The Determinants of the Incidence and the Effects of Overeducation in the Malaysian Labour Market

Zainizam Zakariya
Universiti Pendidikan Sultan Idris

Abstract

This paper attempts to study the quality of jobs match held by workers in the manufacturing sector of Malaysia. Relevant issues are thus covered: the incidence, determinants, and wage impacts of overeducation. Using the second Malaysia Productivity Investment Climate Survey (PICS-2), nearly 20% and 30% of workers are employed in jobs for which they are overeducated and undereducated, respectively. Further examination suggests that overeducation is not only due to lack of human capital accumulation (work experience and training) and soft skills, i.e. English proficiency, leadership, and creativity, but also related to firm characteristics in terms of firm size, the share of university workers at the workplace and hiring practice. Evidently, using augmented Mincer earnings equation signifies that being overeducated leads to a greater wage penalty. The return of surplus education (overeducation), in particular, is lower than the return of required education (6% against 10%) regardless of gender. This means that overeducated workers earn significantly lower than their co-workers who are in similar jobs but who have lower levels of education and well matched. The situation of overeducation among highly educated workers in the Malaysian labour market may impede the country's intention to move towards the state of being a high-income country, as outlined in the "New Economic Model" blueprint.

INTRODUCTION

This paper attempts to study the quality of jobs match held by workers in the manufacturing sector of Malaysia. This type of study is quite rare not only in the country but also across developing nations.[1]In particular, this study focuses on overeducation incidence and its consequences on employed individuals. Overeducation can be defined as the state of workers who have higher schooling than job requirement while those with lower schooling than required are considered 'undereducated'.

Malaysia is an interesting case in its own right. It is a middle income country which has, since the 1970s, moved from being a primary goods exporter to one that is much

---

[1] The main explanation revolves around the paucity of data in developing countries; in particular, there is a lack of information regarding the education or skills required to perform or obtain a job (Mehta et al., 2011).

more reliant on manufacturing and services. Education has played a pivotal role in this transformation with higher levels of investment and educational attainment (UNDP, 2009). The expenditure on education as a percentage of Gross Domestic Product (GDP) in Malaysia has increased from 4% in 1970 to 6 % in 2009 (Cheong, Selvaratnam and Goh, 2011). This compares favourably with a number of developed countries such as the UK, USA, Japan and also Singapore (2.9% to 5.5% in 2005) (UNDP, 2009). There has been a significant increase in enrolments at the tertiary level. Between 1985 and 1995, the total number of students in tertiary education at degree level increased by more than 100%, but over the period of 1995–2005, it increased by over 200% (see Figure 1). As a result, the number of graduates produced by public HEIs has tremendously increased, from 62,990 (both diploma and degree qualifications) in 1985 to 392,552 in 2005, an increase of 5.23 times (see Figure 2). This helps to improve the quality of the workforce - by 2009, the percentage of the labour force with tertiary education had increased to 23%, more than three times higher than it was in 1985, about 7% (see Figure 3).
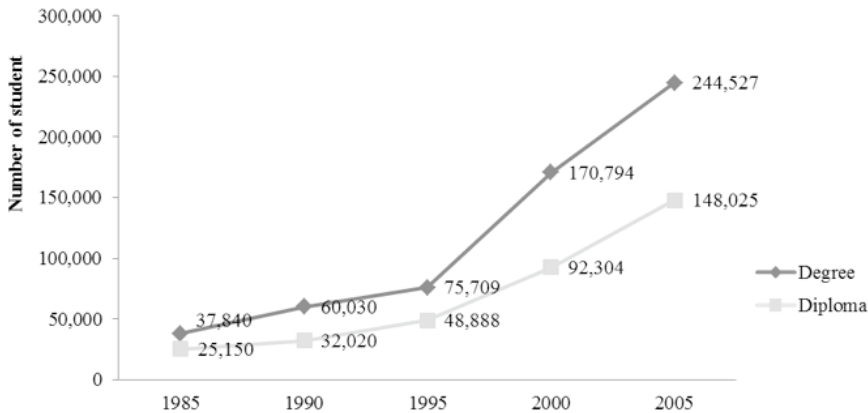

Source: Malaysia Plan, Economic Planning Unit (UPE)

Figure 1 Enrolment by type of education from public higher education institutions, 1985-2005

