Education Mismatch on Women's Workers' Income in Southern Sumatra

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Abstract— **This paper aims to examine the phenomenon of *mismatch* that occurs in women workers in Southern Sumatra. *Mismatch* that occurred was education mismatch with the category of *undereducation* and *overeducation*. Using 2018 Sakernas data, the unit of analysis consisted of 13,683 workers of which 74.66 percent of workers experienced *mismatches* and the remaining 25.34 percent of workers matched educational qualifications with their jobs. The problem of *mismatch* will have an impact on income. Estimation results using the OLS model, simultaneously shows that all determinants of worker's income, namely age, working hours and education have a significant effect. It was found that the most dominant variable affecting worker income statistically significantly both *undereducation* and *overeducation* was education, where changes in employee income *overeducation* due to changes in the level of education were two times greater than changes in *under education* workers.**

Keywords: mismatch, overeducation, undereducation

I. INTRODUCTION

The phenomenon of mismatch in the labor market is a longstanding thing. This mismatch primarily related to the level of education possessed pitch mismatch with jobs gained. If workers with a high education level, which means quality workers work in positions that do not want high qualifications, this phenomenon is called *overeducation*. However, if workers with low qualifications occupy a position for high qualifications then it is called *undereducation*. Both of these phenomena are signals to the economy that the labor market is not functioning properly. In this context, the two phenomena are often referred to as *education mismatch*.

Buchel and Martens (2003) revealed that the phenomenon of *overeducation* is a mechanism of market adjustment when there is an oversupply of *skilled workers*. O*vereducation* is a reflection of human resource allocation inefficient and could undermine allocative efficiency, productivity and economic growth (Linsley, 2005). Bender and Heywood (2006, in Soesilowati, 2009) mentions, *the mismatch* between education and work results in lower income levels, low job satisfaction, and the high rate of *turnover* of workers, which in turn affects the productivity of workers. The phenomenon of *overeducation* and *undereducation* shows a phenomenon of labor market imbalances both in terms of demand and supply.

The work situation in the Southern Sumatra region shows that these two phenomena have occurred. Based on 2018 Sakernas, of the 13,683 workers there were 74.66 percent were workers who experienced *overeducation* and *undereducation*. As for the distribution as seen in Table 1 below.

TABLE I
DISTRIBUTION OF *UNDEREDECATION* AND *OVEREDUCATION* *WORKERS* BY PROVINCE IN SOUTHERN SUMATRA

Province Name	Number of *Undereducation* Workers	Percentage	Number of *Overeducation* Workers	Percentage
Bengkulu	604	4.41	690	5.04
Jambi	832	6.08	859	6.28
Bangka Belitung	748	5.47	616	4.50
Lampung	1544	11.28	1312	9.59
South Sumatra	1548	11.31	1463	10.69
Total	5276	38.56	4940	36.10

Source: Sakernas, 2018, Data Processed 2019

Table 1 shows the problem *undereducation* and *overeducation* occurred in the province of South Sumatra and Lampung is respectively about 11.31 percent and 11.28 percent. Followed by the province of Jambi with the percentage of distribution of workers approximately half of the distribution of workers in the two provinces the most, which is about 6 percent. While the other two provinces (Bengkulu and Bangka Belitung) are the regions with the smallest percentage, namely between 4 percent to 5 percent both for *undereducation* and *overeducation*.

The meeting between employers 'and workers' expectations is also shown in two ways. First, employers look for workers with special expertise for certain jobs, creating a situation of lack of expertise. Second, workers who work in certain positions have skills that are too low or other skills that are not required for the position. This phenomenon is called *mismatch skill*.

Thus, mismatch relates to the fact that the work offered in the economy does not match the supply of existing labor which results in income inequality. This can be caused by imperfect information in the labor market, the time needed to get a job, and changes in residence that result in changes in employment.

