

Labor Participation and Gender Inequality in Indonesia

Preliminary Draft

DO NOT QUOTE

I. Introduction

Income disparities between males and females have been identified as one major issue in the process of economic development. The importance of this has been strongly emphasized at the international level stated under the United Nations Millennium Declaration, which then formalized into one main agenda under the Millennium Development Goals (MDGs) set by the United Nations (UN, 2000). The Human Development Index (HDI) developed by United Nations Development Program (UNDP) is one indicator that has been widely used to indicate what state a country exists in the development process, and the main component of the index is gender inequality. The index not only shows how well a country performs over the years but also how its performance compares to other countries.

According to the latest HDI report (UNDP, 2011), Indonesia is ranked 100 out of 146 countries on the gender inequality measure. There are three dimensions used to measure the inequality: female participation in the parliament, population with at least secondary education, and labor force participation rate across gender. The three weighted scores suggest that the Gender Inequality Index (GII) for the country is 0.505, which is worse than its neighboring country the Philippines with score 0.427. Even though the country index of Indonesia is improving, it's relative position to other countries performance suggests that Indonesia still needs to put more attention on these particular issues as part of its economic development process.

To investigate what the relationship between inequality and economic development is, we need to trace the theory back to the seminal work done by Kuznets more than half century ago (Kuznets, 1955). The theory states that the relationship between per capita income of a country and the income inequality follows an inverted U shape. If we plot per capita income data under the x-axis, with inequality on the y-axis, the theory would predict that the inequality will start to increase in the early stage of development, but will decreasing after a certain time and level of development.

In the context of gender inequality, Boserup (1970) is among the first who argues that the high inequality between men and women in the early stage of economic development originates from the nature of jobs in which men and women are involved. He states that women are mostly active in home industrial processes, which are gradually phased out when large-scale manufacturing emerges. On the other hand, men benefit in the early stage of industrial process, given the number of jobs requiring strong laborers. He also argues that the concurrent economic activity shifts from rural to urban areas give more opportunity to men than women. At the later stage however, an equalizing factor arises when the service sectors develop. This is due to the nature of jobs offered in the service sector. Service sector

jobs allow more women to participate equally with men, which then decrease the gender gap in labor market participation. In terms of factors that influence individuals to perform in labor market, the human capital theory proposed by Mincer (1958) suggests that educational level is the main determinant. Becker (1965) also supports this approach. He defines the decision and opportunity to join labor market as a combined utility maximization of individual and household characteristic in allocating the times, where education plays major role.

Pampel and Tanaka (1986) empirically confirm this theory in their study and suggest that there is a curvilinear effect as they observe the participation of female workers in the process of economic development. They use panel data of 70 nations for years 1965 and 1970, where factors such as female education, family size, adult sex ratio and labor force growth are among the important determinants. However, a study by Fitzenberg et al. (2006) on West Germany finds that even though the average participation and employment gap between men and women has narrowed over time, there seems to be a persistent gender gap over the life cycle. Their sample covers the whole West Germany population using pool census data from 1975 to 1995, which allows them to compare gender in a skill specific life cycle. Their findings show that there is a participation gap between men and women based on their skill level. Their argument applies only for high skilled women where the average participation is nearly as high as for medium and high skilled men, while for low skilled women, the gap is still significant even though the trend seems to be narrowing.

In the case of a developing country, Maurer et al (1973) investigate labor force participation of Thai women, where they consider factors such as education and sex ratio. Using census data of 1960, they employ different approach in the analysis to capture the age effect by running cross sectional regression across different ages of the sample set. Interestingly, the impact of education on labor participation is varied across different age groups in both men and women. Their finding shows that the impacts of female education in affecting labor participation range between -0.026 and 0.005 .

Given the importance of education in affecting labor participation of individuals, this paper attempts to investigate what would be the effect of education on labor participation in Indonesia. Furthermore, we would also like to observe how prevailing the gender inequality is in the country. We then aim to use the results to derive some policy proposals, which should help reduce the disparity.