While universities continue to mass-produce, inevitably, questions have been raised about the quality of jobs held by workers in the labour market (World Bank, 2009). Despite this, to date, no study has addressed the utilisation of education and skills in the Malaysian labour market. There are three objectives in this paper. First, we document the extent of overeducation. Second, we investigate the determinants of overeducation and finally, we explore the effect of overeducation on individuals' earnings. In doing so, this paper is organised as follows. Section 2 provides a very brief overview of some theoretical perspectives on mismatch. Section 3 outlines the data by mainly focusing on the measurement and the incidence of overeducation while section 4 details empirical estimation methods. Section 5 highlights the results in terms of the determinants and the effects of overeducation, followed by the conclusion in the final section.
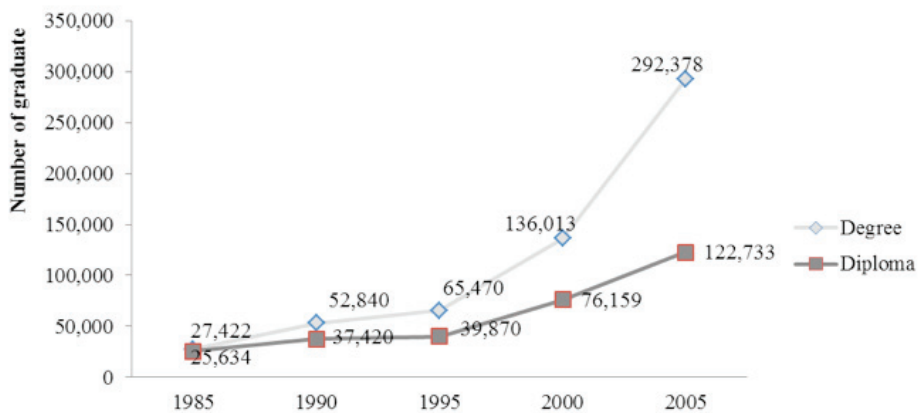
Source: Malaysia Plan, Economic Planning Unit (UPE)

Figure 2 Number of graduate (output) by type of education from public higher education institutions,
1985-2005
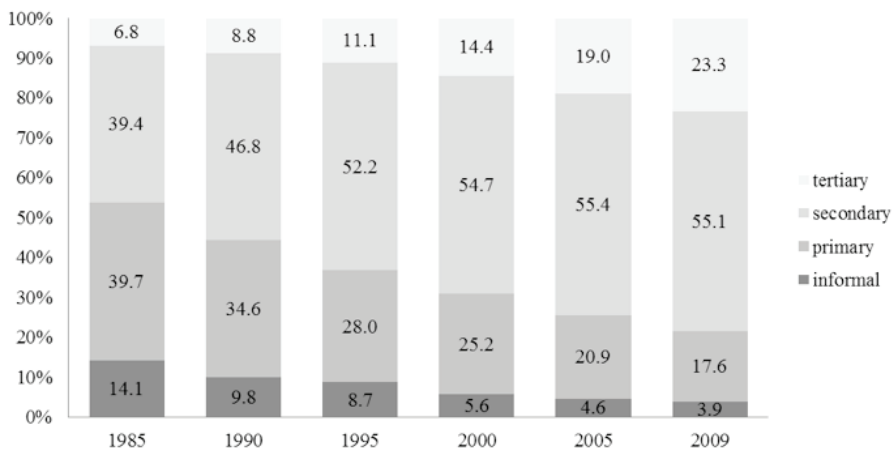
Source: Labour Force Survey, Department of Statistics, multiple years

Figure 3 The quality of labour force by educational attainment, Malaysia,
1985-2009 (%)

THEORETICAL BACKGROUND ON OVEREDUCATION

No single theory has been fully accepted in economics; instead, there is a reliance on existing theoretical frameworks within labour economics as an explanation of over-education. Here, human capital and career mobility theories focus on the supply side, whilst job competition and assignment approaches focus on the demand side.

According to the human capital theory (Becker, 1964), productivity is a function of human capital (i.e. education, experience, and training) and workers are paid based on the value of their marginal product. Consequently, wages are determined by

workers' educational qualifications, experience, and training. Educational mismatch arises if and when an increase in workers' educational attainment is not matched by a rise in the demand for education and this, in turn, leads to a reduction in the relative wage of highly-educated workers. From the firm's perspective, falling relative wages would encourage employers to replace the more highly educated with lowly-educated workers and adjust production techniques to take advantage of such cheaper labour. Highly-educated workers are then placed in positions previously filled by lowly-skilled workers. Mismatch here is transient since firms adjust their production processes while workers reduce their investment in education in response to the lower relative earnings of skilled and/or highly educated workers.

