775	24.3481	25.9492	25.6702
	(12.3676)	(11.0958)	(11.5652)	(9.8961)	(9.7438)
Children under six	0.3633	0.2858	0.3600	0.2462	0.2520
	(0.5949)	(0.5347)	(0.6086)	(0.5065)	(0.5032)
Children age 6-14	0.6216	0.6059	0.5896	0.5547	0.5697
	(0.8036)	(0.7775)	(0.7894)	(0.7432)	(0.7408)
White-collar, high -skilled	0.0052	0.0170	0.1087	0.5863	0.3474
	(0.0716)	(0.1293)	(0.3112)	(0.4925)	(0.4764)
White-collar, low-skilled	0.4008	0.2057	0.1109	0.1753	0.2782
	(0.4901)	(0.4042)	(0.3141)	(0.3802)	(0.4483)
Urban	0.5350	0.5349	0.5867	0.7701	0.8372
	(0.4988)	(0.4988)	(0.4924)	(0.4208)	(0.3694)
Number of observations	3,688	16,739	11,182	5,620	737
Percent distribution	9.6	42.3	31.7	14.5	1.9

Source: Labor Force Survey 2008

Table 1 and Table 2 provide the means and standard deviations of variables used in the analysis. Husbands work longer than wives except own account workers; female own account workers work about 2 hours per month more than the male. Married male as private employees in the formal sector work the longest of 209 hours. Government employees work the least hours of 171 hours for male and 166 hours for female.

Table 2. Variables and Their Means (Standard Deviations) for Married Female

	Unpaid Family Workers	Own Account Workers	Private Employees	Government Employees	Public Enterprise Employees
Monthly hours worked	196.4087	208.9939	205.5481	165.6669	170.3667
	(67.4794)	(74.6964)	(50.7356)	(27.5908)	(24.3078)
Log hourly wage	1.0203	1.0322	1.6049	3.4461	2.2710
	(0.4485)	(0.4841)	(1.0209)	(1.6240)	(1.3069)
Log spouse hourly wage	1.3828	2.6292	3.2066	4.2805	4.4162
	(0.5485)	(1.3998)	(0.9951)	(1.1310)	(1.2487)
Age	42.7513	43.1684	36.9346	41.79653	41.3837
	(9.7888)	(9.0043)	(9.3988)	(9.0918)	(8.5586)
Years of Education	6.2465	6.6855	7.8575	14.3364	13.8450
	(3.6353)	(3.7050)	(4.3556)	(3.5310)	(3.6659)
Labor Market Experience	30.5048	30.4828	23.0770	21.4601	21.5388
	(11.993)	(11.2457)	(11.8273)	(9.8385)	(9.8791)
Children under six	0.2643	0.2593	0.2824	0.2211	0.2431
	(0.5217)	(0.5203)	(0.5283)	(0.4813)	(0.4964)
Children age 6-14	0.6115	0.6648	0.5931	0.5617	0.6666
	(0.7760)	(0.7788)	(0.7698)	(0.7496)	(0.7739)
White-collar, high -skilled	0.0037	0.0141	0.1156	0.6508	0.3953
	(0.0608)	(0.1180)	(0.3197)	(0.4768)	(0.4908)
White-collar, low-skilled	0.2725	0.5575	0.2083	0.2557	0.4729
	(0.4452)	(0.4967)	(0.4061)	(0.4363)	(0.5012)
Urban	0.4413	0.6122	0.5765	0.7933	0.8295
	(0.4965)	(0.4873)	(0.4941)	(0.4050)	(0.3775)
Number of observations	9677	3894	5832	2225	129
Percent distribution	44.5	17.9	26.8	10.2	0.6

Source: Labor Force Survey 2008

The Labor Force Survey does not report actual wages for workers in the informal sector. The logarithm of hourly wage rates for husbands and wives in the formal and informal sectors are estimated from years of education and experience, residence, and selectivity corrections as shown in equation (3). The predicted log wages used in analysis are underestimated from estimation since data contain zero values of wage rates for workers in the informal sector;[12] nevertheless, they can be used for comparisons. Workers in informal

[12] The actual wage rates in Thailand over 1990-2008 are analyzed in Aemkulwat (2009, 2010).

sectors earn less than those in the formal sectors due primarily to the differences in the level of education. In the informal sector, own account workers earn more than unpaid family workers. In all work statuses except government employees, married male earns more than married female. Moreover, for the logarithmic of spouse wage rates, husbands on average earn more than wives for all work statuses.

Married male is older than married female in all work statuses except unpaid family workers. Own account workers are oldest on average, and private employees are the youngest in both genders, reflecting younger generation working in factories rather than in farms. The numbers of years of education are lowest of 6.5 for male own account workers and lowest of 6.8 for female unpaid family workers. Government officials have the highest level of education, 12.7 for male and 14.3 for female. In 2008, for married male, unpaid family workers and private employees have the highest number of children under six year old of 0.36 children, and for married female, private employees have the highest of 0.28 children; government officials of both genders has the lowest children under six year old. Moreover, for husbands, unpaid family workers have the highest number of children age 6-14 of 0.62 children, and for wives, own account workers and public enterprise workers have the highest number of children of 0.66 children.

