

## **Does Overeducation and Undereducation Matter for Returns to Education in Malaysia?**

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### **ABSTRACT**

Incidence of over education and under education has been becoming important issues in the labour market. These two incidences will lead to inefficiency in the use of labour input that subsequently may jeopardize workers' returns to education. This paper attempts to examine this issue by focussing on the effect of over education and under education on returns to education in two economic sectors in Malaysia, the services and manufacturing sectors. The analysis is based on 857 workers' data collected from a field survey conducted in 2015 in four economic zones; West, South, North and East. One state was selected for each zone to include Selangor and Federal Territory of Kuala Lumpur, Pahang, Johor and Penang. The findings from this study demonstrate that overeducated workers receive lower returns to education compared to well-matched workers even though the returns are still positive. On the contrary, under educated workers receive negative return from education.

Keywords: Over education, under education, required education, returns to education.

### **INTRODUCTION**

Human capital remains crucial for driving and sustaining economic growth. The importance of investment in education in determining returns to individual or worker who invest in it has been the focus of human capital theory. Beginning from the seminal works done by Mincer, Schultz and Becker, economist has extensively studied the impact of investment in education on individual income where majorities found a positive relation between educational attainment and returns to workers. Knowledge workers produced by the Government through higher education sector too are important economic assets (capable in leading the research and development activities, which in turns will initiate more innovation and invention of new technology that can increase productivity).

Realizing the importance of education to economic growth, during the Tenth Malaysia Plan, 2011-2015, the Government introduced a range of measures to improve the labour market and transform its education system. Key achievements include the creation of 1.8 million new jobs that contributed to a decline in the unemployment rate from 3.3% in 2010 to 2.9% in 2015, which is considered full employment (Malaysia, 2015). Despite major achievement achieved by Malaysia in upgrading the education system and the labour market, vital issue that might jeopardize the significant contribution of human capital theory is the mismatch between workers educational qualification and the requirement set by the market.

Over-education and under-education are the terms used in the economics of education to identify whether individuals or workers are utilized in their job with respect to their educational background. Overeducation can be defined as the extent to which workers have higher level of schooling than what their jobs require; while those with lower level of schooling than what is required by their jobs are considered as 'under-educated'. Mismatch between workers educational qualification and markets requirement occurred if and when an increase in workers' educational attainment is not matched by a rise in the demand for education from the employers and this, in turn, leads to a reduction in the relative wage of high-educated workers (Zainizam Zakaria et al., 2014).

At present, few studies have been done to analyse the incidence of overeducation and undereducation in the Malaysian scenario. The objective of the paper is to examine the effect of over education and under education on returns to education of 857 workers in the manufacturing and services sectors in Malaysia. The paper is organized into five sections. The next section will discuss the relevant past studies on overeducation and undereducation. Then, section three will elaborate the methodology of data collection and analysis. The fourth section will discuss the finding of data analysis and the final section will conclude.

### **INCIDENCE AND WAGE EFFECT OF EDUCATIONAL MISMATCH: MALAYSIAN AND INTERNATIONAL PERSPECTIVES**

Malaysian studies on the incidence of overeducation have initially started with the investigation into the extent of job mismatch among graduates and their employment opportunity, ignoring the potential monetary effect of such mismatch. These studies attribute rising graduate unemployment to mismatch between the type of skills and educational qualification possessed by graduates and actually required by employers (Wong & Hamali, 2006; Lim, 2011; Md. Razak et al., 2014). However, Subramaniam et al. (2007) argue that unemployment in Malaysia can be reduced by promoting economic growth and foreign direct investment, and not by eliminating job mismatch. Despite the contradictory findings, studies on the impact of job mismatch on employment have renewed Malaysian researchers' interest into examining the issue of educational mismatch. Consequently, a few recent studies, though scarce, have analysed the incidence of overeducation and undereducation from the cause-and-effect dimension.

Zakariya et al. (2014) measure the incidence of overeducation and undereducation in Malaysia to be at 18 percent and 28 percent, respectively. In finding the causes of such educational mismatch, Lim (2013) reveals that graduates with a higher level of predetermined and current (before and after entering the job market) happiness are less likely to be overeducated. While this is the psychological explanation for overeducation, Zakariya, and Mohd. Noor (2014) suggest workplace characteristics as the potential influence of overeducation and overskilling in the manufacturing sector, such as firm size, percentage of university workers at the workforce, types of ownership, number of competitors, and types of hiring practices.

