Female Labor Force Participation in Indonesia

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1. Introduction

Female labor force participation has been growing globally in recent decades, and there is an important implication for economic development. The rising educational attainment of women, accompanied by declining fertility, postponement of marriage, greater access to child care facilities, and more flexible work arrangements are the factors attributing to women's increased participation in the labor market (Manning, 1998). According to Psacharopoulos and Tzannatos (1989), education and participation in the work force both depend on and affect a country's economic and overall development. The higher the participation rate and the educational level of workers, the higher is the country's potential total production. Women's economic role in the development process largely depends on their ability to participate in the labor market, which in turn is determined by their skills and the availability of work opportunities. Women's educational attainment has increased in many developing countries due to greater emphasis on women's education as well as increased government's and donor support for the education sector. However, an important concern is whether the higher educational attainment of women significantly affects their participation in the labor force.

Since colonial times, Indonesia has had a high female participation rate. Although lower than that in other Southeast Asian countries, this high participation rate has set Indonesia apart from many other Muslim countries (Manning, 1998; Widarti, 1998). Indonesian women take part in both formal and informal employment and play an important economic role in the household. Women make up an important share of remunerative employment rather than

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being confined to traditional, unpaid 'women's work' (Benjamin 1996). Women's participation has increased at all ages, among all educational classes in almost all wage- and non-wage segments of the labor market, as well as in both urban and rural areas within and outside Java (Manning, 1998).

The patterns of female labor force participation are the complex outcomes of a variety of economic and non-economic factors (Psacharopoulos and Tzannatos, 1989). Many empirical studies show that female participation in the labor force is a function of a number of personal, social, cultural, demographic and economic factors. This study will diagnose the determinants of female labor force participation (FLFP) with a special emphasis on two aspects, namely education and household level factors, which have been shown in many previous studies to be important factors affecting FLFP. Psacharopoulos and Tzannatos (1989) argued that the relation between female participation and a number of economic variables appears to be ambiguous in both theoretical terms and empirical estimates excluding one variable - education. Neoclassical economic theory suggests that female labor supply is not only a function of her own market wage offer (substitution effect) but also a function of her family interests (income effect) (Meng 1998). Hence, this study will use a number of household level variables to estimate the effect of these variables on FLFP.

The objectives of this study are two-fold. Firstly, it examines the effect of education and household level factors, including women's characteristics, head of household characteristics, household characteristics and region of residence on the probability of FLFP in Indonesia. Many previous studies (Hill, 1983; Tiefenthaler, 1992, 1994) suggest that female labor participation behavior varies between the formal and informal sectors. Hence, this study also investigates the effect of education and household level factors on the probability of female participation in formal and informal sectors of employment. This study aims to make a contribution to understanding the factors that influence an Indonesian woman's decision to join the labor force as a whole and to participate in different sectors of the labor force as well.

2. The Indonesian Economy and the Labor Market

Indonesia is an archipelago in Southeast Asia consisting of 17,000 islands (6,000 inhabited) straddling the equator. The population was estimated at 225 million in 2000. The size of its population ranks Indonesia as the fourth most populous country in the world after China, India and the United States. More than 60 percent of the population lives on the "inner" islands of Java, Madura and Bali, which together account for less than one tenth of the total land area.

Since President Soeharto came to power in 1965 the Indonesian economy has been among the top ten achievers in the developing world (Manning, 1998). Until late 1997, Indonesia enjoyed three decades of rapid economic growth at an average of 7 percent annually. It was known as one of Asia's success stories. By the late 1980s Indonesia was being classified among the select group of developing countries intended to become newly industrialized economies, following the successful path of Asia's outward-looking industrial economies (Hill, 2000). Due to an abundance of natural resources, especially oil, the country faces many challenges in areas of macroeconomic management, allocation of resources and the distribution of wealth. Substantial structural change contributed to the economic growth of Indonesia. The share of GDP attributed to agriculture has fallen even quicker than in other fast-growing economies in East Asia (Manning, 1998). Modern, large-scale industry has replaced much of the traditional manufacturing sector. Technological development in the form of extensive communications and infrastructure networks is visible not only in Java, but also now extending into most of the Outer Island regions. Table 1 indicates that the Indonesian economy of the 1990s is almost unrecognizable in comparison with that of the mid-1960s.

Indeed, agriculture is still the backbone of the Indonesian economy, employing the largest number of workers (see Table 2). However, the share of the agricultural labor force has fallen steadily, from almost three-quarters of the total in 1961 to one-half in 1990 (Hill, 2000). The share of agriculture in total employment in Java first declined quite sharply during the oil boom, followed by a stable period in the 1980s, and experienced a sharp decline in the 1990s (Manning, 1998). The share of industry has doubled from 1961 to 1990, while the share of services has risen by about 75 percent (Hill, 2000). Employment growth

Table 1：Indicators of Economic Development, Mid-1960s to Early 1990

Indicators	Mid-1960s	Early 1990s
1. Real GDP per capita:		
Growth (%)	± 0	± 5
$1991	190	610
	(1965)	(1991)
2. Shares of GDP (%)		
Agriculture	53	19
Industry	11	40
Manufacturing	8	21
3. Employment: % in agriculture	73	50
	(1961)	(1990)
4. Industrial production per capita:		
Textiles (metres)	4.1	28
Electricity (kWh)	17.7	218
Fertilizer (kgs)	1.1	39.1
5. Agriculture and nutrition:		
Daily calories/capita	1,816	2,605
Rice yields (tons/ha)	2.1	4.3
6. Monetary conditions:		
Inflation (% increase)	＞500	5-10
7. Education: % of population with:		
No schooling	68.1	18.9
Tertiary education	0.1	1.6
	(1961)	(1990)
8. Poverty:		
Java % very poor	61	10
% 'sufficient'	8	36
Outside Java % very poor	52	7
% 'sufficient'	10	47

Source: Hill (2000, p.5)
Note: kWh - kilowatt hours, kgs - kilograms, ha - hectares

Table 2: Employment by Sector in Indonesia, 1961-90

	Shares (%)				Increment (%)		
	1961	1971	1980	1990	1961-71	1971-80	1980-90
Agriculture	73.0	65.8	56.1	50.1	28.2	24.4	34.1
Industry	8.1	10.1	13.3	17.0	20.6	23.7	26.7
Manufacturing	5.9	7.8	9.2	11.6	18.2	13.6	18.1
Construction	1.8	1.9	3.2	4.1	2.6	7.5	6.5
Services	18.9	24.1	30.6	32.9	51.2	51.8	39.2
Trade	6.9	11.0	13.1	15.0	32.4	20.1	20.0
Transport	2.2	2.4	2.9	3.7	3.8	4.4	5.9
Finance and other	9.8	10.7	14.6	14.2	15.0	27.4	13.2
Total	100	100	100	100	100	100	100
('000)	32,911	39,163	51,196	70,608	6,252	6,810	19,412

Source: Hill (2000, p.23)

in manufacturing in Indonesia can be compared with that achieved in some more rapidly industrializing economies. Manufacturing output and employment growth was not only rapid in large-scale firms, but small-scale enterprises also continued to account for the lion's share of employment in the sector. Due to Indonesia's

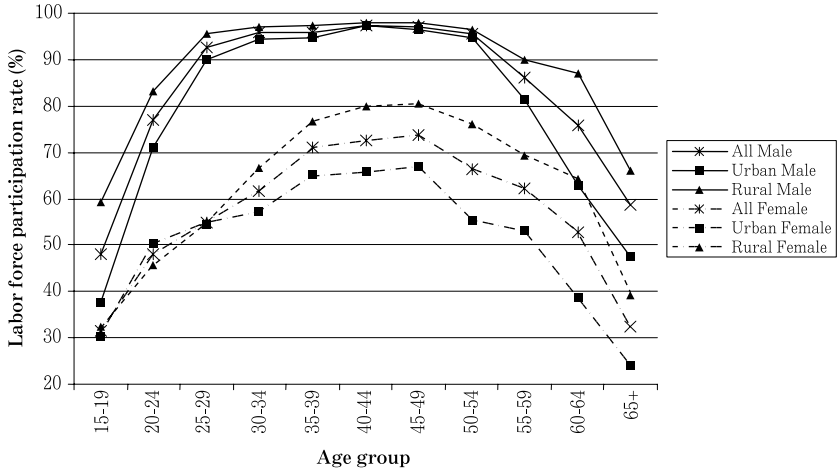
major effort in developing infrastructure, many unskilled and semi-skilled jobs were created in construction. Construction contributed close to 15 percent of all non-agricultural jobs created among males in Indonesia over the period 1971-95 (Manning, 1998). Petty trade dominated occupations in the service sector, which were taken up mostly by females. It was estimated that self-employed and family workers in petty trade alone accounted for approximately 40 percent of all employment in services in the mid 1980s (Manning, 1998). As banks and financial institutions spread rapidly throughout the country in the 1990s, employment in financial services grew from 10 percent per annum (Manning, 1998).