II. Data

In this study, we use cross-sectional data from the Indonesia's Socio-Economic Household Survey (SUSENAS) for the year 2008, issued by the National Bureau Statistics of Indonesia (Statistics Indonesia, 2008). The data collection of this survey is from the population census data. The total sample is calculated based on 20 per cent of total population of enumeration areas in Indonesia. The selection is based on probability proportional to size, which suggests that the selection of the total sample in each enumeration area follows the number of households living in that area. The final selection of households in each area, however, is randomly assigned which suggests that the sampling methodology employed in this survey is a stratified random sampling.

The total sample covers 66,724 households with 265,275 individuals. The questionnaire covers information that we need in this study which include: individual educational level, gender, size of household, region (urban/rural areas), marital status, age, sector of activity, and head of household identification. However, based on the nature of this study, which only takes into consideration individuals who are in the labor force, we only include samples that meet this criterion. In the case of Indonesia, an individual is categorized as active in the labor force if his/her age is between 15-64 years old (inclusive). After sorting out the data we have a sample of about 157,000 individuals total.

III. Econometric Method

The following is the model we use in our attempt to estimate the parameters using the Ordinary Least Square (OLS) method. We use this model to analyze the factors that affect labor participation in Indonesia by focusing on education and gender impact. We follow the original model proposed by Mincer (1958), which could reflect the curvature impact of education on the labor market. The model includes the non-linear variables of schooling and experience as shown by the quadratic form for the two variables in the equation. This suggests that there is a marginal impact of school and experience on the probability in entering the labor market.

The model can be defined as follows:

$$\begin{aligned} \text{Work} = & \beta_0 + \beta_1 \text{Schooling} + \beta_2 \text{Schooling}^2 + \beta_3 \text{Experience} + \beta_4 \text{Experience}^2 + \beta_5 \text{Female} \\ & + \beta_6 \text{Female} * \text{Schooling} + \beta_7 \text{Kid06} + \beta_8 \text{Urban} + \beta_9 \text{Married} + \beta_{10} \text{Household size} \\ & + \beta_{11} \text{Formal Household} + \beta_{12} \text{Head Male} + u \end{aligned}$$

We define the variable work as the dependent variable, which contains categorical values to determine whether each person in the sample is currently working or not. The independent variables are school and gender, which are the main interest of this paper, and are coupled with control variables, which mainly contain demographical information of each individual. Detailed explanations of each variable included in the model is as follow:

- *Work* (labor participation) is identified by looking at the individual activity; whether one is actively working or not within the last 7 days. Being active in this case means that one consumes most of his/her time within that week in pursuit of work. If the answer is yes we assigned number 1, while we put 0 if it is not. However, in this study we do not differentiate between part time or full time labor nor do we differentiate people who work in formal or informal sectors.
- *Schooling* is the number of years of education based on the highest certificate received by individuals. For individuals who did not finish school, we refer to the last grade he/she attended as a reference to get information on total amount of schooling.
- *Experience* (job experience) is the total number of years the person engages in labor activity, either in the formal or informal sectors.

- *Female* is also a categorical variable where we put 1 for female and 0 for male.
- Interaction term *Female*Schooling* is the combination between data on gender and years of schooling, where we generate the data by multiplying the value of the two variables.
- *Kid below 6 years old (Kid06)* is a categorical variable where we put 1 if there is child or children in the household below 6 years old, while we put 0 if there are no members in the household below 6 years old.
- *Urban* is used to define whether the individual lives in urban or rural areas (Urban=1; Rural=0)
- *Married* indicates marital status, where we assigned married equals to 1 while individuals who are not married or never married equal to 0.
- *Household size* is total number of household members who live in the same building for more than 6 months.
- *Formal household* is type of household, where we have two categories of formal or informal. We categorize an individual as formal if most of the members in the household work mainly in formal sector and we then assign a value of 1 in the data. However, if most of the members in the household work in informal sector, we label the individual as in an informal household and put value 0 in the data.

IV. Econometric Results

Before discussing the final regression result, we first check the misspecification problem, which may appear in the estimate. We do this by comparing regression result of our non-linear (quadratic) model with the linear model employing the same independent variables. Given that the non-linear model has more variable than the linear one, we need to use the adjusted R^2 instead of R^2 to decide which model works better.