Studies on the effects of overeducation and undereducation in Malaysia are primarily focused on the monetary outcome, despite having few other studies venturing into the negative impact of overeducation on job satisfaction (Zakariya & Battu, 2013). Basically, overeducated workers tend to suffer from wage penalty (around 9 to 11%) while undereducated workers enjoy wage premium (around 9 to 12%) (Zakariya et al., 2014). Overeducated workers earn less than their well-matched co-workers in similar jobs (Zakariya, 2013). Besides that, the extent of wage differences varies by ethnicity, economic sector and field of study. Wage penalty for being overeducated is higher for Indian and lower for Chinese ethnic, while wage premium for being undereducated is higher for Malay and lower for Chinese. Malay and Indian overeducated workers face higher wage loss in manufacturing and business support services sector, while the impact is insignificant for Chinese (Zakariya et al., 2014). In addition, wage penalty for being overeducated increases by about 14 to 17 percent if one works for a job unrelated to his or her field of study (Zakariya, 2014). Based on these studies, it can be concluded that there is a cost to working on a job that is not matched to one's educational level and field of expertise in Malaysia since the knowledge learnt is not transferable between jobs.

From the international context, studies on the impact of educational mismatch can take the form of wage effect in general, and wage differential and earnings inequality by gender in specific. For example, del Mar Salinas-Jiménez et al. (2013) attribute gender wage discrimination that works to the disadvantage of females to educational mismatch in Spain, while the rising overeducation rate and premia in the U.S. increase the male's and female's Gini coefficient by 20 and 48 percent, respectively, widening the earnings inequality gap by gender (Slonimczyk, 2013).

On the other hand, studies on the wage effect of educational mismatch in general produce mixed results owing to varying measurements used in estimating required education and educational

mismatch variable. Tsai (2010) and Mavromaras (2013) find no negative effect of overeducation on earnings in the U.S. and Australian labour market, respectively, when using panel analysis to account for time-constant individual characteristics. Their results are different from the commonly used cross-sectional analysis that incorrectly assumes random assignment of being overeducated and that omits unobserved heterogeneity among workers.

Other studies that account for unobserved heterogeneity among workers, such as occupational heterogeneity and unobserved ability, have resulted in either smaller or even insignificant negative wage effect of overeducation. For example, by subdividing nursing occupational category in the U.S. into numerous minor occupational categories to estimate required education, Rubb (2014) finds a sizable impact of such occupational heterogeneity on the incidence of overeducation and smaller negative wage impact of being overeducated. However, the significant wage penalty turns insignificant when overeducated workers' skills are perceived to be well matched in Switzerland (Pecoraro, 2014). Such an alternative measure of overeducation suggests that the seemingly severe overeducation reflects only a lack of unobserved attributes, such as ability.

Other alternative measure of overeducation focuses on the age-related effect of overeducation on earnings. Carroll and Tani (2013) find evidence from Australian bachelor degree graduates that younger overeducated graduates do not face with wage penalty compared to their older overeducated counterparts. This is somewhat consistent with Hung's (2008) Taiwanese study that does not consider younger overeducated workers to be disadvantaged compared to the older ones. In general, there is a positive and negative wage impact of overeducation and undereducation, respectively, with the overeducated workers being more pessimistic over their promotion path.

Recent study on the wage effect of overeducation takes the dimension of gender differences in job satisfaction and perceived job mobility, the mismatches in the types of specific job competencies, and the extents of educational mismatch. Although both male and female overeducated workers suffer from wage penalty, job satisfaction among the female workers involved in childrearing is the most affected, triggering them to think of changing current job (Shevchuk et al., 2015). However, the wage penalty and reduced job satisfaction are insensitive to specific areas of acquired learning, but these penalties are resulted from the inability to make use of general or innate ability in one's job (Sánchez-Sánchez & McGuinness, 2015). This finding, to certain extent, renders support to that of Li and Miller (2015) where the earnings differences from acquiring varying university qualifications are smaller when overeducation is more extensive.