The mismatch issue will in turn cause dissatisfaction on both sides of the labor market and is a bad situation for both. Employers become unsure of their workers, while workers are not confident in their competence. This problem will

lead to the income received by workers, the value is below their expectation value and expertise.

In Table 2 it can be seen there are still many *undereducation* and *overeducation* workers who have an income below or equal to 2,800,000 Rupiah. These data imply that if compared between the two categories of workers the larger part is *undereducation* workers. Whereas at the highest income there is an interval of 8,800,001-10,800,000 Rupiah there are only 0.82 percent of total workers, where more distribution is *overeducation* workers who receive the highest income.

TABLE II
INCOME DISTRIBUTION OF *UNDEREDUCATION* AND *OVEREDUCATION* WORKERS IN SOUTHERN SUMATRA

Revenue (Rupiah)	Number of *Under-education* Workers	Percentage	Number of *Over-education* Workers	Percentage
2,800,000	4,383	32.03	3,481	25.44
2,800,001 - 4,800,000	710	5.19	977	7.14
4,800,001 - 6,800,000	122	0.89	292	2.13
6,800,001 - 8,800,000	33	0.24	104	0.76
8,800,001 - 10,800,000	28	0.20	86	0.62
Total	5,276	38.56	4,940	36.10

Source: Sakernas 2018, Data Processed 2019

II. LITERATURE REVIEW

A. Human Capital Theory

Income or wages will vary among workers due to differences in work. Wages will also vary because the workers themselves are different. A number of unique abilities and skills from workers brought into the labor market are called *human capital*. For example, some people try to be biological researchers, while others try to be musicians. Thus through a certain number of skills or education owned by workers will be offered to employers impacting their income throughout their lives (Borjas, 2013; Tarmizi, 2012).

The Human capital theory explains that human resources are determined not only by health, but also by education level. Becker (1993) revealed that education is a process of investment activities that enhance expertise (*investment in human capital*). Education not only increases knowledge but can also improve the skills or expertise of the workforce so that it can increase labor productivity. On one side, increasing productivity can increase economic growth, and can increase the income and welfare of the population. Nowadays the level of education can increase rapidly accompanied by educational facilities. But the fact that there is currently an imbalance between demand and supply in the labor market. The workforce received at the workplace does not match the level of education, so a *mismatch* will occur. This phenomenon is called *overeducation and undereducation* (Sulastri, 2012).

Ability and expertise can be formed through a number of educations taken or experience gained in a job. This means that workers can choose to attend school longer in the hope of earning a higher income. Most others may improve their quality with the experience through the work that occupied

to meet the expectations of higher earnings. Both of these things are the same goal, which is to both cultivate human capital from these workers. These different forms of human capital will explain the fact when workers with higher education qualifications but get jobs that are supposed to be for workers with lower educational qualifications (*overeducation*), because employers want more experienced workers without having to be educated (*undereducation*) for higher income levels.

B. Job Match

In a competitive labor market balance, the interaction of workers who looking for the best job opportunities and employers who want maximum profits equates the marginal product value of workers among companies. The value of a worker's marginal product will not increase if he moves to another company, so there is no incentive for any type of work separation.

However, the entry and exit of workers are common in the competitive labor market. *Job turnovers* occur because workers differ in their abilities and because companies offer different conditions of work. Moreover, workers are uninformed about which companies offer the best opportunities and companies are also lacking information about actual worker productivity.

The condition of the suitability of each company with each employee is called *job match*, which implies that both workers and companies can improve their situation. In other words, a worker has an incentive to find a "right" work environment. The company is also looking for workers who fit the company environment.

When a *mismatch* occurs due to the education level of workers, both *overeducation* and *undereducation*, the phenomenon is related to structural mismatches in the labor market. This means that *overeducation* and *undereducation* are the results of a mismatch between job offers and the education structure of workers.