For the career mobility theory (Sicherman and Galor, 1990), overeducation may reflect the inferior quality of education of workers or other human capital deficiencies such as less work experience or lack of training. Highly educated workers may then be willing to accept a job for which they are overeducated in order to accumulate skills that can then be used later to switch to a higher level occupation or position. For example, increased training may allow workers to acquire more firm-specific skills that complement their formal education and so progress towards higher paid positions. This then reduces mismatch.

The job competition theory (Thurow, 1975) offers a demand side explanation of overeducation. Central to this is the notion that when workers compete in the labour market for high-wage jobs, they create a job queue in which jobs are ranked by earnings and a worker's position in the queue is determined by relative training costs. Individuals here may invest in more education in order to move up the labour queue. In the extreme, education and skills investment simply places individuals at the front of the queue for jobs, as it signals that the employer will be required to invest less in training. Highly skilled workers may require less training and are therefore ranked at the top of the labour queue.

The assignment theory focuses on the problem of assigning workers to jobs (Sattinger, 1993). The basic premise here is that both supply and demand are relevant, individual performance varies from job to job, and for the economy as a whole, total output depends on how workers are assigned to jobs. The allocation is optimal when workers are allocated top-down in relation to their skills, whereby the least competent are given the simplest jobs and the most competent are placed in the most complex jobs (Allen and van der Velden, 2001). As a result, highly educated individuals are more likely to be matched with job vacancies requiring a higher level of education. However, the matching process may not be perfect, for example, when too many workers vie for a specific position. This may lead to some individuals being assigned jobs lower down the hierarchy. In this instance workers may be overeducated, whilst others prove to be undereducated.

DATASET

This study used data from the second survey of the Malaysia Productivity Investment Climate Survey (PICS-2). The PICS-2 which was carried out in 2007 is a workplace survey, a collaborative effort between the World Bank and the Malaysian Government

via the Economic Planning Unit and the Department of Statistics. The survey attempts to understand the investment climate faced by enterprises and how this impacts upon business performance, particularly in the manufacturing and business support services sectors. There are 1,115 establishments selected from the survey across nine manufacturing industries.[2] Samples used in this study were restricted to respondents who were in full-time employment, aged between 15 and 64 and who reported no missing in earnings. Income was measured through hourly earnings. This leff about 10,302 respondents, of which 54.5% were males and 45.5% were females. However, the exact number of workers for the analysis varied due to missing data in some explanatory variables.

Table 1 provides summary statistics for the key variables in this analysis. Respondents were on average 34 years old and reported to have had about 11.3 years of schooling attained which is equivalent in Malaysia to upper secondary qualifications. With respect to other human capital variables, respondents on average accumulated about 157 months of work experience, 7.6 (years) job tenure, and nearly 40% had once attended a training course. Large proportions of respondents were Malay, from the central region, small firms and firms that were purely domestically-owned. There were some differences by gender. Women were slightly younger than men (34 versus 36 years) and were slightly better educated with 25% holding higher degree qualifications (both diploma and university qualifications) relative to 20% among men. Men instead had more work experience and job tenure within firms than women (181 months and 9 years respectively vs. 149 months and 7 years respectively).

Overeducation is measured by comparing an individual's actual education with the required education for a particular job. Whilst measuring actual educational attainment is relatively straightforward, acquiring information on the required education level is trickier. Three methods were considered for measuring the required education: subjective, objective, and statistical methods. This paper utilised the subjective method which relied on the worker's own assessment to measure the required education to obtain or do a particular job.[3] In the PICS-2, respondents were asked directly about the required education to do their jobs based on the following statements "*According to you, what is the most appropriate level of education for the work you are doing?*" There were seven educational levels to choose from, starting from (1) degree, to (7) no qualification.

As shown in Table 2, approximately one in three workers believed that upper secondary qualifications were the most appropriate level of education in doing their job (36%). Lower secondary was the second most appropriate (23%) and followed by a diploma qualification (17%). By comparing the survey respondents' educational attainment with the perceived appropriate education required for the job, we derived conventional estimates of overeducation. Where an individuals' actual schooling exceeds job requirement, they were considered to be overeducated ($S^a > S^r$). Where an individuals' actual level of education was below that required for the job they were

---

[2] Nine major industries are food processing, textiles and garments, wood and furniture, chemical and chemical products, rubber and plastics, machinery and equipment, electrical machinery and electronics, equipment and components, and motor vehicles and parts.