In a nutshell, empirical studies on the wage effect of educational mismatch underscore the explanatory power of unobserved heterogeneity and general or innate ability among workers, as opposed to the specific areas of acquired knowledge from schooling. While this kind of study is still scarce in Malaysian context, a theoretical gap to be filled up in this present study therefore focuses on the extent to which the unobserved ability among workers during their school time and during their work can affect the returns to schooling and educational mismatch.

## METHODOLOGY

In order to achieve the objective of the paper, three regression models will be estimated. All models are the semi logarithm wage models, which are basically based on Mincer Schooling Model (1974). We add other variables to the basic model and in each model, the variable of education is measured in a different way. In model 1, the actual educational attainment by workers is incorporated as a measure of education. In model 2, actual education is replaced by required education, which is defined as well-matched education level for a particular job. The measurement of this variable is based on workers' answer to a specific question in the questionnaire. If they think their educational attainment is suitable for the job that they hold, than required education is equal to actual education. In model 3, we include required education, overeducation and undereducation as measures of educational attainments.

## ESTIMATION MODELS

### Model 1

$$\ln W_i = \beta_{01} + \beta_{11} \text{EDU}_i + \beta_{21} \text{EXP}_i + \beta_{31} \text{EXP}_i^2 + \beta_{41} \text{TRN}_i + \beta_{51} \text{GEN}_i + \beta_{61} \text{JS}_i + \mu_{1i} \quad (1)$$

**Model 2**

$$\ln W_t = \beta_{02} + \beta_{12} \text{REDU}_t + \beta_{22} \text{EXP}_t + \beta_{32} \text{EXP}_t^2 + \beta_{42} \text{TRN}_t + \beta_{52} \text{GEN}_t + \beta_{62} \text{JS}_t + \mu_{2t} \quad (2)$$

**Model 3**

$$\ln W_t = \beta_{03} + \beta_{13} \text{REDU}_t + \beta_{23} \text{OEDU}_t + \beta_{33} \text{UEDU}_t + \beta_{43} \text{EXP}_t + \beta_{53} \text{EXP}_t^2 + \beta_{63} \text{TRN}_t + \beta_{73} \text{GEN}_t + \beta_{83} \text{JS}_t + \mu_{3t} \quad (3)$$

Where  $\ln W$  is logarithm of monthly wage rate,  $\text{EDU}$  is years of schooling,  $\text{EXP}$  is working experience,  $\text{EXP}^2$  is working experience squares,  $\text{REDU}^1$  is required education for a particular job,  $\text{OEDU}$  is over education for a particular job,  $\text{UEDU}$  is under education for a particular job,  $\text{TRN}$  is dummy variable for training, 1= if attended training, 0= otherwise,  $\text{GEN}$  is dummy variable for gender, 1=males, 0=otherwise,  $\text{JS}$  is dummy variable for job status, 1=full time, 0= otherwise,  $i$  is individual.

**SOURCE OF DATA**

The data used for the analysis are gathered from the field survey using a set of structured questionnaire. The minimum sample size is calculated based on Israel (1992). The samples are chosen using stratified sampling. Population sample was gathered from the Labour Force Survey Report, Department of Statistics Malaysia, 2013. Five states in Peninsular Malaysia have been chosen in this study to include four zones; North (Penang), East (Pahang), West (Selangor and Federal Territory of Kuala Lumpur) and South (Johor). The questionnaires were distributed to 1200 private sector workers in the services and manufacturing sectors. Due to divergence of the service sector, only five subsectors were chosen to include education, communication, tourism, finance and health. Whereas for the manufacturing sector, the study covers all subsectors. The sample covers 546 workers in the manufacturing sector, 158 in education, 112 health, 100 finance, 67 communication and 217 tourism to make 1200 workers based on stratified sampling. Data collection were done from February till June 2015 with the help of enumerators. The success rate is 71.4 percent, whereby 857 questionnaires have been successfully completed and suitable for the analysis.