Buchel and Martens (2003) revealed that the phenomenon of *overeducation* is a mechanism of market adjustment when there is an oversupply of *skilled workers*. While overeducation is a reflection of the inefficient allocation of human resources and can reduce allocation efficiency, productivity and economic growth (Linsley, 2005). Bender and Heywood (2006, in Soesilowati, 2009) mentions, *the mismatch* between education and employment results in lower income levels, low job satisfaction, and the high rate of *turnover* of workers, which in turn affects the productivity of workers. The phenomenon of *overeducation* and *undereducation* shows a phenomenon of labor market imbalances both in terms of demand and supply.

In the labor market shows that there is a phenomenon where a worker with a higher level of education occupies a job that is not in accordance with his (lower) level of education. Conversely, someone with a lower level of education actually occupies a job that is higher than the level of education he has (Wiko et al, 2011). In the long run, this becomes a dilemma in the labor market because it will cause open unemployment, problems with income distribution, labor regulations and education policies (Sugiharso and Nazara, 2005).

III. METHOD

A. The scope of r6search

This study discusses the *education mismatch* in the form of enomena *overeducation* and *undereducation* phenomena on regional labor markets of Southern Sumatra covering Jambi, South Sumatra, Bengkulu, Lampung and Bangka Belitung. To analyze the determination of workers' income observed from age, working hours and level of education, in the case of *undereducation* and *overeducation.* The unit of analysis is female workers aged 15 years and over.

B. Number of Samples and Data Collection

This study uses Sakernas data (National Labor Force Survey) in 2018, a special survey conducted by the Central Statistics Agency (BPS) to collect employment data with a selected household sample approach. The sampling area used is Southern Sumatra, which includes Jambi, South Sumatra, Bengkulu, Lampung and Bangka Belitung Islands. Total of whole samples of the Sakernas data 2018 for Southern Sumatra as many as 13,683 workers which included Jambi Province as many as 2,347 workers, South Sumatra 3,911 workers, Bengkulu 1,775 workers, Lampung 3,880 workers and Bangka Belitung Islands 1,770 workers. After being categorized, then all workers in this survey consisting of 5,276 workers (38.56%) were *undereducation*; 4,940 workers (36.10%) were over-*educated* and the remaining 3,467 workers (25.33%) were *adequate* or did not experience *mismatch*.

C. Data analysis technique

This paper uses qualitative and quantitative analysis techniques. Qualitative analysis to describe *education mismatch* in the form of *overeducation* and *undereducation* phenomena. Quantitative analyses such as Pearson correlation analysis and multiple regression analysis to analyze the determinants of income from the influence of age, working hours, and level of education, in the undereducation and overeducation category workers.

In the multiple regression model, the income of workers experiencing *education mismatch* in the labor market can be estimated statistically from the parameters of the independent variable. The equation of the multiple linear regression function using the OLS (Ordinary Least Square) which is used is as follows:

$$L_n Y_{ij} = \alpha + \beta_1 AGE_{ij} + \beta_2 HOUR_{ij} + \beta_3 EDU_{ij} + \mu_{ij} \quad (1)$$

LnY	: Worker's income
i	: 1st worker, 2,3 .... n
j	: mismatch category (1 = *undereducation* worker; 2 = *overeducation* worker)
α	: Constant
β_1 β_2 β_3	: Regression coefficients of each independent variable
AGE	: Age
HOUR	: Work Hours
EDU	: Education

D. Operational Definitions of Research Variables

1. Income is the compensation received by labor per month paid by the company/office using the unit of Rupiah.

2. Education level is the level of education achieved by a person after attending a lesson at the highest grade of a school level by getting a graduation mark (diploma). In this paper the level of education is the number of years of successful education.

3. Age is information about the month and year of the respondent's birth according to the Christian calendar. This information is used to determine the age of the respondent. In this study age uses a unit of the year.

4. Working hours are the working hours of the main work during the past week, measured in hours.

5. *Undereducation* is a category of workers if the length of education is lower than the average length of education for the type of work.

6. *Overeducation* is a category of workers if they have a higher school length than the average length of education for their type of work.