3. Women Labor Force Participation in Indonesia

Female labor force participation rates in Indonesia rose from 1960 in a higher proportion than seen in other East Asian countries. Rates rose from 26.9 to 41.2 percent between 1960 and 2002. The increase was much higher in urban areas, from 26 to 36 percent between 1971 and 1990 (Manning, 1998). Young and less-educated groups, especially those in their twenties, and primary and lower secondary educated women in urban areas are the greatest beneficiaries in relative terms, suggesting that job opportunity expansion in manufacturing has contributed to higher FLFP among young, single females (Manning, 1998). Figure 1 shows the age-specific labor force participation rate (LFPR) by gender and urban/rural areas for the year 2000. The same trend has been found for male and female in both urban and rural areas. All curves generally suggest an upward trend; downward sloping trends were found since the early 50s for male and since the late 40s for female. The female curve remains lower throughout all the age-cohorts. For male, the rate remains steady at more than 90 percent from the 25-29 to 50-54 cohort, whereas the female rate peaks at 74 percent on average at the 45-49 cohort. Among the women, the rates are higher for the rural group compared to their urban counterpart across almost all age cohorts.

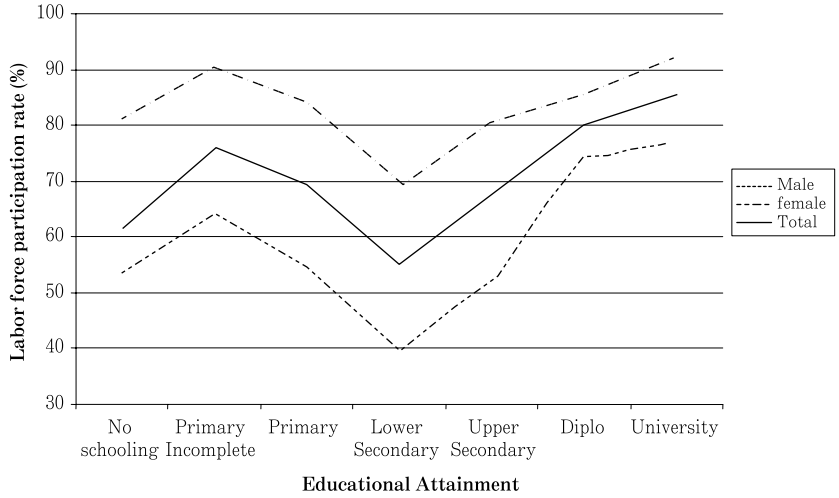
A U-pattern of participation rate by education has been observed in Indonesia since the early 1970s; rates were high among females with no formal schooling, fell among secondary graduates and then rose again among upper secondary and tertiary educated women (Manning, 1998). Figure 2 shows LFPR by

Figure 1: Labor Force Participation Rates of Indonesia by Age, Gender and Urban/Rural Area, 2000



Source: Drawn by the Author based on the 2000 Indonesian Family Life Survey.

Figure 2: Labor Force Participation Rates of Indonesia by Educational Attainment and by Gender, 2000; Persons Aged 15 Years or Above



Source: Drawn by the Author based on the 2000 Indonesian Family Life Survey.

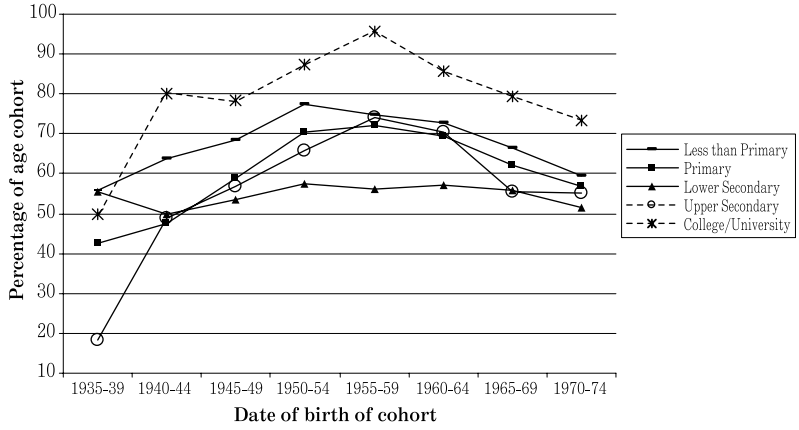
educational attainment for the year 2000, which also supports the U-pattern of participation in Indonesia. Overall, the higher and similar participation rates are found at primary incomplete and tertiary education level rather than lower and upper secondary level. For females, the rate reaches 64 percent at primary incomplete level, and thereafter declines to 55 and 40 percent at primary and lower

secondary level, respectively. The participation rate then sharply increases to more than 50 percent at the upper secondary level and more than 70 percent at the diploma and university level. A relatively low FLFP among primary and lower secondary graduates can be attributed to two factors: the unwillingness of young women to take up informal jobs common among many poorer urban dwellers, and their incapability to compete with more educated people for formal sector jobs (Jellinek, 1991 as quoted in Manning, 1998).

Figure 3 shows both the rise and the fall in the supply of educated female labor across age cohorts. As the proportion of female younger workers with primary and less than primary education is reduced, the proportion of tertiary educated younger women workers is also reduced. However, among both older and younger age cohorts with the exception of the oldest age cohort, the highest proportion of tertiary educated women's participation in labor force is evident from Figure 3.

Significant gender differences are evident in the occupational category (see

Figure 3: Supply of Female Labor According to Educational Qualification across Age Cohorts, 2000



Source: Drawn by the Author based on the 2000 Indonesian Family Life Survey.

Table 3: Occupational Category by Gender in Indonesia, 2000

Occupational Category	Male	Female	Total
Government	67.4	32.6	6.5
Private	65.1	34.9	37.8
Self-employment	60.6	39.4	40.4
Unpaid family worker	30.0	70.0	15.3
No. of Observation	10399	7512	17911

Source: Hill (2000, p.23)

Table 4: Sector of Employment by Educational Attainment in Indonesia, 2000; Persons Aged 15 Years or Above

Sector of employment	Percentage of population with						No. of Observation
	No Schooling	Primary Incomplete	Primary	Lower Secondary	Upper Secondary	College/ University	
Formal							
Male	4.4	15.2	25.0	17.2	29.2	9.0	5199
Female	11.0	16.2	21.5	12.3	25.4	13.5	2743
Total	6.7	15.5	23.8	15.5	27.9	10.6	7942
Informal							
Male	10.9	25.5	29.6	15.5	15.4	3.2	5200
Female	21.3	27.8	25.8	12.5	11.2	1.5	4769
Total	15.9	26.6	27.8	14.1	13.4	2.4	9969

Source: Compiled by the Author based on the 2000 Indonesian Family Life Survey.
Note: Formal sector includes both government and private job and informal sector includes both self-employment and unpaid work.

Table 3). In both public and private sector employment, the female participation rate is about half that of males. On the other hand, 70 percent of workers in unpaid jobs are female. Another salient feature in the employment pattern is that formal sector employment is mainly occupied by higher educated graduates, while the reverse is seen for the informal sector (see Table 4). More than 35 percent of those who are engaged in formal sector jobs have upper secondary education or higher, while 70 percent of informal job holders have primary, less than primary or no education.

4. Conceptual Framework

According to the theory of allocation of time revealed by Becker (1965), an individual allocates time resources between home and market production in a way to maximize his utility function. According to Mincer (1962), each family member must choose between leisure, work at home and work in the job market. The family is considered as the unit of analysis of consumption behavior in the study of market labor supply (Mincer, 1962). Mincer (1962) gave emphasis to the consideration of family context of leisure and work choices and of the home-market dichotomy for the analysis of labor force behavior. He postulated that income will have a positive effect on the demand for leisure, hence the affect on the total amount of work will be negative. As a result, increased family income will decrease female labor force participation. He recognized educational activity to be an essential and most important element in the productive life of individuals.

According to Standing and Sheehan (1978), the probability of labor force participation can be determined by the opportunity costs of activity and inactivity; the higher the opportunity cost of activity the lower the probability of participation, ceteris paribus. Standing (1978) explained that the opportunity cost of inactivity of a woman can be measured by the woman's opportunity wage or her human capital. He also explained that the effect of higher household income on the increasing opportunity cost of inactivity need not be negative and may even be positive in a low-income economy where most of the technologically practicable substitutions have not yet become part of the normal way of life. According to Standing and Sheehan (1978), there will be an inverse relationship between the opportunity cost of activity and household income (the need for income), with a higher opportunity cost for the married woman (due to a reduced need to earn an income).

A woman's market-wage offer (substitution effect), her husband's earnings and family non-earnings income (income effect), her schooling, work experience, number of children and other family background factors are often used as variables by many empirical studies to explain female labor supply (Meng, 1998). According to Psacharopoulos and Tzannatos (1989), some common social characteristics among countries that influence female labor supply functions are non-economic variables, including marital status and fertility, urbanization, landownership and farm size, head of household's status, and employment structure in addition to standard economic variables, including education, experience, wages, and incomes.

This study aims to investigate which factors have a strong influence on women's decision to enter the labor market, with a special emphasis on education and household level factors. The study conducts a separate analysis for the formal and the informal sectors of employment since the characteristics of the labor force entering these two distinct sectors may be different due to the differences in the nature of activity between them. According to Hill (1983), labor force participation decisions may differ between these sectors for several reasons. For example, the wage offer may differ by sector, an informal job may have greater flexibility than a formal one. Entering the informal sector may be

frictionless, while there may be fixed costs associated with working in the formal sector.