In terms of occupation, workers are divided into white collar, high-skilled workers, white collar, low-skilled workers, and blue-collar workers. More than 58 percent of male government officials and 65 percent of female government officials are white-collar, high-skilled workers. In the informal sector, unpaid family workers account less than 1 percent, and own account workers, less than 2 percent. Private employees are about 9.8 percent for male and 11.6 percent for female. In the informal sector, a large percentage of unpaid family workers and own account workers are white-collar, low-skilled workers. For male (female) white-collar, low-skilled workers, unpaid family workers and own account workers account for 40.0 and 20.6 (27.3 and 55.7) percent, respectively, while public enterprise workers, government officials and private employees account for 27.8, 17.5 and 11.1 (47.3, 25.6 and 20.8) percent, respectively. In short, most white-collar, low-skilled workers are in service and our data indicate that in the informal sector, the male unpaid

family workers account for 40 percent and female own account workers account for 56 percent.

To capture differences in the cost of living, the dummy variable, urban, is included and defined as workers employing in Bangkok or sanitary districts as residing in the urban area, and the base category is workers employing and residing in the rural area. About 55-83 percent of workers in the formal sector work and 46-59 percent of workers in the informal sector work in the urban area. More than 80 percent of male and female public enterprise employees work in the urban area. For married male (female) in the informal sector, about 54 (44) percent of unpaid family workers and about 53 (61) of own account workers reside in the urban area.

4. Results

This section provides results investigating the response probabilities of employing in a certain work status and analyzing labor supply and predicted wages in the formal and informal sector.

A. Labor Force Participation

The response probabilities derived from the multinomial logit estimates[13] of the multi-sector labor force participation model are provided in Table 3 and 4 for married men and married women. Because of the difficulty in interpreting logit estimates, only partial probability coefficients are presented. The partial derivative is the marginal effect of an explanatory variable on the probability of working in a sector.

[13] Multinomial logit estimates are provided in Table A1 and A2 in the Appendix

Table 3. Response Probabilities from Multinomial Logit Estimates for Married Male

Explanatory Variables	Unpaid family Workers	Own Account Workers	private employees	government employees	Public Enterprise Employees
Years of education	-0.0026***	-0.0059***	-0.0109***	0.0162***	0.0032***
	(0.0004)	(0.0009)	(0.0009)	(0.0005)	(0.0002)
Age	-0.0022***	0.0138***	-0.0159***	0.0038***	0.0006***
	(0.0002)	(0.0003)	(0.0003)	(0.0002)	(0.0001)
Children under six	0.0054**	0.0009	-0.0054	-0.0007	-0.0002
	(0.0022)	(0.0051)	(0.0048)	(0.0030)	(0.0010)
Children age 6-14	0.0008	0.0127***	-0.0156***	0.0017	0.0004
	(0.0017)	(0.0036)	(0.0034)	(0.0020)	(0.0006)
Urban	-0.0272***	-0.0898***	0.0773**	0.0296***	0.0101***
	(0.0030)	(0.0058)	(0.0055)	(0.0036)	(0.0012)
White-collar, high -skilled	-0.0897***	-0.3871***	0.1130***	0.3601***	0.0037**
	(0.0031)	(0.0074)	(0.0120)	(0.0117)	(0.0017)
White-collar, low-skilled	0.1257***	0.0508***	-0.2132***	0.0368***	0.0000
	(0.0060)	(0.0076)	(0.0061)	(0.0050)	(0.0013)
Number of Observations	3,688	16,739	11,182	5,620	737

Note: * = significant at 0.10 level, ** = significant at 0.05 level, and *** - significant at 0.01 level. Standard errors are in parenthesis. The log of likelihood function is 39,536***.

Education and age have a small and significant impact on probabilities of choosing a work status. For both husbands and wives, an additional year of schooling contributes to a reduction in the probabilities of working in the informal sector as unpaid family workers and own account workers; in the formal sector, the reduction in the likelihood of working as private employees but an increase in chances of working as government officials and public enterprise employees. As workers get one year older, in the informal sector for married female, the likelihood to work as unpaid family workers and own account workers increase; for married male, the probability for own account workers increase, but the chance for unpaid family decrease slightly. In the formal sector, an older male or female worker has less chance to work as private employees but has greater chance to work as government officials and public enterprise workers. There seems to be a link between age and the likelihood to shift from the formal sector to the informal sector as pointed out

by Anderson and Dimon (1999). The age coefficients in the informal sector are mostly positive and coefficients for private employees, the largest group in the formal sector, are negative for both genders. This suggests that as age increases, experience increase but dexterity increases. If dexterity effect outweighs experience effect, the likelihood to shift from jobs as private employees to own account workers for male and to jobs in the informal sector for female.