IV. RESULTS

Age restrictions in this study are individuals aged 15 years and over. This study aims to enter the age variable to determine the relationship and the influence of age and income on labor *undereducation* and *overeducation*. Age is one of the most important factors in generating income because age greatly influences the ability of workers to increase the allocation of working hours.

Table 3 shows that the average age of *undereducation* workers was 42.4 years with a number of *undereducation* workers most bit is spanned the age of the youngest 15-19 years is only 166 votes (1.21 percent), while for *overeducation* number of workers most bit being stretched age more than 60 years old namely only 68 people (0.50 percent). In the range of 40 - 44 years old is the highest distribution for undereducation workers, while for *overeducation* in the range of 35 - 39 years old. The age of workers in below average as many as 42.5 percent. As for the age of the workers who are above average lifespan as much as 57.4 percent of the total workers. The average *overeducation* worker is 35 years old. A total of 50.7 percent is under the age of workers with an average age and working age in the upper age of the average rate of 49.3 percent of the total workers.

TABLE III
DISTRIBUTION OF *UNDEREDUCATION* AND *OVEREDUCATION* WORKERS BY AGE

Age	Number of Workers *Undereducation*	Percentage	Number of *Overeducation* Workers	Percentage
15-19	166	1.21	258	1.89
20-24	368	2.69	785	5.74
25-29	433	3.16	719	5.25
30-34	572	4.18	743	5.43
35-39	707	5.17	758	5.54
40-44	712	5.20	601	4.39
45-49	687	5.02	558	4.08
50-54	599	4.38	320	2.34
55-59	513	3.75	130	0.95
60+	519	3.79	68	0.50
Total	5,276	38.56	4,940	36.10
Average	42.4 years old		35 years old	

Source: Sakernas 2018, Data Processed 2019

This considerable difference in the average age of workers indicates that the first age entering the labor market in the *undereducation* category of workers is indeed older than *overeducation* workers. This is also supported by the fact that in the oldest age group *overeducation* workers *are* only around 1.45 percent while *undereducation* workers cover 7.54 percent. A very different number.

Working hours are one of the considerations for women workers who have a dual role in the household to enter the labor market. Table 4 shows that the number of workers was at least 85+ hours, is 38 people (0.27 percent). In the range of 45-49 hours there is the highest number of workers, namely as many as 1,812 people with a percentage (13.24 percent).

Whereas in overeducation the number of workers was at least 75-79 hours, namely 64 people (0.46 percent). In the range of 45-49 hours has the highest number of workers, as many as 1,545 people with a percentage (11.29 percent).

TABLE IV
DISTRIBUTION OF *UNDEREDUCATION* AND *OVEREDUCATION* WORKERS BY WORKING HOURS

Working hours	Number of *Undereducation* Workers	Percentage	Number of *Overeducation* Workers	Percentage
40-44	1,522	11.12	1,410	10:30
45-49	1,812	13.24	1,545	11.29
50-54	455	3.32	425	3.10
55-59	680	4.96	619	4.52
60-64	365	2.66	384	2.80
65-69	51	0.37	65	0.47
70-74	205	1.49	247	1.80
75-79	63	0.46	64	0.46
80-84	85	0.62	113	0.82
85+	38	0.27	68	0.49
Total	5,276	38.56	4940	36.10
Average	51 hours		52 hours	

Source: Sakernas 2018, Data Processed 2019

Overall both *undereducation* and *overeducation* workers indicate that female workers work full time. The average *undereducation* worker's working hours are 51 hours, and the average *overeducation* worker is 52 hours. Most working hours are also distributed in the same range, namely the number of hours 45-49 hours.

Observed from the level of education completed, it appears that the major *undereducation* workers in Southern Sumatra are elementary school graduates/equivalent, amounting to 19.15 percent. While the junior high school graduation/equivalent only about 0.50 percent, and graduated from high school/in it amounted to 6.44 percent. This shows *undereducation* workers *are* still poorly educated.