It is expected in the study that there will be a positive relationship between educational attainment and participation of women in the labor force. Many previous studies have indicated a significant and positive relationship between these two factors based on the results from many empirical studies using different data sets from different countries (Mincer, 1962; Bloch and Smith, 1977; Castafieda, 1986; Psacharopoulos and Tzannatos, 1989; Assaad, El-Hamidi and Ahmed, 2000; Tansel, 2002). Psacharopoulos and Tzannatos (1989) suggested two reasons in favor of education having a positive effect on the decision to participate in the labor market. First, if education is considered an investment, a woman has to work to recover the cost of that investment in human capital. Second, if education is considered consumption, a woman will be more induced than before to enter the labor market because of a higher earning potential since the opportunity cost of not working is higher. However, it is expected from the study that higher educational attainment may not have a positive association with work in the informal sector where women are self-employed or work in an unpaid job, which does not require higher educational achievement.

There is much empirical evidence that shows that the probability of female labor force participation increases with increasing educational attainment. For instance, Ng (1992), Jakubson and Psacharopoulos (1992), Khandker (1992) and Assaad et al. (2000) found this to be true for Argentina, Ecuador, Egypt and Peru, respectively. However, mixed results have been observed in countries such as Papua New Guinea, Chile, and Indonesia (Sheehan, 1978; Castafieda, 1986; Manning 1998). Widarti (1998) argues that a J-shaped pattern of association between education and female labor force participation is prevailing in many developing countries, where less educated women often exhibit labor force participation rates close to that of well-educated women. On the contrary, moderately educated women have lower rates of participation. Sheehan (1978) found a U-shaped relationship between the two variables for Papua New Guinea. Castafieda (1986) maintains that Chilean mothers who participate more actively in the labor market have the lowest and highest educational levels. Lam and Duryea (1999)

found very low labor force participation effect at the primary education level, but this effect rises very sharply at the post-secondary education level. Manning (1998) indicates that since the early 1970s Indonesia has exhibited a U pattern of participation rate by education, especially in urban areas. Based on the evidence mentioned above, it is expected that women having lower and higher levels of educational attainment have a higher propensity to be in the labor force than those who attain a middle level of education in Indonesia.

As for marital status, it is expected that married women have a lower propensity to participate in the labor force. There is numerous empirical evidence in favor of the hypothesis that married women are less involved in the labor force (Sheehan, 1978; Khandker, 1990; Psacharopoulos and Tzannatos, 1992; Ng, 1992; Scott, 1992; Yang, 1992; Manning, 1998; Assaad, El-Hamidi and Ahmed 2000). Two major reasons that married women are less likely to participate in the labor force than single women are: 1) relying on their husbands for economic support; and 2) having less available time for work due to the need to care for their children (Sheehan, 1978).

Another hypothesis is that family economic status, which may be reflected by education and the income of the head of household, can affect women's participation in the labor force; the higher the education and income of the head of household, the lower the possibility of women joining the labor force. Since most women work to contribute financially to the family, the grearer the earnings head of the household, the less probability there is for a woman to work. Moreover, considering household head income as a proxy of family income; women will participate less in the labor market due to increased family income (Mincer, 1962). Manning (1998) found a negative association between female participation and both the educational achievement and the income status of household heads in urban Indonesia. However, he suggested that income rather than educational status of the head is the primary factor discouraging participation among urban women. Widarti (1998) found that the likelihood of women entering the labor force is negatively associated with both moderate and high levels of husband education in Jakarta. This study suggests that the potential earnings of a husband with a higher level of education may induce wives not to participate in the

labor market.

It is expected that in female-headed households, women will be more likely to participate in the labor force to fulfill the economic needs of the family. Women of large sized families may have the tendency to work to support the family economically, since larger sized families having a greater number of dependent family members will have higher economic needs than a smaller sized family.

Muslim women in Indonesia will participate less in the labor market perhaps due to their desire to preserve Islamic values which discourage women from going out to work. Therefore, it is expected that non-Muslim women will participate more in the labor market than their Muslim counterparts. According to Psacharopoulos and Tzannatos (1989), countries with the lowest female labor force participation rates are those with strong religious views about women in society in general, and in the economy in particular. Psacharopoulos and Tzannatos (1987) in a cross-country analysis implied that religion reduced the female labor force participation rate by more than half in Muslim countries, by 40 percent in Hindu countries, and by 30 percent in Catholic countries. Jones (1977) argued that the low level of involvement in economic activity by indigenous Jakarta women is due in part to the Islamic values among this group.

5. Methodology

In order to estimate the effect of education and household level factors on the probability of female participation in the labor force, the probit model is used. The purpose of the probit model is to examine what factors influence a woman's decision to participate in employment. In the probit model, the dependent variable, "female participation in labor force" is a function of several explanatory variables including the individual's characteristics and household level factors. It can take two binary values: 1 if the female was working/ trying to work/ helping to earn income in the past week during the survey and 0 if otherwise. For estimating the probit model, the maximum likelihood method is applied.

Following the explanation by Maddala (1983), the probability of an individual female in employment can be summarized by an unobserved index y_i^* as a

function of the individual's characteristics and household level factors:

$$y_i^* = \alpha' x_i + u_i \quad \cdots\cdots (1)$$

where x is a vector of variables describing the individual's characteristics and household level factors, α is a vector of unknown parameters and u is a random variable including unmeasured characteristics. The observable binary variable is related to y_i^* in the following sense:

$$\begin{aligned} &y = 1 \text{ if} y^* > 0 \\ &y = 0 \text{ therwise} \end{aligned} \quad \cdots\cdots (2)$$

From (1) and (2) we get

$$\begin{aligned} \text{Prob.}(y_i = 1) &= \text{Prob.}(u_i > -\alpha' x_i) \\ &= 1 - F(-\alpha' x_i) \end{aligned} \quad \cdots\cdots (3)$$

where F is the cumulative distribution function for u.

The observed values of y are just realizations of a binomial process with probabilities given by (3) and varying from trial to trial (depending on x_i). Hence, the likelihood function is

$$L = \prod_{y_i = 0} F(-\alpha' x_i) \prod_{y_i = 1} [1 - F(-\alpha' x_i)] \quad \cdots\cdots (4)$$

Maximizing the likelihood function will give the Maximum Likelihood Estimates of α.

In order to understand the intended effects education and household level factors have on the probability of FLFP, the study has specified models for the whole samples in general, and by different sectors of employment in particular. Hence, we have conducted nine separate sets of regressions. First, three sets of regressions were conducted for the aggregate, urban and rural data sample. Then, the sampled women were segmented into four groups according to the

sector of employment they are engaged in, i.e., government, private, self-employment and unpaid work. A separate regression analysis for each segmented data set is carried out using the same variables as in the analysis of the aggregate data sample. Lastly, the sector of employment is further categorized into two sectors: formal and informal. With the segmentation of the samples, separate regressions were conducted for each category accordingly.

5. 1. Data

The data used in this study comes from 2000 Indonesian Family Life Survey (IFLS), nationwide household survey which was conducted by RAND in collaboration with the Population Research Center, University of Gadjah Mada, Indonesia. The data set contains more than 38,500 individual observations from 10,400 households across 13 provinces which represent about 83 percent of the Indonesian population. Information is available on personal characteristics of the population such as age, sex, marital status, education, and religion. Information on household, such as, family size and location and region of residence is also available. Employment data include occupation, job category, field of work, hours worked per week, monthly income, and job benefits. The IFLS 2000 has collected data on employment from the respondent aged 15 years or older and recognized those being in labor force whose primary activity during the past week of survey time was working/trying/helping to earn income. From this data set, a total of 8,862 cases were used. This sample included all individual females in the prime working age range (15 to 60 years) for whom relevant data were available.

5. 2. Variables

All the specified models consider the status of employment as the dependent variable. In the first specification, the dependent variable is whether a woman is employed or not. In the second specification, whether a woman is working in the government sector or the private sector or self-employment or performing unpaid work or is inactive. In the last specification, whether a woman is employed in formal or informal sector or not employed. The sample size is equal for all models. Independent variables are classified as female's characteristics, religion,

head of household characteristics, household characteristics and region of residence. For each variable a reference group is selected, usually representing the respondents whose relationship to labor force participation is not the focus of the study. Independent variables used for the study are described below.

Female's Characteristics: The variables representing female individual characteristics are age, marital status and education. Age is classified into three cohorts, 15-24, 25-39, and 40-60 to investigate the effect of different age groups. These three age group dummy variables may be crucially related to the women's decision on LFP, because the married women aged between 15 and 39 years rather than other age groups have the potential for child bearing and rearing. Women aged 15-24 is used as the reference group. Marital status variables are, 'married' and 'separated/divorced/widow' and the reference of these two variables are 'single'. These two marriage-related variables are important for women making decisions on LFP because a married women may have low propensity to LFP due to the responsibilities of domestic work and child rearing and also due to having a spouse who can earn money for the expenses of the family, while a separated/divorced/widow woman may not have any choice other than LFP to earn money to meet family expenses. In order to examine the differential impact of type of schooling, seven levels of schooling are categorized, which are: 1) no schooling; 2) incomplete primary; 3) primary; 4) lower secondary; 5) upper secondary; 6) diploma; and 7) university. Taking 'no schooling' as the reference all the education variables is dummy variable. Lower secondary and upper secondary include all three types of education: general, vocational and Islamic. Those who have graduated from college in 1/2/3 year Diploma program are considered as 'Diploma' and those who have graduated from university in a 4 year Bachelor program or Master program or Doctoral program are included under the variable 'university'.