The presence of children has a significant impact on some work status. The number of children under six increases the probability of becoming male unpaid family worker. For female, it increases the likelihood to join the informal sector as unpaid family workers and own account workers, but decreases the propensity to work as private employees. The presence of older children aged 6-14 also increases the likelihood to work as male own account workers. For female, as the number of children aged 6-14 increases by one person, the probability of participating as own account workers increases by 0.03 and the likelihood of becoming private employees decreases by 0.03. Residence in the urban or rural area also significantly impact in all work statuses for male and some sector for female. Residing in Bangkok or in sanitary districts has a negative effect on the likelihood to work in the informal sector and has a positive impact on the propensity to work in the formal sector. In the informal sector, urban residence decreases the probability of becoming own account and unpaid family workers. For female, living in the urban area decreases the chance of being unpaid family workers by 0.07 but increases the likelihood of being private employees by 0.07.

Table 4. Response Probabilities from Multinomial Logit Estimates for Married Female

Explanatory Variables	Unpaid family Workers	Own Account Workers	private employees	government employees	Public Enterprise Employees
Years of education	-0.0035***	-0.0050***	-0.0043***	0.0118***	0.0009***
	(0.0009)	(0.0008)	(0.0009)	(0.0004)	(0.0001)
Age	0.0065***	0.0079***	-0.0164***	0.0018***	0.0002***
	(0.0003)	(.0003)	(0.0003)	(0.0001)	(0.0000)
Children under six	0.0216***	0.0223**	-0.0421***	-0.0023	0.0005
	(0.0050)	(0.0048)	(0.0051)	(0.0018)	(0.0004)
Children age 6-14	0.0037	0.0301***	-0.0330***	-0.0008	0.0000
	(0.0034)	(0.0032)	(0.0035)	(0.0012)	(0.0003)
Urban	-0.0752***	0.0021	0.0712***	0.0010	0.0009*
	(0.0056)	(0.0054)	(0.0056)	(0.0021)	(0.0005)
White-collar, high -skilled	-0.3518***	-0.1374***	0.2328***	0.2516***	0.0049***
	(0.0070)	(0.0112)	(0.0154)	(0.0146)	(0.0018)
White-collar, low-skilled	-0.0588***	0.2311***	-0.2049***	0.0301***	0.0024***
	(0.0059)	(0.0063)	(0.0058)	(0.0034)	(0.0008)
Number of observations	9677	3894	5832	2225	129

Note: * = significant at 0.10 level, ** = significant at 0.05 level, and *** - significant at 0.01 level. Standard errors are in parenthesis. The log of likelihood function is 16,889***.

When comparing to the blue collar workers, for male, being white-collar, high skilled or white-collar low-skilled workers has a significant effect on labor force participation in most sectors of both genders. For male and female, being white-collar, high-skilled workers rather than blue-collar workers decreases the propensity to join the informal sector and increases the propensity to join the formal sector. In the informal sector, the marginal effect of white-collar, high-skilled on the probability of becoming unpaid family workers and own account workers for male (female) are -0.09 and -0.39 (-0.35 and -0.14), respectively. The partial derivatives of becoming private employees, government officials, and public enterprise employees for male (female) are 0.11, 0.36 and 0.004 (0.23, 0.25 and 0.005), respectively. Being white-collar, low-skilled workers increase the likelihood of joining the informal sector for male as unpaid family workers and own account workers by 0.12 and 0.05; for female, it increases for own account workers by 0.23 but decreases for unpaid family workers by 0.06. In the formal sector, the probabilities for male

and female private employees decrease, but those for government officials and public enterprise employees increase.

B. Wages and Hours of Work

The determinants of labor supply and logarithm of hourly wage rate are given in Table 5 and Table 6 for married male and married female, respectively, estimated by the three stage least squares method. The standard errors in parenthesis have been corrected for sample selectivity bias. The approximate Wald statistics are statistically significant when testing for overall significance of the systems of simultaneous equations implying left hand side variables have an impact on right hand side variables.

For married male, the predicted wage has a positive and significant effect for own account workers, government officials, public enterprise employees and suggesting that substitution effect outweighs income effect for male workers, with elasticities at 0.23, 0.14, and 0.15, respectively. The result indicates that the wage elasticities are very low in the formal and informal sector. The wife's wage rate has a negative and significant effect on men's hours of work for private employees and public enterprise employees, but is insignificant for workers in the informal sector, partly since hourly wages are difficult to define in this sector. The own wage effect for male unpaid family workers, relatively small group for male in the informal sector, is also insignificant.