TABLE V
DISTRIBUTION OF *UNDEREDECATION AND OVEREDUCATION* WORKERS BASED ON EDUCATION LEVEL OWNED

Level of education	Number of *Under-education* Workers	Percentage	Number of *Over-education* Workers	Percentage
Not completed in primary school	1,706	12.47	323	2.36
Elementary school	2,620	19.15	3,607	26.36
Middle school	69	0.50	30	0.22
High school	739	5.40	91	0.67
DI / DII	20	0.15	760	5.55
DIII	122	0.89	126	0.92
Total	5,276	38.56	4,940	36.10

Source: Sakernas 2018, Data Processed 2019

The same thing is also found in overeducation workers where the majority of the level of education completed is primary school/equivalent, which is 26.36 percent. While graduating high school/equivalent only 0.67 percent, and graduate Diploma at 6.47 percent. Thus a similar pattern occurred in *undereducation* and *overeducation* workers, which is dominated by less-educated workers (Not graduated from elementary school/elementary school) and less than 10 percent of the total female workers there have a high school education level and above.

In the correlation analysis the results show that between income and age of workers both undereducation and overeducation workers have a weak correlation with the opposite direction (*undereducation*) and direct correlation (*overeducation*), as shown in Table 6.

TABLE VI
CORRELATION OF INCOME AND AGE IN *UNDEREDUCATION* AND *OVEREDUCATION* WORKERS

		Undereducation Workers		*Overeducation* Workers	
		Income	Age	Income	Age
Income	Pearson Correlation	1	-0.24	1	.230 **
	Sig. (1-tailed)		0.040		.000
	N	5276	5276	4940	4940
Age	Pearson Correlation	-0.24	1	.230 **	1
	Sig. (1-tailed)	0.040		.000	
	N	5276	5276	4940	4940

Source: Sakernas 2018, Data Processed 2019

From Table 7 it can be concluded that there is a positive and moderate correlation between income and working hours variables of 0.50 (*undereducation*). Meanwhile, *overeducation* workers showed a negative and weak correlation between income and working hours variables, namely -0.037 and significant with values below 0.05.

TABLE VII
CORRELATION OF INCOME AND HOURS IN
UNDEREDUCATION AND *OVEREDUCATION* WORKERS

		Undereducation Workers		*Overeducation* Workers	
		Income	Working Hours	Income	Working Hours
Income	Pearson Correlation	1	0.50	1	-.037 **
	Sig. (1-tailed)		0,000		.005
	N	5276	5276	4940	4940
Working hours	Pearson Correlation	0.50	1	-.037 **	1
	Sig. (1-tailed)	0,000		.005	
	N	5276	5276	4940	4940

Source: Sakernas 2018, Data Processed 2019

Finally, the correlation between the income and education is there is correlation equal between groups of workers *undereducation* and *overeducation*. Correlation workers *undereducation* is a weak positive and amounted to 0.286 and the workers *overeducation* there is a coefficient of correlation of 0.403 and significant with a value below 0.05 (Table 8).

Results estimasi against labor income equation *undereducation* and *overeducation* shown in Table 9 below. Simultaneously all independent variables have a significant effect on both categories of workers. It can also be observed that based on the parameter estimation marks the two categories of workers show the same results. Both *undereducation* workers and *overeducation* of income changes are significantly affected in line with changes in the determinant variable (working hours and education level). The difference is the workers *undereducation* u it is not the one determinant that is statistically significant, whereas for workers *overeducation* these variables as well as two other variables are statistically significantly affect the income of workers.