Table 1 shows the result for both linear and quadratic model. The second column shows result for linear model while the third column gives result for non-linear model, where variable work is the dependent variable in both model. The first column indicates all independent variables included in each model.

Table 1. Misspecification model testing

VARIABLES	Linear Model (Work)	Non-linear Model (Work)
	-	
School	0.00160*** (0.000403)	-0.0145*** (0.000934)
School2		0.000827*** (5.35e-05)
	-	
Female_school	0.00215***	-9.11e-05

	(0.000503)	(0.000507)
Experience	0.00150*** (8.91e-05)	0.0129*** (0.000375)
Experience2	-	0.000178*** (5.69e-06)
Kid_06	-0.0419*** (0.00214)	-0.0431*** (0.00214)
Urban	-0.0917*** (0.00206)	-0.0945*** (0.00205)
Married	0.0118*** (0.00264)	-0.0230*** (0.00286)
Hhsize	-	
	0.00121*** (0.000441)	-0.00122*** (0.000439)
Female	-0.249*** (0.00417)	-0.265*** (0.00421)
Formal_hh	0.271*** (0.00227)	0.263*** (0.00228)
Head_male	-0.0467*** (0.00346)	-0.0375*** (0.00346)
Constant	0.891*** (0.00584)	0.805*** (0.00754)
Observations	157,265	157,265
R-squared	0.216645	0.222344
Adj R-squared	0.216595	0.222285
Standard errors in parentheses		
*** p<0.01, ** p<0.05, * p<0.1		

As observed in the table, the sign of parameters in both models are the same except for *married*, where the value turns into negative in the quadratic model. The parameter values also do not differ much except for the school and experience, which have different form. Only the interaction term of female and school (*female*school*) shows obvious difference, where it gives significant value in the linear model but it turns out to be negligible in the non-linear model. Given these differences, there still need a consideration to claim whether the quadratic model we employ in this paper is better the linear one.

In order to decide which one of these models is the best in explaining the relationship between education and labor participation based on the proposed model, we need to look at the value of adjusted R^2 of both models. As observed in the table, adjusted R^2 for the linear model is approximately 0.217, while the second model gives 0.222. This shows that the quadratic model fits much better in explaining the relationship of labor participation with our variable interest of education and gender.

Table 2. Regression Result

VARIABLES	OLS Work	WLS Work
School	-0.0145*** (0.000934)	-0.0145*** (0.000929)
School2	0.000827*** (5.35e-05)	0.000827*** (5.30e-05)
Female_school	-9.11e-05 (0.000507)	-9.11e-05 (0.000480)
Experience	0.0129*** (0.000375)	0.0129*** (0.000395)
Experience2	- 0.000178*** (5.69e-06)	- -0.000178*** (6.00e-06)
Kid_06	-0.0431*** (0.00214)	-0.0431*** (0.00215)
Urban	-0.0945*** (0.00205)	-0.0945*** (0.00209)
Marriage	-0.0230*** (0.00286)	-0.0230*** (0.00301)
Hhsize	-0.00122*** (0.000439)	-0.00122*** (0.000448)
Female	-0.265*** (0.00421)	-0.265*** (0.00410)
Formal_hh	0.263*** (0.00228)	0.263*** (0.00174)
Head_male	-0.0375*** (0.00346)	-0.0375*** (0.00361)
Constant	0.805*** (0.00754)	0.805*** (0.00775)
Observations	157,265	157,265
R-squared	0.222	0.222

Standard errors in parentheses

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

After checking the misspecification problem in the model, we now turn to discuss the final regression result. Table 2 displays the regression results of our quadratic model. The first regression shows the normal OLS estimate, while the second regression is the same model but runs with robust standard error command to handle the heteroskedacity problem. The only difference between the two regressions is the standard error, where the second regression shows robust standard error. Therefore, in the second model we have the corrected standard error, which is used for reference when we want to test

the significance of the coefficients. The corrected standard error does not differ much from the original model, though it gives slightly lower value for school and female coefficients.