Religion: In the sample, majority (88.5 percent) is Muslim and the remaining are Protestant, Catholic, Hindu and Buddhist. Hence, religion is segregated into two groups, Islam and non-Islam. Since the variable, Islam is one of the focuses of this study, the non-Islam group is considered as the reference group.

Head of Household Characteristics: Among the respondents, 87.4 percent live

in male-headed household. Therefore, characteristics of the head of household who are typically male are important in order to understand the participation decision of female in employment. Age, education and monthly income of the head of household are used as the proxy for characteristics of head of household. Moreover, income of the household head can also be considered as a proxy for household economic status. Actually, the study wanted to use household monthly income as a proxy of economic status of household, but could not due to data unavailability in the IFLS 2000. Education variables of head of household are – 'Primary/Lower Secondary' and 'Upper Secondary/Higher Education' taking 'no schooling and primary incomplete' as reference and monthly income variables are – 'Rp 1,00,001－3,00,000', 'Rp 3,00,001－8,00,000' and 'Rp 8,00,000＋', taking ＜ Rp 1,00,000 as the reference. Education variable of the household head will reflect the social status of the family, which may affect the woman upon her decision on LFP. Monthly income variables which reflect the economic status of family may also be important factors upon women's decision on LFP.

Household Characteristics: Female-headed household and family size are used as the proxy for characteristics of household. The variable 'female-headed household' may be an important factor for women's decision on LFP since women of female-headed household may not have any choice other than working to earn money. Women's participation decision may also be affected by the number of family members, since women of large sized family may have a tendency to participate in economic activity to support the family economically. The study also wanted to use the data on nature of family structure, whether it is nuclear or joint as a proxy for characteristics of household, since this variable could be a determinant for women taking decision of LFP. However, it could not be used due to data unavailability in the IFLS 2000.

Region of Residence: Location of household, urban or rural is used as an independent variable. To examine regional differences in female labor force participation provincial dummies are also used in the analysis. Since thirteen provinces were selected for IFLS data collection, we have used all those provincial dummies. West Java, Indonesia's most populated and one of its more dynamic provinces, is selected as the reference group.

Table 5 provides descriptive statistics of all the independent variables. The table illustrates that female labor force participation rate is 60 percent.

6. Results

6. 1. Female Participation in Labor Force

The results of the Probit model estimated on a set of explanatory variable

Table 5: Means (and Standard Deviations) of Sample Variables

Variables	All Sample	Participation in Labor Force	Participation in Formal Sector	Participation in Informal Sector
Age group				
25-39 years	0.39	0.41	0.43	0.40
	(0.49)	(0.49)	(0.50)	(0.49)
40-60 years	0.30	0.37	0.27	0.43
	(0.46)	(0.48)	(0.44)	(0.50)
Marital status				
Married	0.71	0.71	0.60	0.77
	(0.46)	(0.45)	(0.49)	(0.42)
Separated/Divorced/Widow	0.08	0.12	0.12	0.12
	(0.28)	(0.33)	(0.32)	(0.33)
Education				
Primary Incomplete	0.22	0.25	0.18	0.30
	(0.41)	(0.44)	(0.39)	(0.46)
Primary	0.27	0.26	0.22	0.28
	(0.44)	(0.44)	(0.41)	(0.45)
Lower Secondary	0.18	0.13	0.12	0.14
	(0.39)	(0.34)	(0.33)	(0.34)
Upper Secondary	0.17	0.16	0.25	0.11
	(0.38)	(0.37)	(0.43)	(0.32)
Diploma	0.02	0.03	0.07	0.01
	(0.16)	(0.17)	(0.26)	(0.08)
University	0.02	0.02	0.05	0.01
	(0.13)	(0.15)	(0.22)	(0.09)
Religion				
Islam	0.89	0.88	0.89	0.87
	(0.32)	(0.33)	(0.32)	(0.33)
Head of Household Characteristics				
Age	44.21	44.86	43.59	45.58
	(12.00)	(11.86)	(12.17)	(11.61)
Education				
Primary/ Lower Secondary	0.40	0.39	0.35	0.41
	(0.49)	(0.49)	(0.48)	(0.49)
Upper Secondary/Higher	0.24	0.22	0.32	0.16
Education	(0.43)	(0.41)	(0.47)	(0.37)
Monthly income	0.31	0.32	0.35	0.30
Rp 1,00,001-3,00,000	(0.46)	(0.47)	(0.48)	(0.46)
	0.28	0.26	0.28	0.25
Rp 3,00,001-8,00,000	(0.45)	(0.44)	(0.45)	(0.43)
	0.16	0.14	0.17	0.13
Rp 8,00,000+	(0.37)	(0.35)	(0.37)	(0.33)
	0.13	0.18	0.21	0.17
Female Headed Household	(0.33)	(0.39)	(0.41)	(0.37)
	4.82	4.63	4.63	4.63
Family size	(2.04)	(2.05)	(2.18)	(1.97)

Table 5: Continued

Variables	All Sample	Participation in Labor Force	Participation in Formal Sector	Participation in Informal Sector
Region				
North Sumatra	0.07	0.07	0.05	0.07
	(0.25)	(0.25)	(0.22)	(0.26)
West Sumatra	0.04	0.04	0.04	0.04
	(0.20)	(0.20)	(0.19)	(0.20)
South Sumatra	0.05	0.05	0.03	0.06
	(0.21)	(0.21)	(0.16)	(0.24)
Lampung	0.04	0.04	0.02	0.06
	(0.20)	(0.21)	(0.13)	(0.24)
Jakarta	0.08	0.07	0.12	0.05
	(0.27)	(0.26)	(0.33)	(0.21)
Central Java	0.13	0.15	0.15	0.16
	(0.34)	(0.36)	(0.36)	(0.36)
Yogyakarta	0.05	0.07	0.07	0.06
	(0.22)	(0.25)	(0.26)	(0.24)
East Java	0.15	0.15	0.16	0.15
	(0.35)	(0.36)	(0.37)	(0.36)
Bali	0.05	0.05	0.05	0.06
	(0.23)	(0.23)	(0.23)	(0.23)
West Nusa Tengara	0.07	0.07	0.06	0.08
	(0.26)	(0.26)	(0.24)	(0.27)
South Kalimantan	0.04	0.05	0.03	0.06
	(0.21)	(0.21)	(0.16)	(0.23)
South Sulawesi	0.06	0.04	0.03	0.04
	(0.23)	(0.20)	(0.18)	(0.21)
Urban	0.48	0.45	0.61	0.35
	(0.50)	(0.50)	(0.49)	(0.48)
Sample size	8,862	5,293	1,939	3,353

Source: Computed by the Author based on the 2000 Indonesian Family Life Survey.

using the labor force status of all women aged between 15 and 60 years as the dependent variable are presented in Table 6. Three sets of numbers are reported in this table, which are estimated parameter, their asymptotic t-statistics (in parenthesis) and marginal effect of each variable on the probability of being in labor force. Predicted probability has been calculated for each variable while holding all other variables at their means. This is presented in Table 7.

In general, Table 6 reveals that female labor force participation is significantly and positively correlated to all age-groups, lower and higher level of education of herself, female headed household and residing in all provinces except Bali and South Sulawesi; while variables such as married, Islam religion, middle level of education of herself, higher level of education of household head, monthly income of head and family size have significant negative association with female labor force participation in Indonesia.

The results indicate that female's age positively influences the possibility of their involvement in employment as all the age variables are significant at 1 percent level. It is found that women aged 40-60 have the highest probability to participate in the labor force for all the three categories: total, urban and rural samples, 82 percent, 78 percent, and 85 percent respectively (Table 7). One of the possible reasons for 40-60 years aged women more likely participating than other groups is that this age group has the advantage of having enough time to join the labor force over their younger counterpart who belongs to the child bearing and child rearing age.

Marital status of women is an important factor affecting female employment. The results support the hypothesis as it was assumed that married women would have lower propensity in LFP. The data shows that married women are 8 percent less likely than single women are to participate in employment and the coefficient of the aggregate sample for this variable is significant at 1 percent level.