[3] See McGuinness (2006) and Oosterbeek and Leuven (2011) for other methods.

classified as under-educated ($S^a < S^r$). Those whose actual educational attainment was appropriate for the job (i.e. actual and required education are the same) are deemed well-matched ($S^a = S^r$).[4]

Table 1 Means and standard deviations – PICS-2

Variable	All		Male		Female	
	Mean	**SD**	**Mean**	**SD**	**Mean**	**SD**
Education level						
No/informal qualification	0.03	0.18	0.04	0.21	0.02	0.14
Primary education	0.12	0.33	0.13	0.33	0.12	0.33
Lower secondary	0.25	0.43	0.28	0.45	0.21	0.41
Upper secondary	0.38	0.49	0.36	0.49	0.41	0.49
Diploma	0.13	0.34	0.11	0.31	0.15	0.36
University	0.09	0.29	0.08	0.29	0.09	0.29
Age	34.89	9.83	35.86	9.99	33.91	9.56
Years of schooling completed	11.31	3.52	11.02	3.63	11.64	3.34
Exp (month)	165.45	120.05	181.26	123.15	149.38	114.61
Train	0.42	0.49	0.43	0.50	0.40	0.49
Female	0.55	0.45				
Married	0.65	0.48	0.68	0.47	0.62	0.49
Ethnicity						
Malay	0.55	0.50	0.58	0.49	0.52	0.50
Chinese	0.35	0.48	0.33	0.47	0.39	0.49
Indian	0.10	0.29	0.09	0.29	0.10	0.30
Region						
Central	0.35	0.48	0.35	0.48	0.34	0.47
North	0.23	0.42	0.24	0.42	0.23	0.42
South	0.33	0.47	0.31	0.46	0.34	0.47
East coast	0.03	0.16	0.03	0.18	0.02	0.13
Malaysia East	0.07	0.25	0.07	0.25	0.07	0.25
% workers with university qualification						
< 25% of the total employees	0.76	0.42	0.76	0.43	0.77	0.42
25%-50% of the total employees	0.19	0.39	0.18	0.38	0.19	0.39
>50% of the total employees	0.05	0.22	0.06	0.23	0.04	0.20
Firm size						
Small - < 50 emp	0.40	0.49	0.43	0.50	0.37	0.48
Medium - 50 - 150 emp	0.31	0.46	0.30	0.46	0.32	0.47
Large - > 150 emp	0.29	0.45	0.27	0.44	0.31	0.46
Ownership						
Purely domestic-owned	0.68	0.47	0.68	0.47	0.68	0.47

[4] On average, years of required education are found to be lower than years of actual schooling attainment (10.7 years against 11.3 years) whereas years of surplus and deficit schooling are approximately 2.6 years each.

Table 1 *(cont.)*

< 30% foreign-owned	0.05	0.21	0.05	0.22	0.04	0.21
> 30% foreign-owned	0.27	0.45	0.27	0.44	0.28	0.45
Firm providing on-the-job training	0.52	0.49	0.49	0.50	0.55	0.50
Occupation						
Managerial	0.15	0.36	0.13	0.33	0.17	0.38
Professional	0.08	0.28	0.09	0.28	0.08	0.27
Skilled job	0.37	0.48	0.45	0.50	0.28	0.45
Clerical/Non-production	0.23	0.42	0.22	0.41	0.24	0.43
Unskilled job	0.17	0.38	0.12	0.32	0.23	0.42
Hours of work (weekly)	45.82	12.23	46.81	12.56	44.81	11.81

Source: Second Private Investment Climate Survey (2007)

Table 2 Most Appropriate Level of Education for the Work respondents Are Doing

	All		Male		Female	
	N	**%**	**N**	**%**	**N**	**%**
Degree	1,081	10.5	601	10.7	478	10.2
Diploma	1,762	17.1	848	15.1	914	19.5
Upper secondary	3,657	35.5	1,926	34.3	1,730	36.9
Lower secondary	2,380	23.1	1,381	24.6	1,003	21.4
Primary	845	8.2	472	8.4	375	8.0
Informal/None	577	5.6	386	6.9	188	4.0
Total	**10,302**	**100.0**	**5,614**	**100.0**	**4,688**	**100.0**

Table 3 shows the overeducation incidence which stands at 19%, with the corresponding figures of 52% and 30% for adequately matched and undereducated. Whilst a higher proportion of women were overeducated compared to men, the reverse hold for undereducation.[5]