The variables of interest in the regression result are *school* and *gender*, which are central to this paper. It is shown that the effects of school on labor participation is negative but with increasing marginal return. The minimum point of school year impact on labor participation is reached at 8.76, which is around 8-9 years of education. This result shows that on average, additional year of education reduces the probability of participating in labor market (working) when the level of education is less than 9 years. However, the probability turns to be positive if the education level is 9 years or more. If we check the data, there are more than 39% of observations that are reported to have education more or equal to 9 years. It means that we need to interpret the result, which suggests the positive impact of education above this threshold.

This finding suggests that there is trade-off between having more years of education and participating in labor market, which mainly applies to individuals who have low level of education or did not finish secondary school (Junior high school). However, for individuals with higher level of education there is positive impacts of having more years of education in helping them join the labor market. One main reason is that in Indonesia, there is minimum requirement of education level for people who want to work at low level of formal sector job. The minimum level is having junior high school certificate when they apply the job. This is one reason why we find the turning point of school impact of labor participation at around 9 years.

Table 3. Total Share of Education Level Earned

Total year of schooling	Male (percent)	Female (percent)	Total Observations (percent)
0	3.75	8.79	6.29
1	1.11	1.38	1.25
2	2.69	3.38	3.04
3	4.5	5.06	4.78
4	3.89	4.06	3.98
5	4.08	4.07	4.07
6	30.26	31.07	30.67
8	8.28	5.68	6.97
9	17.62	16.18	16.89
12	17.52	14.93	16.21
15	6.29	5.4	5.84
Total	100	100	100

The data confirms this result, where there are a significant number of observations stating that the individuals complete an education level of above 9 years. Table 3 shows that for almost 40 per cent of observations, the years of education reached is equal to or above 9 years, while 54 percent of

observations reported attending at least one year of education, but did not complete junior high school level. Around 6 per cent of this population did not have any education at all.

Therefore, the results suggest that providing an additional year of educational to individuals who are not working, but completed junior high school would help them to get a job. However, this investment is not applied for individuals who did not reached junior high school level. This condition also explains the labor market restriction in Indonesia, where on average, most people who have completed their junior high school, could get higher opportunity of getting job, relative to people who do not have it, by providing them more educational level. The coefficient of *schooling* is also significant based on the p-value, where we could reject the null hypothesis at even 1 per cent level.

Another perspective to analyze the convex relationship between school and labor participation is the dualistic sector that exist in the economy. We can argue that individuals who earned their education less than 9 years might end up working in a non-formal sector that does not require minimum educational level. In this case, the trade-off between having additional year of education is acceptable; as the person could have gain more experience to keep working instead of going back to school. This is also in line with our next explanation on variable of experience, which shows positive impact on labor participation.

The second variable, which we are interested in, is the gender. We label it as *female*, which reflects the value for female compare to male. As shown in table 2, the coefficient of female is negative. This suggests that the probability of a female to join the labor market is lower than a male by 26.5 per cent. This coefficient is also significant at 1 per cent level, which suggests that there is inequality between male and female in getting job.

However, if we consider the interaction coefficient between female and school, the value is very close to zero, which suggests that school does provide a significant help to women in helping them getting the job. This result contradicts the theory; where additional year of education should improve the probability of joining labor market for female, but in the case of Indonesia it may be possible.

To analyze it, we need to look at the condition in developing countries, where most households are poor. In a poor household, parents generally consider their kids as an asset that could generate income to the family by letting them to work when they have enough strength and physical ability. Therefore, parent's decision to let their kids start working after finishing their primary school is a normal decision, as they think they have grown up and have enough knowledge to read, write and count. This is also what we observe in the data (Table 3), where there are 30 per cent of sample reported to finish their education only at primary level, which is more than half of total observations who did not complete junior high school. This data is in line with what reported in HDI, where average level of schooling in Indonesia is 5.8 years (UNDP, 2011).

Given the fact that the majority of population has a lower level of education, we find that there are no significant differences between male and female with an education level below 9 years. However, the consequences of this decision to male and female in getting job in the future might be considerable.

We can use the theory proposed by Boserup where the job opportunity for men with a low education level might still exist as they could work in informal sector, which most of the time require physical strength. However, female who has low level of education cannot compete in this type of job, which obliges them to work at home and become unemployed in the future. This is one of the main reason why educational level did not play much role to help female entering the labor market, due to the nature of job available and the labor market constrained discussed earlier.