Education variables show a mixed result (Table 6). Primary incomplete, upper secondary, diploma and university education have a significant positive effect on female labor force participation. Contradictory to our expectation, lower secondary education has a negative effect and primary education does not have any significant effect on female participation. However, urban data supports our hypothesis as all the education variables are positively significant at 1 percent or 5 percent level except lower secondary education. For rural samples, diploma and university education has significant positive association, whereas lower secondary education has a significant negative association with FLFP. In line with our hypothesis, estimated probability presented in Table 7 reveals that probability of participation is quite high for lower and higher level of educational achievement as compared to moderate level of educational achievement. Participation is higher for educational attainment more than lower secondary in case of aggregate and urban samples and more than upper secondary in case of rural samples. Higher participation is also found for those who have not completed primary education in case of aggregate and urban samples and for those who have no schooling or have not completed primary education in case of rural samples. For aggregate

samples, primary uncompleted women, upper secondary graduates, diploma holders and university graduates have 4 percent, 4.3 percent, 21 percent and 20.6 percent higher participation possibility than those who have never attended school, while, primary and lower secondary education reduce the probability of participation by 0.3 percent and 8.5 percent, though primary education is not

Table 6: Probit Estimates for Female Labor Force Participation by Region of Residence

Variables	Total		Urban		Rural	
	Coefficient (t-statistics)	Marginal effects	Coefficient (t-statistics)	Marginal effects	Coefficient (t-statistics)	Marginal effects
Female Characteristics						
Age group:						
25-39 years	0.628 (14.44)***	0.231	0.587 (9.04)***	0.224	0.660 (11.07)***	0.230
40-60 years	0.846 (15.11)***	0.295	0.811 (9.87)***	0.296	0.884 (11.36)***	0.290
Marital Status:						
Married	-0.213 (-4.25)***	-0.080	-0.300 (-4.20)***	-0.116	-0.063 (-0.87)	-0.023
Separated/Divorced/ Widow	0.134 (1.60)	0.050	0.222 (1.83)*	0.085	0.157 (1.32)	0.056
Education:						
Primary Incomplete	0.105 (1.86)*	0.040	0.228 (2.18)**	0.088	0.080 (1.16)	0.029
Primary	-0.007 (-0.12)	-0.003	0.213 (2.04)**	0.082	-0.082 (-1.13)	-0.030
Lower Secondary	-0.220 (-3.36)***	-0.085	0.022 (0.20)	0.009	-0.299 (-3.44)***	-0.113
Upper Secondary	0.115 (1.67)*	0.043	0.413 (3.69)***	0.157	-0.140 (-1.41)	-0.052
Diploma	0.656 (5.67)***	0.214	0.842 (5.48)***	0.279	0.784 (3.35)***	0.224
University	0.629 (4.77)***	0.206	0.865 (5.19)***	0.283	0.676 (2.29)**	0.201
Religion						
Islam	-0.238 (-4.04)***	-0.087	-0.145 (-1.98)**	-0.056	-0.320 (-2.98)***	-0.110
Head of Household Characteristics						
Age	0.014 (1.75)*	0.005	-0.005 (-0.40)	-0.002	0.029 (2.71)***	0.011
Age Square	0.000 (-2.05)**	0.000	0.000 (0.17)	0.000	0.000 (-2.81)***	0.000
Education:						
Primary/Lower Secondary	-0.017 (-0.45)	-0.006	-0.125 (-2.15)**	-0.049	0.067 (1.35)	0.024
Upper Secondary/Higher Education	-0.188 (-3.68)***	-0.072	-0.257 (-3.61)***	-0.101	-0.149 (-1.89)*	-0.055
Monthly income:						
Rp 1,00,001-3,00,000	-0.103 (-2.48)**	-0.039	-0.043 (-0.59)	-0.017	-0.150 (-2.90)***	-0.055
Rp 3,00,001-8,00,000	-0.152 (-3.42)***	-0.058	-0.165 (-2.22)**	-0.065	-0.108 (-1.83)*	-0.040
Rp 8,00,000+	-0.234 (-4.49)***	-0.091	-0.266 (-3.26)***	-0.105	-0.156 (-2.08)**	-0.058

Table 6: Continued

Variables	Total		Urban		Rural	
	Coefficient (t-statistics)	Marginal effects	Coefficient (t-statistics)	Marginal effects	Coefficient (t-statistics)	Marginal effects
Household Characteristics						
Female Headed Household	0.781 (13.04)***	0.256	0.731 (9.10)***	0.258	0.810 (8.84)***	0.244
Family Size	-0.040 (-4.99)***	-0.015	-0.037 (-3.41)***	-0.015	-0.042 (-3.58)***	-0.016
Region of Residence						
Region:						
North Sumatra	0.141 (2.05)**	0.053	-0.113 (-1.25)	-0.045	0.512 (4.51)***	0.164
West Sumatra	0.136 (1.76)*	0.051	0.142 (1.14)	0.055	0.193 (1.91)*	0.068
South Sumatra	0.305 (4.06)***	0.110	0.040 (0.34)	0.016	0.536 (5.30)***	0.171
Lampung	0.364 (4.59)***	0.129	0.036 (0.22)	0.014	0.514 (5.42)***	0.166
Jakarta	0.179 (2.87)***	0.066	0.122 (1.75)*	0.047		
Central Java	0.453 (8.42)***	0.161	0.427 (5.35)***	0.159	0.504 (6.81)***	0.167
Yogyakarta	0.612 (8.05)***	0.204	0.535 (5.72)***	0.194	0.739 (5.41)***	0.218
East Java	0.239 (4.68)***	0.088	0.142 (1.86)*	0.055	0.333 (4.76)***	0.115
Bali	0.028 (0.33)	0.011	0.148 (1.27)	0.057	-0.055 (-0.40)	-0.020
West Nusa Tengara	0.265 (4.11)***	0.097	0.297 (2.62)***	0.112	0.347 (4.25)***	0.118
South Kalimantan	0.282 (3.72)***	0.102	0.155 (1.33)	0.060	0.418 (4.11)***	0.138
South Sulawesi	-0.305 (-4.31)***	-0.119	-0.162 (-1.67)*	-0.064	-0.432 (-4.12)***	-0.167
Urban	-0.156 (-4.67)***	-0.059				
Sample Size	8,862		4,241		4,621	
Log Likelihood	-5193.62		-2558.115		-2577.834	
Pseudo R-square	0.131		0.122		0.150	

Source: Computed by the Author based on the 2000 Indonesian Family Life Survey.
Note: ***, **, * indicates significant at 1%, 5% and 10% level respectively.

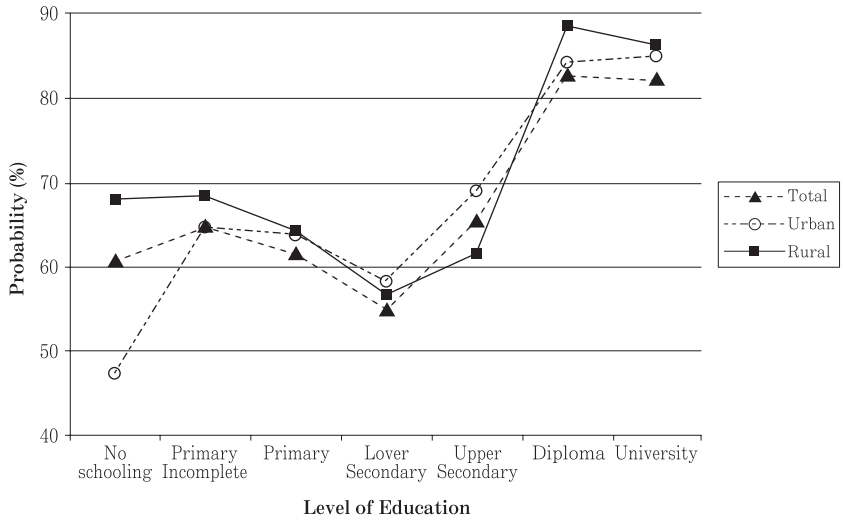
significant. Education variables show quite different results for urban and rural Indonesia. In the case of rural Indonesia, a J-shaped curve is apparent between level of education and FLFP, since propensity of participation decreases for primary, lower secondary and upper secondary education by 3 percent, 11.3 percent and 5.2 percent respectively and increases for primary incomplete, diploma and university by 2.9 percent, 22.4 percent and 20 percent respectively in comparison to no schooling; though primary incomplete, primary and upper secondary is not statistically significant. On the other hand, in the case of urban

Table 7: Predicted Probability of Female Labor Force Participation by Region of Residence (percent**)**

Characteristics	Total	Region	
		Urban	Rural
Age group:			
25-39 years	75.43	70.77	79.54
40-60 years	81.52	77.89	84.87
Marital Status:			
Married	59.55	53.42	65.76
Separated/Divorced/Widow	66.55	65.3	71.4
Education:			
No schooling	60.89	47.33	68.07
Primary Incomplete	65.05	64.8	68.44
Primary	61.77	63.79	64.23
Lower Secondary	54.98	58.19	56.67
Upper Secondary	65.52	68.99	61.61
Diploma	82.75	84.13	88.41
University	82.17	84.81	86.28
Religion			
Islam	60.92	56.82	65.06
Non-Islam	69.67	62.42	76.01
Education of Household Head:			
No schooling	63.93	62.97	66.12
Primary/Lower Secondary	61.57	54.57	67.81
Upper Secondary/Higher Education	56.44	50.96	61.54
Monthly income of Household Head:			
Less than Rp 1,00,000	66.19	62.48	69.51
Rp 1,00,001-3,00,000	59.23	56.33	62.51
Rp 3,00,001-8,00,000	57.75	53.27	63.23
Rp 8,00,000+	54.33	49.24	61.13
Female Headed Household	83.82	79.36	87.26
Male Headed Household	58.17	53.51	62.91
Residing in Province:			
North Sumatra	66.86	53.37	81.7
West Sumatra	66.82	62.82	72.73
South Sumatra	72.44	59.03	82.32
Lampung	74.33	58.89	81.67
Jakarta	68.04	61.43	
Central Java	75.7	71.51	80.2
Yogyakarta	81.16	75.3	87.2
East Java	69.44	62.34	75.7
Bali	62.97	62.92	64.42
West Nusa Tengara	70.93	68.23	76.88
South Kalimantan	71.71	63.27	79.33
South Sulawesi	50.68	51.5	50.42
Region of Residence:			
Urban	58.84		
Rural	64.76		

Source: Computed by the Author Using the Estimated Result of Table 6
Note: Probability of participation is estimated for each variable while holding all other variables at their means.