For married female in Table 6, the effect of predicted wage is positive and significant for unpaid family workers and private employees and with elasticities at 0.93 and 0.55; this indicate that unpaid family workers respond to wage change more than private employees. These estimates are much higher than Hill's (1989) estimates for Japanese workers at 0.25 and 0.26, respectively. Government officials in the formal sector have negative elasticities of 0.32, indicating that income effect outweighs the substitution effect.[14] The cross wage effect is negative in all groups but statistically significant only for own account workers in the informal sector as well as private employees, government officials. This indicates that in the informal sector when the husband wage rate goes up; own account workers tend to work less.

[14] Schultz (1990) finds that the own wage elasticities for Thai women and men in the formal sector are negative.

Table 5. Labor Supply and Hourly Wage Rate for Married Male

	Unpaid family Workers		Own Account Workers		Private Employees		Government Officials		Public Enterprise	
	log(wage)	Annual Hours	log(wage)	Annual Hours	log(wage)	Annual Hours	log(wage)	Annual Hours	log(wage)	Annual Hours
Intercept	0.346***	220.820***	0.5534***	156.531***	0.282***	192.739***	0.109***	188.16**	0.132***	211.391***
	(0.0236)	(35.5033)	(0.0058)	(4.9209)	(0.0060)	(24.6606)	(0.0087)	(2.2864)	(0.0232)	(6.3329)
Log wage (predicted)	-	34.8228	-	47.8429***	-	19.9023	-	24.060**	-	26.2714**
		(27.3112)		(3.0347)		(17.4048)		(3.9056)		(11.8341)
Log wife's income	-	1.5717	-	0.4112	-	-1.1172**	-	-0.390	-	-1.5099*
		(1.5449)		(0.6757)		(0.4820)		(0.3291)		(0.8820)
Year of Education	0.095***	-3.1449	0.0935***	-6.2309***	0.094***	-2.4156	0.109***	-3.594***	0.107***	-4.0497***
	(0.0007)	(2.6285)	(0.0003)	(0.4567)	(0.0004)	(1.8307)	(0.0005)	(0.6105)	(0.0014)	(1.4387)
Labor Market Experience	-0.017***	-	-0.025***	-	-0.016***	-	-0.013***	-	-0.013***	-
	(0.0003)		(0.0001)		(0.0001)		(0.0001)		(0.0004)	
Children Under 6	-	-2.4659	-	-1.1231	-	-0.9630	-	-1.778	-	-0.8823
		(1.8641)		(0.9604)		(1.0168)		(1.1359)		(2.8469)
Children age 6-14	-	-1.1943	-	-1.6014**	-	-2.6992**	-	-1.132	-	0.0390
		(2.4262)		(0.6526)		(1.3444)		(0.7662)		(2.0135)
Urban	0.239***	-	0.2523***	-	0.251***	-	0.247	-	0.249***	-
	(0.0046)		(0.0019)		(0.0025)		(0.0031)***		(0.0097)	
White-collar, high-skilled	-	82.4735	-	-29.154***	-	-29.377	-	9.0003*	-	38.518*
		(50.8313)		(5.2672)		(27.9026)		(5.3201)		(21.8318)
White-collar, low-skilled	-	28.4916***	-	56.5342***	-	23.8286*	-	7.6614***	-	0.0709
		(7.0942)		(1.9663)		(12.3256)		(2.0143)		(5.0148)
Rhamda	-2.21***	194.645	-2.369***	-25.275***	-2.39***	-6.5823	-2.34***	67.640***	-2.35***	135.97**
	(0.0676)	(207.3616)	(0.0140)	(9.1382)	(0.0077)	(99.4400)	(0.0044)	(10.8033)	(0.0166)	
No of observations	3,688		16,739		11,182		5,620		737	
Approximate Wald	80700.13***		347538.9***		500498.8***		1212817***		82992.18***	

Note: * = significant at 0.10 level, ** = significant at 0.05 level, and *** - significant at 0.01 level. Standard errors are in parenthesis.