In terms of other control variables, we find that *experience* has an important role in helping an individual to join the labor market. As shown in table 2, the coefficient of experience is positive and significant at the 1 per cent level, which suggests that work experience has a positive impact on getting into the labor market. However, the sign of this variable squared is negative which implies a decreasing marginal return to experience. The turning point for experience is 36 years, which means that beyond this point, the positive effect of one more year of experience on the variable work will begin to decrease in magnitude.

One explanation might be that the value of experience as a heuristic (rule of thumb decision) for labor value becomes displaced by other qualitative signals of labor value such as specific positions held, speed of advancement, or other demonstrated specific qualifications. Another explanation might focus on the reduced ambitions of those with increase age and differing phases of life (e.g. younger men without families take more risks to quit and find higher paying jobs).

Another variable that plays a role in the labor participation of an individual is that of the Region. In our regression, we define Region by *urban* to reflect household living in urban areas in contrast to those living in rural areas. This variable is negative and significant at the 1 per cent level, which suggests that living in urban areas does not give higher chance for people to get into the labor market. Chances of finding a job in urban areas are less by 9.45 per cent relative to finding a job in rural areas. This could be explained by the fact that most of people who are working are located in rural area (Table 4).

Table 4. Employment Status Across Region

Region	Not Working (%)	Working
Rural	54,53	60,92
Urban	45,47	39,08
Total	100	100

Looking at the gender of the *head of the household*, results show that the probability of a household member to join the labor force is less when the head of the household is male as compared to female, a difference of 3.75 per cent. This is because household members can rely on the fathers as household heads to work for all the members in better paying jobs. However, when the household head

is woman, the other members have higher urgency to work and help the mother, given that the mother is most likely to earn less compare to what a father's earn.

Variable of *formal_household* gives positive sign, which means that individual who lives in a family where most of them are engaged in the formal sector have a higher probability of joining the labor force compare to individuals who live in a family that are engaged in informal sector. The coefficient is significant at 1 per cent level and it shows 0.263 per cent higher chance for individual who live in formal household. This variable can be interpreted as household characteristic which influence the decision of individual to join the labor market. If most of the household member works in formal sector, there would be high possibility that the member have higher education level which is above the threshold. On the other hand, if most of the members in a household work in informal sector, there will be high chance that the individual who lives there did not spend much time at school which gives less chance to enter the labor market.

The *household size* variable explains that the bigger the family size, the less likely for individuals in the household to participate in the labor market. The argument that supports this conclusion is that a person who is in a big family can rely on other members for a living. For the coefficient, we can interpret that one additional member of household would reduce the probability of participating in labor market by 0.31 per cent.

V. Conclusion and Policy Responses

In this study, we analyze how education measured by formal school years would affect individuals to participate in labor market. We also assess the gender inequality between men and women in accessing the labor market. Other demographic factors such as marital status, household size, location and others are also considered in the analysis.

Overall, we identify that additional year of formal education could not increase the chance of individual to participate in labor market if the person does not complete junior high school level. This finding can be seen as labor market restriction, which shows a threshold of minimum level of education to join the labor market. However, in the case of Indonesia, there are many people who spent their time in school for less than 9 years, where most of them only complete the primary level.

This condition can become a vicious cycle to most of the people in the country, who are majority are poor, which keep the poor to be unemployed. This is because next generation of poor cannot find opportunity to improve their quality of life given their educational constraints. The consequence is even more severe when we look at women who cannot compete with men in getting a job, especially true if they do not have enough education to directly enter the formal job market.

Looking at policy responses, job training or skill improvement might be a better option to help individuals who have low formal education to get them into labor market in the short run. However, in the long run, there is a need to have national policy to promote nine years minimum educational attainment for all citizens. The finding in this study is in line with the policy implemented by the

government of Indonesia last year, which is an introduction of a new policy to make a compulsory of 9 years minimum level of education for all students in the country (Kompas, 2011). The government also provides free education to students from poor households, which should give more incentive to parents to keep their kids at school. It is expected in the future that there will be more people who complete their educational levels at junior high school or higher thus helping more of the poor enter the labor market.

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