TABLE VIII
CORRELATION OF INCOME AND EDUCATION IN
UNDEREDUCATION AND *OVEREDUCATION* WORKERS

		Undereducation Workers		*Overeducation* Workers	
		Income	Education	Income	Education
Income	Pearson Correlation	1	.286	1	.403 **
	Sig. (1-tailed)		0,000		.000
	N	5276	5276	4940	4940
Education	Pearson Correlation	.286	1	.403 **	1
	Sig. (1-tailed)	0,000		.000	
	N	5276	5276	4940	4940

Source: Sakernas 2018, Data Processed 2019

Age it is the determinant of the real effect is dominant against labor income *over education* due to this category of workers taking his first job at a certain age, although the level of education is higher than the requirement of the job and receive a low income. This relates to career mobility theory. *Overeducation* is an investment in work experience where there are promotion opportunities for higher job positions inside and outside the company (Sicherman and Galor in Baert et.al; 2012). So *overeducation is* only a transition and is short term. The meaning is that with age, the experience will also increase so that it can occupy a

better position with higher income. In contrast to *undereducation* category workers, age does not significantly affect income because when a certain age workers get a job that exceeds their qualifications, then when in the future there is a selection for a better position then the worker will not get it. So age increases with increasing income but the effect is not statistically real.

The most dominant determinant affecting worker income in both categories is the level of education. However, the income of over- *education* workers increased more than doubled the income of *undereducation* workers. This is in line with the logic explained in the determinant of age. Every 1 percent increase in the duration of schooling will increase *undereducation* workers 'income *by* 6.3 percent while *overeducation* workers' income will increase by 12.6 percent.

The working hours variable actually shows the opposite of the education level variable behavior. The income of *undereducation* workers increased by 0.6 percent for every 1 percent increase in working hours. Whereas on the *overeducation of* workers 'income, a 1 percent change in the increase in working hours causes an increase in income in the amount of one-third lower than changes in *undereducation* workers' income. This implies workers in the *overeducation* category with the ability to qualify for higher knowledge of their work taking the job because it avoids the worry of being unemployed (Arulampalam, 2001 in Baert, 2012) or it can also be due to psychological disappointment. Thus, an increase in the number of hours worked does not increase income as high as an increase in *undereducation* workers' income.

TABLE IX
RESULTS OF ESTIMATES OF THE MULTIPLE REGRESSION
REVENUE MODEL UNDEREDUCATION AND
OVEREDUCATION WORKERS

Revenue Equation (LnY)	Variables	Estimation Parameters	Probability	Significance
Undereducation				
	A constant	13,656	0 .000	*
	AGE	0 .001	0 .438	
	HOUR	0. 006	0 .000	*
	EDU	0 .063	0 .000	*
R Square	0 .088			
F-statistics	170,412			*
Overeducation				
	A constant	12,571	0 .000	*
	AGE	0 .013	0 .000	*
	HOUR	0 .002	0 .005	*
	EDU	0 .126	0 .000	*
R Square	0 .147			
F-statistics	284,073			*

Source: Sakernas 2018, Data Processed 2019
* Significant at α = 5%

V. CONCLUSION

Undereducation of female workers in the Southern Sumatra region is on average older than *overeducation* workers. But this is not the case with determinants of work hours and worker education. There is a similarity of facts that occur in this variable, where the two categories of workers have the same relative working hours which is around 50 hours per week. Likewise, education is relatively equally dominated by workers with low education.

A positive correlation exists between workers' income and education in both categories of workers. But the opposite is true for the correlation between income with age and income with work hours. A stronger income-working hour correlation occurs with *undereducation* workers while a stronger income-education correlation occurs with *overeducation* workers.

This descriptive result is in line with the estimation on the income model which is influenced by age, working hours and education. The dominance of the effect of education on employee income is greater in the *overeducation* worker group, but the effect of working hours on income is greater in the *undereducation* worker income model.

VI. Suggestion

Noting that determinants of worker's income are dominated by education, especially *overeducation* workers, it can be a benchmark for employer to accelerate achievement of position in accordance with worker education through improving skills with provision of training facilities or *on job training* at beginning of the work based on higher knowledge abilities. On worker side, result of this study can be recommendation to provide a better market signal to employer about himself so that he can earn income in accordance with the level of education.

Acknowledgments

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