Table 6. Labor Supply and Hourly Wage Rate for Married Female

	Unpaid family worker		Own Account Workers		Private worker		Government Officials		Public Enterprise	
	log(wage)	Annual Hours	log(wage)	Annual Hours	log(wage)	Annual Hours	log(wage)	Annual Hours	log(wage)	Annual Hours
Intercept	-0.463***	270.64***	-0.503***	166.045***	-0.600***	252.284***	-0.711***	156.2701***	-0.710***	149.701***
	(0.0061)	(15.2736)	(0.0069)	(26.9431)	(0.0034)	(8.0855)	(0.0046)	(10.5489)	(0.0189)	(21.9314)
Log wage (predicted)	-	181.859***	-	7.8379	-	113.878***	-	-52.4368***	-	-97.6571
		(27.5910)		(44.2986)		(17.6640)		(15.2271)		(60.4367)
Log husband's income	-	-0.5819	-	-3.4538***	-	-8.8381***	-	-3.6519	-	-1.7604
		(1.8163)		(0.8957)		(0.7124)		(0.6747)***		(2.1203)
Year of Education	0.071***	-13.5***	0.073***	-0.6765	0.074***	-8.3488***	0.079***	-1.6195	0.080***	7.7326
	(0.0002)	(1.9326)	(0.0003)	(3.1246)	(0.0002)	(1.2645)	(0.0003)	(1.5024)	(0.0010)	(6.7813)
Labor Market Experience	-0.0008***	-	-0.0002	-	0.004***	-	0.006***	-	0.006***	-
	(0.0001)		(0.0001)		(0.0001)		(0.0001)		(0.0004)	
Children Under 6	-	-2.6853**	-	-1.1725	-	-3.3098***	-	5.0637**	-	-1.1428
		(1.3040)		(2.3093)		(1.2618)		(2.0719)		(4.3497)
Children age 6-14	-	-1.4818*	-	-1.5319	-	-2.3403***	-	3.9478**	-	-1.9815
		(0.8754)		(1.4791)		(0.8849)		(1.6989)		(3.8122)
Urban	0.0623***	-	0.064***	-	0.064***	-	0.0645***	-	0.0585***	-
	(0.0010)		(0.0016)		(0.0013)		(0.0017)		(0.0079)	
White-collar, high-skilled	-	49.479***	-	-2.8917	-	-45.785***	-	-75.4439***	-	71.1626
		(11.3735)		(16.075)		(4.2952)		(28.2812)		(48.1543)
White-collar, low-skilled	-	49.767***	-	57.5883***	-	25.2202**	-	26.5350**	-	8.2906
		(2.2921)		(2.7009)		(2.1044)		(13.0533)		(27.8262)
Rhamda	-4.4636***	806.18***	-4.53***	-79.76	-4.50***	395.85***	-4.50***	-424.47***	-4.46***	-300.02
	(0.0131)	(127.9012)	(0.0183)	(225.5041)	(0.0045)	(75.9814)	(0.0034)	(127.6770)	(0.0136)	(187.8139)
No of observations	9677		3894		5832		2225		129	
Approximate Wald	773196.9***		402488.4***		2628709***		5206648***		204087.4***	

Note: * = significant at 0.10 level, ** = significant at 0.05 level, and *** - significant at 0.01 level. Standard errors are in parenthesis.

Education increases wages and reduce hours of work for male and female, but experience reduce wage rates for married male. Additional year of education tends to benefit male more than female and workers in the formal more than those the informal sector. The returns to education for female are about 7.1-8.1 percent, and those for male, 9.3-10.9 percent. The returns to education for male (female) workers in the informal sector as unpaid family workers is 9.5 (7.1) percent and that as own account workers is 9.4 (7.3) percent; those in the formal sector range from 9.4 to 10.8 (7.4 to 8.1) percent. Our returns to education for male but not for female are quite close to Hawley's findings whose returns to education range from 10 to 11 percent over 1985-1998. In addition, completing an additional year of schooling reduces working hours by 2.4 to 6.2 hours for male and 1.6 to 1.5 hours per year for female. In the informal sector, for married male (female), an addition year reduces working by 3.1 (13.5) hours for unpaid family workers and 6.2 (0.7) for own account workers.

Moreover, for male, an additional year of experience reduces the hourly wage rate about 1-2 percent in the formal sector and 2-3 percent in the informal sector, after taking into account the effects of education, cost of living, and selection correction. In contrast, experience increases the female wage rate less than 1 percent in the formal sector; for female unpaid family workers, experience decreases the wage rate slightly. The large negative returns to experience for male and female workers in the informal sector indicate that dexterity may outweigh the experience factor where younger workers perform a better manual job in the informal sector than the older workers.

The presence of children under 6 and children age 6-14 tend to reduce working hours. For male, the coefficients of children under 6 are negative but insignificant, but the presence of children under 6 reduces working hours of unpaid family workers by 2.7 hours and those of private employees by 3.3 hours. For male, the presence of children 6-14 reduces working hours of own account workers by 1.6 hours and those of private employees by 2.7 hours; for female, the presence of children 6-14 reduces working hours of unpaid family workers by 1.5 hours and those of private employees by 2.3 hours. Surprisingly, the presence of children under 6 and children age 6-14

increase working of female government officials by 5.1 and 3.9 hours, respectively. In summary, in the informal sector, for male own account workers, the presence of children age 6-14 reduces working hours by 1.6 hours, and for female unpaid family workers, the presence of children under six reduces working hours by 2.7 hours and the presence of children age 6-14 reduces by 1.5 hours.

The hourly wage rates in the urban area are higher than those in the rural area. Male workers residing in Bangkok or in sanitary districts in other provinces earns about 23.4-25.2 percent more than those outside, but female workers earns only about 5.9-6.4 percent higher. In particular, for married male (female) in the informal sector unpaid family workers and own account workers in the urban area earn 23.9 and 25.2 (6.2 and 6.4) percent, respectively, higher than those in the rural areas.