**RESULTS****Profile of Respondents**

Table 1 presents profile of respondents, which include gender, age, ethnicity, education level, job status and economic sector. The distribution of respondents by gender are almost equal with 47.4 percent males and 52.6 percent females. The majority of the respondents are at the young age at between 21-25 and 26-30 years old. It is followed by aged 31-35 years old at 16.6 percent and most of them are Malays. With regards to educational attainment, 32.4 percent of the respondents are SPM holders followed by Bachelor Degree (27.2 percent) and Diploma (22.6 percent). The highest educational attainment is Masters, which encompass 6 percent of the respondents. Most respondents have level of education that match with their jobs, but 11.6 percent are over educated and 3.2 percent are under educated. Almost all respondents are working full-time and 53.3 percent are in the manufacturing sector. Among those who work in the services sector, the majority are in tourism industry (14.5 percent). The remaining are in health (9.5 percent), finance (8.6 percent), education (7.4 percent) and communication (6.7 percent)

<sup>1</sup> Hartog (2000) derives formula to obtain over ( $S^o$ ) and under education ( $S^u$ ) as follows;

$S^o = S - S^r$  if  $S > S^r$ ; otherwise = 0

$S^u = S^r - S$  if  $S^r > S$ ; otherwise = 0

$S^r$  is required education perceived by the respondent. If their educational attainment ( $S$ ) is appropriate with their jobs than  $S = S^r$

## Descriptive Statistics of Variables

Table 2 presents descriptive statistics of 857 workers involved in this study. The mean value of monthly wage is RM2, 242.07 with the minimum value of RM400 and the maximum value of RM15, 000. On average, the age of respondents are 30 years old and 52.63 percent are females. About 77.0 percent of the respondents had attended training and have working experience of 7.8 years. On average workers years of schooling is about 13.5 years. Years of required education is slightly lower than years of actual schooling attainment, which is 13.3 years, which may be due to over education among the respondents. The maximum of over education is 7 years and under education is 5 years.

## Estimation Results

Before the discussion on the estimation results, we present the result for model fitness. Tests for multicollinearity and heteroscedasticity are performed and the results show that the data do not suffer from these two statistical deficiencies. A test for multicollinearity using Variance Inflation Factor (VIF) demonstrates the value of less than 10 for all explanatory variables, which imply the nonexistence of multicollinearity problem. A non-significant value of Breusch-Pagan test also implies that the data is free from heteroscedasticity problem.

Table 3 presents estimation results for the 3 models. In model 1 returns to overall years of schooling is 16.2 per cent<sup>2</sup> and significant at 1% level of significance. Returns to education for required education in model 2 is slightly lower at about 15 per cent and slightly higher in model 3. In model 3, based on the standardized  $\beta$ , it is shown that workers with over education also receive significantly positive wages but the return is lower than returns from required education. On the other hand, workers with under education experience a wage loss. The magnitude of wage gain from over education, even though it is lower than required education is 7.8 per cent and wage loss from under education is 14.2 per cent. The results is consistent with the theory and finding from Zainizam (2013). This reflects that there is advantage for workers with over education, even though their jobs need lower years of schooling than what they possess. For workers with under education, since their jobs need higher level of education than what they possess, they do not receive wage gain compared to their fellow workers with required and over education. The results signal that furthering education at higher level is necessary for the wage gain even though it does not match the required education for a particular job. However, having said that, the required education is the best option because it gives the highest returns.

From model 1, the results show that other incorporated variables like working experience, training attainment, gender and job status are also important determinants of wages. All variables have positive and significant impact on wages. The effect of working experience is about 5 per cent, which reflects that one year increase in working experience will increase wage for about 5 per cent. Workers who had ever attended training will receive wage premium at about 13.2 per cent compared to those who had not attended training. Male workers receive wage premium of about 13.0 per cent compared to female workers and full-time workers receive about 40.5 per cent higher wages compared to part-time workers. The results are almost similar for model 2 and model 3.

## CONCLUSION

The finding from this paper demonstrates that overeducated workers still receive positive returns from education but the percentage is lower than their fellow workers with well-matched education. Under educated workers, on the hand, will suffer from a wage loss, due to their lower qualification than required. This signals the importance of education for workers to generate wage premium, even though their level of education is higher than what is required. Therefore, from the workers' perspective, over education is still good for their wage gain and welfare, but required education is the best solution.