Table 3 The Incidence of Over and Undereducation

Educational –mismatch	All		Male		Female	
	N	**%**	**N**	**%**	**N**	**%**
Well-matched	5,347	51.9	5,017	48.7	5,738	55.7
Overeducated	1,906	18.5	1,906	18.5	1,916	18.6
Undereducated	3,049	29.6	3,379	32.8	2,648	25.7
Total	**10,302**	**100.0**	**5,614**	**100.0**	**4,688**	**100.0**

---

[5] Nevertheless, the incidence of overeducation in Malaysia seems to be at the lower end of the existing estimates. Groot and Maassen van den Brink (2000) undertake a meta-analysis based on data from 25 over-education studies and find that the incidence of over-education varies from 10% to 42% with the unweighted average for overeducation standing at 23.3%. A recent review by Leuven and Oosterbeek (2011), overeducation using the subjective method stands at an average overeducation rate of 37%.

Zainizam Zakariya

EMPIRICAL METHODS

The classic specification of the earnings regression was based on the Mincer specification (Mincer, 1974) which generally takes the following form:

$$\ln(w_i) = \alpha_0 + \alpha_1 X_i + \alpha_2 S + \alpha_3 Exp + \alpha_4 Exp^2 + \varepsilon_i \qquad (1)$$

where ln (w) is a natural logarithm of earnings (hourly), X is a vector of explanatory variables, S is education, Exp is experience and Exp^2 is a quadratic term of potential work experience, and ε is the error term for individual i. Equation (1) suggests that workers' productivity (w) is determined by workers' characteristics, particularly education. No distinction was made between actual and required years of education and there was no role for demand side factors, where more years of education imply higher earnings, which meant that any year of education was just as valuable as another.

However, following Sattinger's assignment theory (1993), earnings were treated as a function of both the demand (required education) and supply side (attained education) which can be written as follows:

$$\ln(w) = \gamma_0 + \gamma_1 S^r + \gamma_2 S^o + \gamma_3 S^u + \gamma_4 \exp + \gamma_5 \exp^2 + \mu \qquad (2)$$

where actual educational attainment (S) is decomposed into required schooling (S^r), over schooling (S^o) and under schooling (S^u) in relation to those necessary to obtain or perform the job. Equation (3) is also known as the 'ORU earnings function' (Overeducation, Required and Undereducation) (Hartog, 2000).

S^r, S^o and S^u are obtained using the following formula:

$$S = S^r + S^o - S^u$$
$$S^o = S - S^r \text{ if } S > S^r$$
$$\quad = 0 \text{ otherwise}$$
$$\text{and}$$
$$S^u = S^r - S \text{ if } S^r > S$$
$$\quad = 0 \text{ otherwise} \qquad (3)$$

All unknown parameters were estimated using ordinary least square (OLS). We ran separately for the pooled, males and females sample. Apart from the educational mismatch variable, we also controlled for other covariates as outlined in Table 1 such as work experience, training, gender, marital status, children under 12 years old, ethnic, occupations, firm size, ownership and firm age.

EMPIRICAL RESULTS

Before examining the wage impact of overeducation, here we present the factors that potentially drive educational mismatch in the labour market. Table 4 reports the marginal effects estimated from the multinomial logit. We start by discussing the effects of educational attainment on overeducation. Perhaps, the way one measures overeducation which is based upon educational level may suggest that overeducation

might not have taken place among low-educated workers. Here we find evidence that overeducation incidence increases with education. For each additional year of schooling completed, there is an increase of 0.7 percentage points the risk of overeducation. As regards training and experience, the results show that more trained and experienced workers increase the likelihood of being in a well-matched job. This is in line with the career mobility theory (Sicherman, 1991) where overeducated is more educated but there is a lack of training and work experience. Having additional professional certificates also boosts the job match quality.

There is no evidence that women and married respondents increase the risk of overeducation. However, the presence of children boosts the opportunities of workers to get a well-matched job. This perhaps tells us that the presence of children gives more motivation or desire for parents (probably the father) to look for a job that can maximise their educational background, hence their household income, leading to a well-matched job. Previous studies show that overeducation is prevalent among the minority ethnics (e.g. Battu et al., 2004). This is, however, not the case in our study in which the Chinese are less likely to be overeducated than the Malays (reference group). This is perhaps partly attributable to the fact that the PICS-2 focuses on the private sector, i.e. the manufacturing sector. Many studies in Malaysia have shown that the Chinese have more advantages over the Malay in the private sector in terms of higher earnings and better job position (Hodges-Aeberhard and Raskin, 1997; Gallup, 1997; Shafii et al., 2009).