White-collar, low-skilled workers, particularly female, tend to work longer hours than blue-collar workers, but there is no pattern for white-collar, high skilled workers. In the informal sector, male (female) white-collar low-skilled workers work about 28.5-56.5 (49.8-57.6) hours higher; in the formal sector, they work about 7.7-23.8 (25.2-26.5) hours higher. In particular, for male (female) white-collar low-skilled workers in the informal sector, unpaid family workers and own account workers work 28.5 and 56.5 (49.7 and 57.8), respectively, more than blue-collar counterparts. For male, the white-collar, high-skilled workers who are own account workers work 29.2 hours lower, while those who are government officials and public enterprise employees work 9.0 and 38.5 hours higher than the blue collar counterparts. For female, the white-collar, high-skilled who are unpaid family workers work 49.5 hours more than blue collar counterparts, while those who are private workers and government officials work 45.8 and 75.4 hours fewer.

Finally, most coefficients of selection corrections are statistically significant indicating that the selection corrections are warranted in order to obtain consistent estimates. For the wage equations, the selection correction has a negative effect on all work statuses for married male and married female indicating that unobservable factors which increase the probability of participation in a sector also decreases predicted offered wage rates. For the hourly equations, the selection correction variables for male unpaid family

workers, male private employees, and female own account workers are insignificant. In the informal sector, the selection correction coefficient for male own account workers is negative and that for female unpaid own account workers is positive. In the formal sector, correction coefficient for female private employees is negative, while coefficients of government officials and public enterprise employees of both genders are positive. The positive coefficient indicates that unobservables which increase the probability of participation in a sector also increase hours of work.

5. Conclusions

This paper estimates multi-sector labor supply and offered wage as well as participation choice functions for married male and female in Thailand with an emphasis on the informal sector in Thailand using Labor Force Survey for 2008. The multi-sector model is appropriate as Thailand has a large informal sector and family workers and self-employed workers are two large work statuses in this sector. The important findings from this research are as follows. First, for married male, own account workers are the largest work status; for married women, unpaid family workers are the largest work status; most workers in the informal sector work in agriculture and service. Moreover, there are more married female than married male in the informal sector. Second, the likelihood of participating in the informal sector as own account workers and unpaid family workers is negatively related with education, urbanity, and being white-collar workers and is positively related to age and presence of children. Residence and occupation variables have a greater impact on the probability to work in a particular work status than personal and household variables.

Third, the wage elasticities are larger for married male than married female even in the informal sector; the wage elasticities of workers in the informal sector are larger than those in the formal sector. The own wage elasticity for male own account workers is 0.23 and that for female unpaid family worker is 0.93; elasticities for male unpaid family workers and female own account workers are insignificant since hourly wages are difficult to find in this sector. The cross wage elasticity is negative and significant only for female own account workers. Finally, the returns to education for male unpaid

family workers and own account workers are about 9.4-9.5 percent; those for female are about 7.1-7.3 percent. Surprising, the returns to experience for both male and female workers in the informal sector are negative, after controlling for education, the cost of livings, and selective sample as dexterity may dominate the experience factor in the informal sector.

References

Aemkulwat, C. (2009). "Labor Market Transformation in Thailand after Two Decades," paper prepared for The First Annual Conference of the University Network for Development in Asia (UNDA), The International Seminar on "Skills Development for the Emerging New Dynamism in Asian Developing Countries under Globalization" in Bangkok, Thailand on January 23-25, 2009.

Aemkulwat, C. (2010). "Labor Force Structure Change and Thai Labor Market, 1990-2008," paper prepared for The Second ANDA International Seminar on "Skills Development for the Emerging New Dynamism in Asian Developing Countries under Globalization" at Phnom Phen, Cambodia on January 8-10, 2010.

Anderson, J. B., & Denise, D. (1999). "Formal Sector Job Growth and Women's Labor Sector Participation: The Case of Mexico," *The Quarterly Review of Economics and Finance*, Vol. 39, 169-191.

Belsley, D. A. (1988). "Two- or Three-Stage Least Squares?" *Computer Science in Economics and Management*, Vol. 1, 21-30.

Blomquist, N. S., & Hansson-Brusewitz, U. (1990). "The Effect of Taxes on Male and Female Labor Supply in Sweden," *The Journal of Human Resources*, Vol. 25(3) Special Issue on Taxation and Labor Supply in Industrial Countries (Summer, 1990), pp. 317-357.

Boonperm, J. (2000). "Surveys on Informal Sector in Thailand," paper presented at the 4th Meeting of the Expert Group on Internal Sector Statistics (Delhi Group), Geneva, 28-30.

Colombino, U., & Boca, D. (1990). "The Effect of Taxes on Labor Supply in Italy, *The Journal of Human Resources,* Vol 25 (3), Special Issue on Taxation and Labor Supply in Industrial Countries, pp. 390-414.