Figure 4: Predicted Probability of Women's Participation in Labor Force by Level of Education and Urban/Rural Area



Source: Drawn by the Author Using the Estimated Result of Table 6

Indonesia, all levels of education have higher probability of participation in comparison to no schooling, though probability of participation is almost the same for primary incomplete and primary education, which decreases for lower secondary and then sharply increases for diploma. On the whole, the relationship between female education and LFP is rather unexpected (compared with other countries), indicating that women who participate most are the ones not completing primary education and those having educational attainment upper secondary or higher. Castafieda (1986) for Santiago of Chile also found similar results for mothers' labor force participation.

The marginal effect of different levels of education indicates the J-pattern relationship with FLFP for aggregate and rural data samples which is evident in Figure 4. If no schooling is excluded, a J-shaped curve is also apparent for urban Indonesia. One of the reasons behind primary and lower secondary graduates not having higher possibility to enter the job market may be due to reluctance of taking up unskilled jobs suitable for less than primary educational qualification and unwillingness to join informal jobs common among many poorer people. Widarti (1998) illustrates one argument in the case of moderately educated married women. According to the study, women are generally married to men

with somewhat higher educational levels than themselves, which makes moderately educated married women reluctant to enter the labor market. On the other hand, the inability of primary and lower secondary graduates to compete with more educated people for formal sector jobs explains their low participation in the labor force (Jellinek, 1991 as quoted in Manning, 1998). The most convincing reason behind the higher participation of highly educated women in the labor market is that the opportunity cost of their being economically inactive is very high.

Religion is an important determinant of female labor force participation in Indonesia. The results, as we assumed, show a negative relation between Islam and FLFP. The variable is significant at 1 percent level for total and rural sample and significant at 5 percent level for the urban area. Muslim females have 8.7 percent, 5.6 percent and 11 percent less possibility than non-Muslim for total, urban and rural samples respectively to participate in the labor force.

The results show that the age of the head of household is significantly correlated with female being in employment, for total and rural samples. According to expectation, data shows that higher level of education of the head of household is significantly negatively related to female labor force participation. Household heads having attained education of upper secondary or above decreases the propensity of women's LFP by 7.2 percent, 10 percent and 5.5 percent for aggregate, urban and rural samples. In line with the hypothesis, the results show that higher income of the household head lead to the lower propensity of FLFP. Women are 3.9 percent, 5.8 percent and 9 percent less likely to enter the labor market if the household head have monthly income within Rp 1,00,001 and 3,00,000, within Rp 3,00,001 and 8,00,000 and more than Rp 8,00,000 respectively. Higher income of household head makes a family economically solvent which discourages women's entry into labor market.

In line with the hypothesis, the results show that women in female-headed households are likely to increase their participation in employment. Female-headed households induce participation by 25.6 percent, 25.8 percent and 24.4 percent for total, urban and rural samples respectively and all the coefficients are significant at 1 percent level. The study assumed that the larger the family size

the higher the possibility of females joining the labor force since women may need to support the family economically in the case of larger number of family members. However, this assumption is not supported by the observed result. Contrary to expectation, women are found 1.5 percent less likely to be in the labor force, if number of family size increases by one.

The dummy variables for the regions of residence are included to see the regional variations in labor force participation. In the total sample, all the regional variables are statistically significant at 1 percent level except Bali. Residing in all provinces except South Sulawesi increases the probability of employment significantly as compared to living in West Java. However, for urban samples, residing in all provinces except North Sumatra and South Sulawesi induces the probability of being in the labor force, though Jakarta, Central Java, Yogyakarta, East Java, West Nusa Tengara and South Sulawesi are only significant. In case of rural samples, residing in all provinces except Bali and South Sulawesi increases the probability of FLFP, though Bali is not significant. Table 7 shows that among the provinces, women residing in Yogyakarta have the highest probability (81.2 percent) of entering the labor force, while residing in South Sulawesi they have the lowest probability (50.7 percent).

The coefficient estimate on urban share is negative and significant at 10 percent level. The marginal effect of residing in an urban area is to lower the probability of FLFP as compared to residing in a rural area by 6 percent. This implies that rural locations increase the probability of FLFP.

6. 2. Female Participation in Different Sectors of Employment

The same explanatory variables used to see the effect of female participation in the labor force are used to see whether these influence female participation in employment according to the occupational category. For this, data of all female aged 15-60 years are segmented according to the sector of employment they are engaged in: government, private, self-employment and unpaid work. The sectors of employment are further categorized into formal and informal sector, while the formal sector includes both government and private employment and informal sector includes both self-employment and unpaid work. The results are presented

in Table 8.a and Table 8.b. Predicted probability of FLFP are computed for each variable and are presented in Table 9.

The results show that age group 25-39 has a significant positive effect on the likelihood of labor force participation for government, private and self-employment, while the group 40-60 is positively significant for government and self-employment. In the case of the formal and informal sector, the coefficient of

Table 8.a: Probit Estimates for Female Labor Force Participation by Different Sector of Employment

Variables	Government		Private		Self-employment		Unpaid work	
	Coefficient (t-statistics)	Marginal effects	Coefficient (t-statistics)	Marginal effects	Coefficient (t-statistics)	Marginal effects	Coefficient (t-statistics)	Marginal effects
Female Characteristics								
Age group:								
25-39 years	0.807 (5.51)***	0.012	0.224 (4.45)***	0.057	0.624 (11.45)***	0.173	0.040 (0.74)	0.008
40-60 years	1.226 (7.24)***	0.031	0.017 (0.26)	0.004	0.846 (12.88)***	0.252	0.044 (0.64)	0.009
Marital Status:								
Married	0.113 (0.81)	0.001	-0.619 (-11.09)***	-0.171	0.618 (8.97)***	0.143	-0.085 (-1.35)	-0.018
Separated/Divorced/ Widow	0.084 (0.40)	0.001	-0.273 (-3.45)***	-0.060	0.742 (8.57)***	0.243	-0.699 (-6.61)***	-0.099
Education:								
Primary Incomplete	0.357 (1.28)	0.005	-0.050 (-0.82)	-0.012	0.165 (2.99)***	0.045	-0.093 (-1.54)	-0.018
Primary	0.330 (1.13)	0.004	-0.128 (-2.01)**	-0.031	0.147 (2.46)**	0.040	-0.167 (-2.63)***	-0.032
Lower Secondary	0.960 (3.36)***	0.025	-0.394 (-5.24)***	-0.086	0.122 (1.69)*	0.033	-0.283 (-3.73)***	-0.051
Upper Secondary	1.930 (6.98)***	0.130	0.016 (0.20)	0.004	0.000 (0.00)	0.000	-0.316 (-3.81)***	-0.057
Diploma	3.100 (10.61)***	0.617	0.071 (0.58)	0.018	-0.570 (-3.93)***	-0.113	-0.862 (-4.37)***	-0.104
University	2.787 (9.33)***	0.505	0.281 (2.17)**	0.078	-0.322 (-2.18)**	-0.072	-0.798 (-3.59)***	-0.099
Religion								
Islam	0.047 (0.39)	0.000	-0.006 (-0.09)	-0.001	0.043 (0.66)	0.011	-0.414 (-5.84)***	-0.100
Head of Household Characteristics								
Age	0.117 (4.07)***	0.001	-0.039 (-4.38)***	-0.010	0.033 (3.34)***	0.009	0.015 (1.48)	0.003
Age Square	-0.001 (-3.90)***	0.000	0.000 (3.83)***	0.000	0.000 (-3.68)***	0.000	0.000 (-0.83)	0.000
Education:								
Primary/ Lower Secondary	0.222 (1.51)	0.002	-0.111 (-2.62)***	-0.027	-0.002 (-0.06)	-0.001	0.083 (1.94)**	0.017
Upper Secondary/ Higher Education	0.266 (1.63)*	0.003	-0.186 (-3.11)***	-0.044	-0.010 (-0.17)	-0.003	-0.249 (-3.77)***	-0.047
Monthly income:								
Rp 1,00,001-3,00,000	-0.079 (-0.57)	-0.001	0.137 (3.04)***	0.035	-0.036 (-0.81)	-0.009	-0.214 (-4.62)***	-0.041
Rp 3,00,001-8,00,000	0.140 (1.08)	0.002	-0.114 (-2.24)**	-0.028	0.039 (0.81)	0.010	-0.142 (-2.78)***	-0.028
Rp 8,00,000+	0.122 (0.90)	0.001	-0.259 (-4.15)***	-0.059	-0.047 (-0.79)	-0.012	-0.031 (-0.50)	-0.006
Household Characteristics								
Female Headed Household	0.140 (0.96)	0.002	0.225 (3.99)***	0.060	0.686 (11.56)***	0.218	-0.318 (-4.45)***	-0.056
Family Size	-0.015 (-0.72)	0.000	-0.013 (-1.46)	-0.003	-0.010 (-1.18)	-0.003	-0.029 (-2.95)***	-0.006