Table 4 The determinants of overeducation and undereducation–marginal effects

	Overeducated		Undereducated	
Yearsch	0.070	***	-0.025	***
	(0.020)		(0.002)	
Exp	0.000	*	0.000	
	(0.000)		(0.000)	
Expsqr	0.000	***	0.000	
	(0.000)		(0.000)	
Training	-0.076	***	0.008	***
	(0.012)		(0.001)	
Profcert	-0.034	**	0.011	***
	(0.016)		(0.002)	
Malay (ref group)				
Chinese	-0.045	***	0.006	***
	(0.012)		(0.001)	
Indian	-0.008		0.000	
	(0.019)		(0.002)	
Female	-0.003		-0.004	***
	(0.010)		(0.001)	
Married	0.000		0.002	
	(0.012)		(0.001)	

Table 4 *(cont.)*

Child12	-0.013	**	0.001	*
	(0.005)		(0.000)	
Klang Valley (ref group)				
South	0.021		0.000	
	(0.014)		(0.001)	
North	0.021	*	-0.003	**
	(0.013)		(0.001)	
East	0.070	**	-0.015	***
	(0.029)		(0.004)	
Malaysia East	0.088	***	-0.003	
	(0.021)		(0.002)	
Managerial (ref group)				
Professional	-0.090	***	-0.001	
	(0.028)		(0.003)	
Skilled workers	0.193	***	-0.025	***
	(0.020)		(0.002)	
Non-production	0.176	***	-0.028	***
	(0.021)		(0.002)	
Unskilled workers	0.306	***	-0.036	***
	(0.021)		(0.002)	
Skills and ability				
Engcomm	0.035	***	-0.009	***
	(0.002)		(0.001)	
Profcomm	0.010		0.002	**
	(0.012)		(0.001)	
Teamwork	-0.001		-0.002	
	(0.016)		(0.002)	
Leadership	0.030	**	0.000	
	(0.014)		(0.001)	
Numerical	0.019		0.004	**
	(0.016)		(0.002)	
Creativity	0.025	*	0.003	**
	(0.014)		(0.001)	
Probsolv	-0.018		-0.001	
	(0.015)		(0.002)	
% share of university workers at the workplace (Univ1_<25% ref group)				
Univ2_25% – 50%	-0.023		0.003	**
	(0.014)		(0.001)	
Univ3_>50%	-0.064	***	0.002	
	(0.024)		(0.002)	
Small size firm_< 50 emp (ref group)				
Firmsize2_ 50 – 150 emp	-0.039	***	0.002	
	(0.013)		(0.001)	

Table 4 *(cont.)*

Firmsize3_>150 emp	-0.015		0.002	
	(0.015)		(0.002)	
Ownership (Purely domesticall-owned_(ref group)				
Owners2_<30% foreign-owned	0.015		-0.002	
	(0.024)		(0.002)	
Owners3_>30% foreign-owned	0.005		0.000	
	(0.013)		(0.001)	
Hiring practise				
Hiring education-based	-0.023	**	0.003	***
	(0.010)		(0.001)	
Hiring experience-based	-0.015		0.000	
	(0.013)		(0.001)	
Hiring technology-based	0.033	***	0.001	
	(0.012)		(0.001)	
Firmtrain	-0.025	**	0.002	*
	(0.013)		(0.001)	
N			9,700	
Pseudo R-sq			0.18	
Log-likelihood			-8069.104	
χ^2			146104.658	

Robust standard error in italics
*, **, and *** respectively 0.1, 0.05 and 0.01

Thus, the results just simply reflect labour market outcomes in the manufacturing sector and not the whole sector in Malaysia.

The risk of overeducation is also lower among workers in the central than in other regions. This would be an expected finding since the central region is the most developed area, as it attracts more skilled workers who seek good jobs. Whilst in other regions, job creation does not help in accommodating job hunters, particularly the better-educated workers. Being employed in a professional job also reduces the risk of overeducation. With respect to skills at the workplace, the findings support the notion that the overeducated lack skills (Chevalier and Lindley, 2009). Table 2 shows that employed individuals in the manufacturing sector particularly men who lack skills in English communication, leadership and creativity increase the likelihood of being overeducated. The magnitude effects are larger for those who have English communication skills.