Gindling, T. H. (1991). "Labor Market Segmentation and the Determination of Wages in the Public, Private-Formal, and Informal Sectors in San José, Costa Rica," *Economic Development and Cultural Change*, Vol. 39, No. 3 (April), pp. 585-605.

Hawley, J. D. (2004). "Changing Returns to Education in Times of Prosperity and Crisis, Thailand 1985-1998," *Economics of Education Review*, Vol. 23 (2004), pp. 273-286.

Hay, J. W. (1980). "Occupational Choice and Occupational Earnings: Selectivity Bias in a Simultaneous Logit-OLS Model," unpublished Ph.D. dissertation, Yale University.

Heckman, J. J. (1979). "Sample Selection Bias as a Specification Error," *Econometrica* Vol. 47 (January 1979), pp. 153-161.

Hill, A. M. (1983). "Female Labor Force Participation in Developing and Developed Countries – Consideration of the Informal Sector," *The Review of Economics and Statistics*, Vol. 65, No. 3 (August 1983), pp. 459-468.

Hill, Anne M. (1989). "Female Labor Supply in Japan: Implications of the Informal Sector for Labor Force Participation and Hours of Work," *The Journal of Human Resources*, Vol. 24, No. 1 (Winter 1989), pp. 143-161.

Moenjak, T., & Worswick, C. (2003). "Vocational Education in Thailand: a Study of Choice and Returns," *Economics of Education Review*, 22, pp. 99-107.

Poaponsakorn, N. (1979). "Labor Supply, Demand for Children and Wage Rates of Paid Employees in Thailand," Ph.D. Thesis, University of Hawaii.

Schultz, T. P. (1990). "Testing the Neoclassical Model of Family Labor Supply and Fertility," *The Journal of Human Resources*, Vol. 25, No. 4 (Autumn, 1990), pp. 599-634.

Sirilerdpitak, N. (2008). "Effect of Wages on Labor Supply Classified by Occupation in Non-agricultural Sector," Master Thesis, Chulalongkorn University.

Tiefenthaler, J. (1999). "The Sectoral Labor Supply of Married Couples in Brazil: Testing the Unitary Model of Household Behavior," *Journal of Population Economics*, Vol. 12, pp. 591-606.

Appendix

Table A1. Multinomial Logit Estimates and Probabilities of the Multi-sector Labor Supply Participation Model for Married Male

Explanatory Variables	Unpaid family Workers	private employees	government employees	Public Enterprise Employees
Years of Education	-0.0187***	-0.0172***	0.1845***	0.2622***
	(0.0056)	(0.0040)	(0.0054)	(0.0115)
	[-0.0026]***	[-0.0109]***	[0.0162]***	[0.0032]***
	(0.0004)	(0.0009)	(0.0005)	(0.0002)
Age	-0.058***	-0.0747***	0.0093***	0.0171***
	(0.0021)	(0.0014)	(0.0022)	(0.0046)
	[-0.0022]***	[-0.0159]***	[0.0038]***	[0.0006]***
	(0.0002)	(0.0003)	(0.0002)	(0.0001)
Children under six	0.064**	-0.0169	-0.0097	-0.0116
	(0.0322)	(0.0227)	(0.0367)	(0.0768)
	[0.0054]**	[-0.0054]	[-0.0007]	[-0.0002]
	(0.0022)	(0.0048)	(0.0030)	(0.0010)
Children age 6-14	-0.0181	-0.071***	-0.0104	0.003
	(0.0233)	(0.0161)	(0.0251)	(0.0504)
	[0.0008]	[-0.0156]***	[0.0017]	[0.0004]
	(0.0017)	(0.0034)	(0.0020)	(0.0006)
Urban	-0.1289***	0.4178***	0.516***	1.0037***
	(0.0395)	(0.0263)	(0.0441)	(0.1048)
	[-0.0272]***	[0.0773]***	[0.0296]***	[0.0101]***
	(0.0030)	(0.0055)	(0.0036)	(0.0012)
White-collar, high -skilled	-0.767***	1.7922***	3.3202***	1.7744***
	(0.2408)	(0.0729)	(0.0757)	(0.1279)
	[-0.0897]***	[0.1130]***	[0.3601]***	[0.0037]**
	(0.0031)	(0.0120)	(0.0117)	(0.0017)
White-collar, low-skilled	0.9665***	-0.8523***	0.2396***	-0.101
	(0.0433)	(0.0384)	(0.0512)	(0.1033)
	[0.1257]***	[-0.2132]***	[0.0368]***	[0.0000]
	(0.0060)	(0.0061)	(0.0050)	(0.0013)
constant	0.8937***	2.843***	-4.19***	-7.1603***
	(0.1148)	(0.0811)	(0.1298)	(0.2714)
Number of Observations	3,688	11,182	5,620	737

Note: * = significant at 0.10 level, ** = significant at 0.05 level, and *** - significant at 0.01 level. Standard errors are in parenthesis. The log of likelihood function is 35,322***.