Table 8.a Continued

Variables	Government		Private		Self-employment		Unpaid work	
	Coefficient (t-statistics)	Marginal effects	Coefficient (t-statistics)	Marginal effects	Coefficient (t-statistics)	Marginal effects	Coefficient (t-statistics)	Marginal effects
Region of Residence								
Region:								
North Sumatra	0.209	0.003	-0.307	-0.066	0.250	0.072	0.276	0.064
	(1.24)		(-3.86)***		(3.16)***		(3.16)***	
West Sumatra	0.237	0.003	-0.251	-0.055	0.425	0.130	-0.017	-0.003
	(1.34)		(-2.69)***		(4.94)***		(-0.16)	
South Sumatra	-0.216	-0.002	-0.438	-0.088	0.271	0.079	0.623	0.168
	(-0.95)		(-4.55)***		(3.20)***		(7.34)***	
Lampung	0.196	0.003	-0.553	-0.104	0.103	0.028	0.747	0.211
	(0.78)		(-5.14)***		(1.12)		(8.83)***	
Jakarta	-0.308	-0.002	0.161	0.043	0.061	0.016	-0.028	-0.006
	(-1.84)*		(2.45)**		(0.80)		(-0.28)	
Central Java	0.122	0.001	0.062	0.016	0.356	0.104	0.216	0.048
	(0.83)		(1.08)		(5.97)***		(3.27)***	
Yogyakarta	0.190	0.002	0.020	0.005	0.345	0.103	0.528	0.137
	(1.24)		(0.25)		(4.27)***		(6.03)***	
East Java	0.040	0.000	0.037	0.009	0.158	0.044	0.226	0.050
	(0.27)		(0.67)		(2.69)***		(3.52)***	
Bali	0.371	0.006	-0.164	-0.038	0.589	0.188	-0.549	-0.082
	(1.91)*		(-1.69)*		(6.26)***		(-4.62)***	
West Nusa Tengara	0.606	0.013	-0.254	-0.056	0.230	0.066	0.369	0.089
	(3.70)***		(-3.38)***		(3.07)***		(4.85)***	
South Kalimantan	0.603	0.013	-0.555	-0.105	0.298	0.088	0.516	0.134
	(3.34)***		(-5.55)***		(3.53)***		(5.95)***	
South Sulawesi	0.459	0.008	-0.595	-0.111	0.141	0.039	-0.039	-0.008
	(2.60)***		(-6.49)***		(1.70)*		(-0.42)	
Urban	-0.062	-0.001	0.311	0.077	-0.027	-0.007	-0.541	-0.109
	(-0.74)		(8.21)***		(-0.72)		(-12.85)***	
Sample Size	8,862		8,862		8,862		8,862	
Log Likelihood	-716.983		-3871.61		-4019.556		-3348.372	
Pseudo R-square	0.434		0.092		0.143		0.13	

Source: Computed by the Author based on the 2000 Indonesian Family Life Survey.
Note: ***, **, ** indicates significant at 1%, 5% and 10% level respectively.

both the age groups is found to be positively significant. Forty to sixty years aged women are 25 percent more likely to engage in self-employment, whereas only 3 percent more likely to be in government jobs. Twenty-five to thirty-nine years and 40-60 years aged women have a higher propensity to be in the informal sector job by 17.2 percent and 25.3 percent respectively and to be in the formal sector by 8.6 percent and 7.1 percent respectively. Data implies that like many other developing countries, both younger and elder women are more likely to work in the informal sector, where they become self-employed. This occurs because perhaps it is easier for them to work in the informal sector that has flexible working hours and entering the informal sector may be frictionless (Hill, 1983).

From these results, it is evident that marital status is an important factor for FLFP not only for the aggregate samples but also important for labor force

participation status segregated by sector of employment. Both married and separated/ divorced/ widowed women are negatively associated with participating in private employment while positively associated with self-employment. In case of entering formal and informal sector job, both these groups have negative and positive associations respectively. This implies that the informal sector is a popu-

Table 8.b: Probit Estimates for Female Labor Force Participation by Formal/Informal Sector of Employment

Variables	Formal Sector		Informal Sector	
	Coefficient (t-statistics)	Marginal effects	Coefficient (t-statistics)	Marginal effects
Female Characteristics				
Age group:				
25-39 years	0.303 (6.09)***	0.086	0.457 (10.03)***	0.172
40-60 years	0.245 (3.85)***	0.071	0.664 (11.67)***	0.253
Marital Status:				
Married	-0.545 (-9.87)***	-0.164	0.278 (5.20)***	0.101
Separated/Divorced/Widow	-0.257 (-3.28)***	-0.065	0.215 (2.82)***	0.083
Education:				
Primary Incomplete	-0.001 (-0.02)	0.000	0.102 (1.96)**	0.038
Primary	-0.020 (-0.32)	-0.006	0.029 (0.53)	0.011
Lower Secondary	-0.209 (-2.84)***	-0.055	-0.064 (-1.00)	-0.024
Upper Secondary	0.374 (5.04)***	0.114	-0.179 (-2.61)***	-0.065
Diploma	1.285 (11.60)***	0.467	-0.833 (-6.35)***	-0.246
University	1.171 (9.42)***	0.426	-0.599 (-4.37)***	-0.191
Religion				
Islam	0.016 (0.25)	0.004	-0.237 (-4.05)***	-0.091
Head of Household Characteristics				
Age	-0.025 (-2.80)***	-0.007	0.035 (4.21)***	0.013
Age Square	0.000 (2.22)**	0.000	0.000 (-3.96)***	0.000
Education:				
Primary/Lower Secondary	-0.103 (-2.48)**	-0.028	0.059 (1.58)	0.022
Upper Secondary/Higher Education	-0.117 (-2.02)**	-0.032	-0.132 (-2.47)***	-0.049
Monthly income:				
Rp 1,00,001-3,00,000	0.135 (3.04)***	0.038	-0.191 (-4.77)***	-0.070
Rp 3,00,001-8,00,000	-0.074 (-1.51)	-0.020	-0.083 (-1.90)*	-0.031
Rp 8,00,000+	-0.172 (-2.90)***	-0.045	-0.096 (-1.83)*	-0.036

Table 8.b Continued

Variables	Formal Sector		Informal Sector	
	Coefficient (t-statistics)	Marginal effects	Coefficient (t-statistics)	Marginal effects
Household Characteristics				
Female Headed Household	0.254 (4.57)***	0.076	0.375 (6.89)***	0.145
Family Size	-0.011 (-1.30)	-0.003	-0.026 (-3.29)***	-0.010
Region of Residence				
Region:				
North Sumatra	-0.271 (-3.52)***	-0.067	0.398 (5.65)***	0.155
West Sumatra	-0.160 (-1.84)**	-0.042	0.314 (3.97)***	0.122
South Sumatra	-0.446 (-4.77)***	-0.102	0.637 (8.40)***	0.249
Lampung	-0.494 (-4.76)***	-0.110	0.678 (8.59)***	0.265
Jakarta	0.089 (1.37)	0.025	0.078 (1.12)	0.029
Central Java	0.081 (1.44)	0.023	0.408 (7.56)***	0.158
Yogyakarta	0.031 (0.41)	0.009	0.587 (7.99)***	0.230
East Java	0.050 (0.91)	0.014	0.244 (4.64)***	0.093
Bali	-0.097 (-1.04)	-0.026	0.162 (1.86)*	0.062
West Nusa Tengara	-0.113 (-1.58)	-0.030	0.412 (6.33)***	0.160
South Kalimantan	-0.399 (-4.31)***	-0.093	0.580 (7.61)***	0.227
South Sulawesi	-0.451 (-5.28)***	-0.103	0.042 (0.56)	0.016
Urban	0.262 (7.18)***	0.073	-0.357 (-10.69)***	-0.132
Sample Size	8,862		8,862	
Log Likelihood	-4156.641		-5085.92	
Pseudo R-square	0.107		0.135	

Source: Computed by the Author based on the 2000 Indonesian Family Life Survey.
Note: ***, **, ** indicates significant at 1%, 5% and 10% level respectively.

lar and productive sector for both young and old aged married women where they are self-employed.