With respect to workplace characteristics, one may argue that capital intensive-firms may require more highly skilled workers relative to labour-intensive firms so that skills underutilisation may be more evident in the latter. Here, we found evidence for this. Overeducation is found to be lower for workers in a firm which employs

more highly-educated workers, i.e. over 50% of the workforce having a university qualification (univ3≥50%). Perhaps, workplaces that are skewed towards hiring more educated workers have more scope for improving match quality. Overeducation risk is also found to be higher in a small firm than a medium-sized firm. Belfield (2010) argues that mismatch may be higher where firms have weak hiring systems and where they do not properly check worker capabilities before hiring. We therefore controlled for three criteria in hiring – education, work experience and technical aspect and ascertain their impact on overeducation. The results revealed that workers had a lower risk of overeducation at firms that emphasised education as the main criteria for recruitment. Where work experience (technical skills) was a priority for hiring practice, it reduced (increases) the risk of overeducation. The evidence also indicates that firms providing on-the-job training at the workplace increased the likelihood of being in well-matched jobs. This is as expected, since firms providing on-the-job training may facilitate workers to improve their career within the firm in the future.[6]

Table 5 presents the results of the wage impacts of overeducation. Two models are examined. Model 1 focuses on basic human capital model whilst Model 2 focuses on augmented human capital model. Looking firstly at model 1, the results show that returns to education (*yearsch*) is positive and significant at the 1% level. For each additional year of schooling completed, there is an increase of 4% individuals' hourly earnings, *ceteris paribus*. By gender, males earn higher wages than females (approximately 4.3% against 3.0%).

Table 5 The wage impacts of overeducation and undereducation

lnwage (hourly)	Pooled		Male		Female	
Model 1						
Year of schooling completed (*yearsch*)	0.037	***	0.043	***	0.030	***
	(0.002)		(0.003)		(0.002)	
N	9,902		5,355		4,547	
R-adjusted	0.659		0.669		0.655	
Model 2						
Required education (S^r)	0.099	***	0.093	***	0.099	***
	(0.003)		(0.005)		(0.005)	
Surplus education (S^o)	0.055	***	0.044	***	0.063	***
	(0.005)		(0.006)		(0.007)	
Deficit education (S^u)	-0.045	***	-0.038	***	-0.054	***
	(0.005)		(0.006)		(0.007)	
N	9,902		5,355		4,547	
R-adjusted	0.673		0.670		0.681	

---

[6] In terms of undereducation, the results are the mirror of the overeducation determinants which are discussed here.

Robust standard error in italics
*, **, and *** respectively 0.1, 0.05 and 0.01

In model 2, we present the ORU specification, the results show that the rate of return to required education is nearly 10% and the returns are slightly higher for females than for males (10% against 9%). The return to surplus education (S^o) is found to be positive and highly significant at the 1% level. Other factors being equal, for each year of surplus schooling there is an increase of an individual's hourly earnings by 5.5%, though, the returns are lower than the returns to required education (5.5% against 10%). This means that workers who are working in occupations that demand less schooling than they actually have (overeducated) get higher wages than their co-workers (6%) but lower wages than workers with similar levels of schooling who work in jobs in which their schooling equals what is required. By gender, the return to surplus education is considerably greater for females than for males (6.3% against 4.4%). The coefficient of deficit schooling is negative and significant at the 1% level meaning that undereducated receive lower wages than their co-workers but get more than workers with the same level of schooling who work in jobs that require their level of schooling.

From Table 5, the earnings do not seem to be decided exclusively on the basis of actual schooling attained (Model 1). Instead, earnings are determined by how workers are assigned to their jobs as shown in Model 2. These findings are in line with Hartog and Oosterbeek (1988), Alba-Ramirez (1993), Groot (1996); Kiker et al. (1997) and Sloane et al. (1999). This implies that the rate of return to education depends on the allocation of skills over jobs where workers found are not randomly distributed, instead there are based on the choices made to maximise their income.

CONCLUSIONS

This paper is an attempt to fill a gap in the existing studies on over-education by examining the incidence, determinants, and effects of over-education in the context of a developing country such as Malaysia. We have at our disposal a unique workplace dataset that contains information on required education to do the job.