Table A2. Multinomial Logit Estimates and Probabilities of the Multi-sector Labor Supply Participation Model for Married Female

Explanatory Variables	Unpaid family Workers	private employees	government employees	Public Enterprise Employees
Years of Education	0.0082*	0.0047	0.291***	0.33***
	(0.0045)	(0.0048)	(0.0074)	(0.0220)
	[-0.0035]***	[-0.0043]***	[0.0118]***	[0.0009]***
	(0.0009)	(0.0009)	(0.0004)	(0.0001)
Age	-0.01***	-0.0794***	0.0135***	0.0261***
	(0.0017)	(0.0018)	(0.0029)	(0.0079)
	[0.0065]***	[-0.0164]***	[0.0018]***	[0.0002]***
	(0.0003)	(0.0003)	(0.0001)	(0.0000)
Children under six	-0.0195	-0.2113***	-0.1336**	0.0709
	(0.0261)	(0.0286)	(0.0461)	(0.1204)
	[0.0216]***	[-0.0421]***	[-0.0023]	[0.0005]
	(0.0050)	(0.0051)	(0.0018)	(0.0004)
Children age 6-14	-0.098***	-0.098***	-0.1277***	-0.0937
	(0.0174)	(0.0174)	(0.0312)	(0.0848)
	[0.0037]	[-0.0330]***	[-0.0008]	[0.0000]
	(0.0034)	(0.0035)	(0.0012)	(0.0003)
Urban	-0.2168***	-0.2168***	0.016***	0.3003*
	(0.0295)	(0.0295)	(0.0567)	(0.1721)
	[-0.0752]***	[0.0712]***	[0.0010]	[0.0009]*
	(0.0056)	(0.0056)	(0.0021)	(0.0005)
White-collar, high -skilled	-1.2513***	1.2916***	2.8903	1.7795***
	(0.1338)	(0.0934)	(0.1102)	(0.2704)
	[-0.3518]***	[0.2328]***	[0.2516]***	[0.0049]***
	(0.0070)	(0.0154)	(0.0146)	(0.0018)
White-collar, low-skilled	-0.92***	-1.4808***	-0.1078***	-0.0264
	(0.0316)	(0.0367)	(0.0719)	(0.2261)
	[-0.0588]***	[-0.2049]***	[0.0301]***	[0.0024]***
	(0.0059)	(0.0058)	(0.0034)	(0.0008)
constant	1.224***	3.7697***	-4.8701	-8.4979***
	(0.0946)	(0.1001)	(0.1638)	(0.4749)
Log likelihood	13053	10775	4325	258
Number of observations	9677	5832	2225	129

Note: * = significant at 0.10 level, ** = significant at 0.05 level, and *** - significant at 0.01 level. Standard errors are in parenthesis. The log of likelihood function is 16,889***.

Table A3. Cross Tabulation of Work Status and Occupation

Number of Workers	White-Collar High Skilled			White-Collar, Low Skilled		Blue-Collar					Total	Percent Distribution
	Legislators	Professional	Technician	Clerks	Service	Skilled Agriculture	Craft and related workers	Plant and Machine	Elementary	Unknown		
Employer	1704	22	73	19	1108	613	589	68	51	0	4247	3.4%
Own Account Workers	142	206	505	128	13425	18638	3393	1800	2387	1	40625	32.6%
Unpaid Family Workers	11	28	142	255	8125	13846	1123	115	1004	0	24649	19.8%
Government Employees	1034	5509	2026	1873	1354	218	247	557	1304	17	14139	11.3%
Public Enterprise Employees	123	119	235	444	48	17	206	106	111	4	1413	1.1%
Private Employees	718	1241	2789	2549	4735	3700	8234	6228	9168	59	39421	31.6%
Association	2	2	2	1	11	7	76	5	6	0	112	0.1%
Total	3734	7127	5772	5269	28806	37039	13868	8879	14031	81	124606	100.0%
% of Work Status	White-Collar High Skilled			White-Collar, Low Skilled		Blue-Collar					Total	Percent Distribution
	Legislators	Professional	Technician	Clerks	Service	Skilled Agriculture	Craft and related workers	Plant and Machine	Elementary	Unknown		
Employer	40	1	2	0	26	14	14	2	1	0	100	3.4%
Own Account Workers	0	1	1	0	33	46	8	4	6	0	100	32.6%
Unpaid Family Workers	0	0	1	1	33	56	5	0	4	0	100	19.8%
Government Employees	7	39	14	13	10	2	2	4	9	0	100	11.3%
Public Enterprise Employees	9	8	17	31	3	1	15	8	8	0	100	1.1%
Private Employees	2	3	7	6	12	9	21	16	23	0	100	31.6%
Association	2	2	2	1	10	6	68	4	5	0	100	0.1%
Total	3	6	5	4	23	30	11	7	11	0	100	100.0%