Table 8. a shows that the impact of education varies across different employment sectors. All levels of education are positively associated with being in government employment, while the opposite relationship is found for unpaid work. Though in the case of government employment, primary incomplete and primary education and in the case of unpaid job, primary incomplete is not significant. In case of self-employment incomplete primary, primary and lower secondary

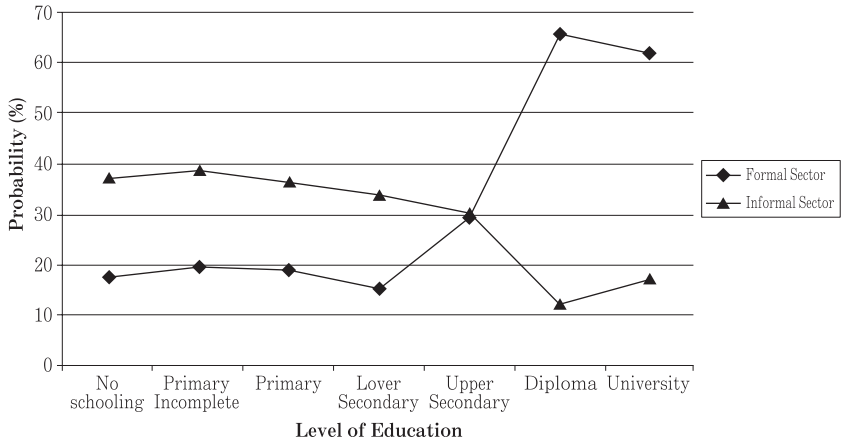
Table 9: Predicted Probability of Female Labor Force Participation by Sector of Employment

Variables	Predicted Probability (Percentage)	
	Formal Sector	Informal sector
Age group:		
25-39 years	25.17	46.56
40-60 years	24.74	53.99
Marital Status:		
Married	15.51	38.84
Separated/Divorced/Widow	13.79	43.33
Education:		
No schooling		
Primary Incomplete	17.67	37.42
Primary	19.63	38.77
Lower Secondary	19.24	36.55
Upper Secondary	15.28	33.81
Diploma	29.29	30.41
University	65.49	11.95
	61.65	17.02
Religion		
Islam		
Non-Islam	19.7	34.74
	19.26	43.84
Education of Household Head:	0	
No schooling	21.62	36.07
Primary/Lower Secondary	17.97	37.07
Upper Secondary/Higher Education	17.29	32.09
Monthly income of Household Head:		
Less than Rp 1,00,000	19.84	39.49
Rp 1,00,001-3,00,000	22.32	30.97
Rp 3,00,001-8,00,000	18.2	33.55
Rp 8,00,000+	15.91	32.78
Female Headed Household	26.36	48.51
Male Headed Household	18.78	34
Residing in Province:		
North Sumatra	13.41	50.27
West Sumatra	15.68	47.44
South Sumatra	10.03	59.59
Lampung	9.21	61.2
Jakarta	22	38.45
Central Java	21.65	49.54
Yogyakarta	20.47	57.57
East Java	20.85	43.74
Bali	17.21	41.61
West Nusa Tengara	16.87	50.71
South Kalimantan	10.84	57.5
South Sulawesi	10.03	37.22
Region of Residence:		
Urban	23.64	29.06
Rural	16.37	42.3

Source: Computed by the Author Using the Estimated Result of Table 8.b
Note: Probability of participation is estimated for each variable while holding all other variables at their means.

education induces participation while diploma and university education reduces participation. In case of private employment, primary and lower secondary education reduces participation, while university education induces participation. From the data, it is implied that self-employment and unpaid work does not require higher educational attainment. It can be suggested that primary education is productive in self-employment, while secondary and tertiary education is more productive for government employment; and only university education is productive for private employment. In the case of formal sector jobs, upper secondary, diploma and university education have a significant positive effect and the marginal effect is very high, 46.7 percent and 42.6 percent respectively for diploma and university education. In case of informal sector jobs, educational attainment higher than lower secondary have a significant negative association with LFP implying, as we expected, that higher educated women have a lower propensity to enter informal sector job. Diploma holders and university-graduate women have a lower propensity to join employment in the informal sector by 24.6 percent and 19 percent respectively. Table 9 and Figure 5 illustrates that women's estimated probability of entering the informal sector is higher than entering the formal sector for those who have no education, have not completed primary and are primary and secondary graduates, while the reverse is true for diploma holders and university graduate women.

Figure 5: Predicted Probability of Women's Participation in Labor Force by Formal/Informal Sector and Level of Education



Source: Drawn by the Author Using the Estimated Result of Table 8. b

The age of the head of household is found to exhibit a significant positive relation with government and self-employment and significant negative relation with private employment, though the effect is not high. In case of formal and informal sector jobs, women have 3.2 percent and 4.9 percent lower probability to be employed if the head of household has education higher than lower secondary. If the head of household's monthly income lies in the highest income cohort, women have a lower possibility to participate in private jobs by 5.9 percent while if household head's income lies in lower income cohort, Rp 1,00,001-3,00,000, women have a higher possibility to participate by 3.5 percent. However, the income of household head has no significant effect on women entering the government sector and self-employment. In case of the formal sector jobs, the hypothesis of the study is supported since higher monthly income of the household head reduces FLFP and lower income induces FLFP.

A female-headed household has significant positive association with private and self-employment, but has significant negative association with unpaid job. The marginal effect of female-headed households is very high for self-employment, where participation is increased by 21.8 percent. In line with our expectation, female-headed households have a significant positive relation with FLFP in both the formal and informal sector. The coefficient of family size is negatively significant for the informal sector.

The estimated results for most of the regional dummies for the informal sector samples are significant. In the case of formal sector employment, living in North Sumatra, West Sumatra, South Sumatra, Lampung, South Kalimantan and South Sulawesi significantly reduces the probability of FLFP as compared to West Java. In the case of the informal sector job, living in all provinces induces the possibility of FLFP, though the coefficient of Jakarta and South Sulawesi is not significant. For formal sector samples, urban location significantly induces FLFP by 7.3 percent, while for informal sector samples it reduces FLFP by 13.2 percent implying that rural women are more likely to work in informal sector.

7. Conclusion

This study is an effort to analyze the effect of education and household level

factors on female LFP using data from the 2000 Indonesian Family Life Survey. The goal of this study is to investigate which factors have the most influence on women's decision to enter the labor market as a whole. In addition, it also attempts to explore which factors have an effect on women's decision to participate in different employment sectors since the nature of female participation in different sector varies. In general, a woman who is older, not completed primary education or attained education more than lower secondary, and residing in female-headed households has a higher possibility to join the labor force. A woman who is highly educated, residing in a female-headed household in an urban area and whose household head has a low monthly income is more likely to join the formal sector. However, a woman who is older and married, has not completed primary education, and is residing in a female-headed household is more likely to join the informal sector.

This study confirms the J-curve relationship between women's educational attainment and LFP. The probability of participation is high among females with incomplete primary education; it falls among primary and lower secondary graduates and then rises again among upper secondary, diploma and university graduates. The probability of FLFP in the formal sector also shows a J-curve relationship with women's educational achievement. By contrast, in the case of informal sector, a downward slopping curve is apparent, implying that the probability of participation in this sector decreases with the increased level of educational attainment. Mixed findings of education indicates that the relationship between educational achievement of women and their LFP is not always a positive one. This type of mixed findings was also found by Manning (1998) for urban Indonesia in 1992. This mixed result is probably influenced by interrelated socio-economic, demographic and family issues affecting women's participation in the labor market.

Based on the findings from previous studies, this study explores some possible reasons primary and lower secondary graduate females are less likely to join the labor market. First, women having a tendency to be married to somewhat higher educated men than themselves are likely to be moderately educated married women who are reluctant to enter the labor market. Second, there is a

general reluctance among moderately educated young women to take up informal jobs common among many poorer people. Third, the inability to compete with higher educated people for formal sector jobs is another reason. Fourth, a small supply of higher wage jobs going to the higher educated candidates tend to leave the moderately educated workers unemployed. Another notable finding is that a lower level of education, i.e., incomplete primary, primary and lower secondary education is productive for self-employment, while all levels of education higher than primary is productive for government sector employment and only university education is found productive for the private sector. This confirms that upper secondary, diploma and university education are highly productive for formal sector employment and incomplete primary education is highly productive for the informal sector as a whole.

The study shows a strong relationship between FLFP and age, marital status, religion and household headship. Marriage has strongly discouraged women to work in the formal sector, while the reverse is true for the informal sector. Muslim women are less likely to work in the informal sector. Since women of female-headed households do not have any other choice but to join the labor market to earn money, they have a higher tendency to participate in both formal and informal sector employment in both urban and rural Indonesia.

Women from better-off households tend to remain outside the workforce, since participation is significantly negatively associated with both the higher educational attainment and higher income status of household heads. However, higher income status and educational attainment of household head more than incomplete primary discourages women to join the formal sector, while educational attainment of household head more than lower secondary and head having monthly earnings more than Rp. 100,000 discourages women to work in the informal sector. Therefore, family status remains an important factor contributing to women's non-participation in the labor market. However, the study has not found any satisfactory reasons behind the negative association between family size and FLFP.

Both high and low-income provinces tend to increase FLFP except South Sulawesi, one of the low-income provinces in Indonesia. The marginal effect of

rural Yogyakarta is very high (21.8 percent). Higher income provinces, such as Jakarta, tend to increase FLFP for urban share, while North Sumatra and South Sumatra tend to do the same for rural share. Women residing in lower income provinces, such as Central Java, Yogyakarta, East Java and West Nusa Tengara have a higher propensity to enter the labor market regardless of urban or rural area. There are no provinces which significantly encourage women to join the formal sector, while all provinces except Jakarta and South Sulawesi encourage joining the informal sector.

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