Using the workers' own self assessment, we find whilst the majority of workers in the manufacturing sector are in well-matched jobs, overeducation accounted for about 19% of the sample and nearly one-third of our sample is undereducated. We then explored why a large of proportion of workers managed to get a well-matched job whilst others did not. Results from the multinomial logit suggest that the overeducated not only lacked work experience and on-the-job training but also lacked soft skills particularly English communication, leadership and creativity skills. Moreover, the overeducation incidence is not only influenced by individuals' characteristics but also the characteristics of firms such as workforce composition, firm size, hiring practices and workplace training facilities. With respect to earnings outcomes, the findings suggest that overeducation resulted in earnings penalty. The ORU model shows that although returns to surplus education are positive (S^o), the returns are lower than the returns to required education (S^r). Holding other factors constant, workers who are working in occupations that demand less schooling than they actually have (overeducated) get higher wages than their co-workers, approximately about 6% but lower wages than

workers with similar levels of schooling who work in jobs in which their schooling equals what is required, about 10%. For policy implication, the phenomenon of overeducation in the labour market might affect the government's initiative to move towards high-income country (NEAC, 2009) as it reduces the workers' productivity by reducing their earnings.

REFERENCES

Alba-Ramírez, A. (1993). Mismatch in the Spanish labor market: Overeducation? *The Journal of Human Resources, 28*(2), 259-278.

Allen, J., & van der Velden, R. (2001). Educational mismatches versus skill mismatches: Effects on wages, job satisfaction, and on-the-job search. *Oxford Economic Papers, 53*(3), 434-452.

Battu, H. & Sloane, P.J. (2004). Overeducation and Ethnic Minorities in Britain. *The Manchester School, 72*(4), 535–559.

Becker, G. (1964). *Human capital: A theoretical and empirical analysis with special reference to education*. New York: Columbia University Press.

Belfield, C. (2010). Over-education: What influence does the workplace have? *Economics of Education Review, 29*(2), 236-245.

Cheong, K. C., Selvaratnam, V., & Goh, K. M. (2011). 'Education and human capital formation'. In Rasiah, R. (Ed.), *Malaysian economy: Unfolding growth and social change.* Kuala Lumpur: Oxford University Press.

Chevalier, A., & Lindley, J. (2009). Overeducation and the skills of UK graduates. *Journal of the Royal Statistical Society. Series A: Statistics in Society, 172*(2), 307-337.

Gallup, J. L. (1997). Ethnicity and earnings in Malaysia. HIID Development Discussion Paper No. 593, 1997.

Groot, W. (1996). The incidence of, and returns to overeducation in the UK. *Applied Economics, 28*(10), 1345-1350.

Hartog, J., & Oosterbeek, H. (1988). Education, allocation and earnings in the Netherlands: 0verschooling? *Economics of Education Review, 7*(2), 185-194.

Hartog, J. (2000). Over-education and earnings: Where are we, where should we go? *Economics of Education Review, 19*(2), 131-147.

Hodges-Aeberhard, J. & Raskin, C. (1997). *Affirmative action in the employment of ethnic minorities and persons with disabilities*. Geneva: International Labour Office.

Kiker, B. F., Santos, M. C., & De Oliveira, M. (1997). Overeducation and undereducation: Evidence for Portugal. *Economics of Education Review, 16*(2), 111-125.

Mehta, A., Felipe, J., Quising, P., & Camingue, S. (2011). Overeducation in developing economies: How can we test for it, and what does it mean? *Economics of Education Review, 30*(6), 1334–1347.

National Economic Advisory Council (NEAC). (2009). *New economic model*. Kuala Lumpur: Percetakan Nasional Berhad.

Sattinger, M. (1993). Assignment models of the distribution of earnings. *Journal of Economic Literature, 31*(2), 831-880.

Shafii, Z., Abidin, N. Z., & Ahmad, A. R. (2009). Ethnic heterogeneity in the Malaysian economy: a special reference to the ethnic group participation in financial planning activities. *The Journal of International Social Research. 2*(*8*), 394-401.

Sicherman, N., & Galor, O. (1990). A theory of career mobility. *The Journal of Political Economy, 98*(1), 169-192.

Sloane, P. J., Battu, H., & Seaman, P. T. (1999). Overeducation, undereducation and the British labour market. *Applied Economics, 31*(11), 1437-1453.

Thurow, L. C. (1975). *Generating inequality: Mechanism of distribution in the U.S. economy*. New York: Basic Book Inc.

United Nation Development Programme (UNDP) (2009). *Human development report.* New York: UNDP.

World Bank.(2009). *Malaysia productivity and investment climate assessment update.* No. 49137-MY. Washington, DC: The World Bank.