In order to possess required level of education, this is the responsibility of both parties; the education providers and the workers. With regards to education providers, they must provide education that is tailored to the market needs. For workers, they must find jobs that are suitable to their education level to gain maximum returns. This of course needs extra efforts and time to look for jobs and at the same time equip themselves with skills that they do not obtain from formal education through attending training programmes. A negative return from under education reflects inefficiency of

<sup>2</sup> Since the wage models are in semi logarithm form, the percentage point or marginal effect of the explanatory variables are obtained using this formula;  $(e^{\beta} - 1 \times 100)$  where  $\beta$  is estimated coefficient.

workers to handle jobs that requires higher level of education. Even though they manage to get jobs, but they are not able to receive wage gain. This problem can be overcome with the help of employers in term of providing workers training to make them more efficient. At the same time workers should involve in life-long education to achieve a required level of education for any jobs they might hold in the future.

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TABLE 1: Profile of Respondent

Variable	Frequency	Percent
<b>Gender:</b>		
Male	406	47.4
Female	451	52.6
<b>Age:</b>		
16-20	18	2.1
21-25	253	29.5
26-30	299	34.9
31-35	142	16.6
36-40	62	7.2
41-45	36	4.2
46-50	28	3.3
51-55	14	1.6
56-61	5	0.6
<b>Ethnicity:</b>		
Malays	751	87.6
Chinese	71	8.3
Indians	34	4
Others	1	1
<b>Education Level:</b>		
UPSR	5	0.6
PMR/SRP	22	2.6
SPM/O-Level	278	32.4
Certificate/STPM/A-Level/-Matriculation	74	8.6
Diploma	194	22.6
Bachelor Degree	233	27.2
Masters	51	6
<b>Education mismatch:</b>		
Well matched	731	85.2
Over education	99	11.6
Under education	27	3.2
<b>Job Status:</b>		
Full-time	831	97
Part-time	26	3
<b>Economic Sector:</b>		
<i>Services</i>		
i) Education	63	7.4
ii)Communication	57	6.7
iii)Health	81	9.5
iv) Finance	74	8.6
v)Tourism	124	14.5

<i>Manufacturing</i>	458	53.3
N	857	100

Source: Field Survey, 2015

TABLE 2: Descriptive Statistics

Variable	N	Min	Max	Mean	Standard Deviation
Monthly wages	857	RM400.00	RM15,000.00	RM2,242.0735	RM1,555.84303
Age	857	18.00	61.00	29.8891	7.48741
Gender	857	0.00	1.00	0.5263	.49960
Training	857	0.00	1.00	.7701	.42100
Work Experience	857	.10	37.00	7.8584	6.83845
Squared of Work Experience	857	0.00	1369.00	105.9321	189.00126
Job Status	857	0.00	1.00	0.9703	.17162
Over education (So)	857	0.00	7.00	.3396	1.01403
Under education(Su)	857	0.00	5.00	.0817	.48612
Years of education required for the particular job (Sr)	857	6.00	18.00	13.3011	2.44479
Years of schooling (S)	857	6.00	18.00	13.5496	2.42267

Source: Field Survey, 2015

TABLE 3: Estimation Results

Variable	Model 1	VIF	Model 2	VIF	Model 3	VIF
EDU	0.150 (0.006)***	1.078				
REDU			0.143 (0.005)***	1.041	0.154 (0.006)***	1.123
OEDU					0.075 (0.013)***	1.098
UEDU					-0.133 (0.027)***	1.06
EXP	0.049 (0.006)***	9.234	0.040 (0.006)***	9.117	0.045 (0.006)***	9.283
EXP <sup>2</sup>	-0.001 (0.0002)***	9.026	-0.001 (0.0002)**	9.002	-0.001 (0.0002)***	9.095
TRN	0.124 (0.031)***	1.021	0.12 (0.032)***	1.022	0.114 (0.031)***	1.025
GEN	0.122 (0.026)***	1.018	0.108 (0.026)***	1.019	0.116 (0.026)***	1.021
JS	0.34 (0.076)***	1.013	0.299 (0.077)***	1.015	0.313 (0.075)***	1.03
INTERCEPT	4.718 (0.110)***		4.957 (0.107)***		4.748 (0.109)***	
N	857		857		857	
R <sup>2</sup>	0.541		0.521		0.553	
R Adjusted	0.538		0.518		0.549	

Note: Figures in brackets are standard deviations; \*\*\*significant at 1%, \*\* significant at 5%, \* significant at 10%.