

# **OVEREDUCATION AND HAPPINESS IN THE MALAYSIAN GRADUATE LABOUR MARKET**

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## **ABSTRACT**

The objective of this paper is to examine overeducation among Malaysian graduates with focus on its association with predetermined (before they enter the labour market) and current level of overall life happiness. Results reveal that there are a substantial percentage of overeducated graduates. Graduates who reported a higher level of predetermined happiness are less likely to be overeducated. Overeducation is also significantly and negatively associated with one's current level of happiness. This finding suggests 'hysterias' of overeducation and supports Job Competition Theory's prediction on persistent of overeducation. Thus, happiness might be one of the reasons why overeducation is a persistent and durable phenomenon.

**Keywords:** Overeducation; happiness; graduate labour market; 'hysterias' of overeducation.

## **1. INTRODUCTION**

During the last one-decade, we have witnessed a rapid development in Malaysian university education sector. According to the Ministry of Higher Education of Malaysia, total enrolment in Malaysian Higher Education Provider has increased substantially from 664,402 (year 2002) to 1,134,134 (year 2010). Indeed, for developing countries such as Malaysia, higher education is an important element to achieve sustainable economic growth.

The skilled labour that produced by higher education sector is believe to be capable of initiating research and development activities, which in turn will lead to more innovations in increasing productivity. Individually, higher education is a 'ticket' that promise an economic success and a 'ladder' for those less-privileged to move to middle class. Thus, investment in higher education, either by individual or government, is expected to yield high return.

Nevertheless, this return on higher education can be constrained by the incidence of overeducation – a situation where a graduate works in employment not commensurate with his/her qualifications (such as clerk and factory operator). Overeducation implies

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underutilisation of a nation's valuable human resources and one's university qualification (which also implies a low return on one's human capital investment). Overeducation also impedes government efforts on improving the socio-economic status of those less privileged through higher education. Empirically, overeducation has been found to be a persistent and durable phenomenon (Chevalier, 2000; Battu, Belfield and Sloane, 2000).

Since the financial crisis of 1997, the Malaysian economy has experiencing a persistent and increasing problem of graduate unemployment. Various studies have been conducted to studies the determinants of graduate unemployment. For instance, Lim & Normizan (2004) reported that around twenty per cent of the Malaysian graduates were in full-time employment that is not commensurate with qualification (overeducated). This amount is equal to those who obtained full-time employment that is commensurate with qualification. Similarly, Lim (2011) found that around twenty six per cent of the Malaysian graduates were overeducated and this amount is larger than those who are unemployed (around twenty three per cent). This highlights the problem of overeducated graduates can be prominent as unemployed graduates.

However, issue of graduate overeducation which is as important as graduate unemployment, has been largely ignored in the literature of Malaysian graduate unemployment. Similarly, despite enormous amount of research on relationship between unemployment and happiness, it appears that association between overeducation and happiness is yet to be measured. To fill the gap, this paper aims to study the determinants of graduate overeducation with focus on its association with overall life happiness.

As claimed by Gottschalk & Hansen (2003), relatively, the issue of overeducated workers has not gaining appropriate attentions in the economics literature. This might due to the difficulties in defining and measuring which jobs are non-graduate jobs and also the availability of data. There are three measurements of overeducation – external assessment method using expert job analysts, statistical method using mean and standard deviation for year of schooling, and self-assessment method using worker's self-assessment (Dolton and Silles, 2001).

These three measurements have their own strengths and weaknesses. As described by Chevalier (2000), the self-assessment method, which compares one's education to self-assessed qualification required to perform his/her job, can provide a precise measure of overeducation. But, it is subject to self-reporting bias. On the other hand, the external assessment method which uses expert assessment, such as Dictionary of Occupational Titles of the US Employment Service to ascertain educational requirements of a job, avoids self-reporting bias. But, it might be out-of-date. The statistical method classifies one as overeducated if one's education level is one standard deviation (an *ad hoc* value) above the mean (or mode) education level of an occupation. This method is described by Chevalier (2000) as the least desirable.

Battu, Belfield and Sloane (2000) compared these three measurements of overeducation. They found evidence of measurement inconstancy. Overeducation is found to be sustainable and persistent over time, regardless of types of measurement used. Verheast and Omeij (2006) examined effects of different measurement of overeducation on job satisfaction, mobility, training participation and wage. Effects of overeducation (from the worker's viewpoint)

on job satisfaction are found to have significant and negative impact, across all different measurements.

In the present paper, the overeducation measurement is graduate's self-assessment. If the graduate believes that the job that he/she currently has does not require a degree qualification, then this graduate is considered as overeducated and vice versa. Due to data limitation, this paper is not able to analyse any potential bias that might exist due to choice of measurement. Nevertheless, as overeducation measurement is found to be robust (to different types of measurement) on its persistency and effect on job satisfaction, this bias should be at its minimal.

Relating to the measurement of happiness, one of the popular methods is a single-item global measurement of self-reported happiness that typically asks, "In general, how happy are you at present with your life as a whole?" Easterlin (2001) provides a brief review on happiness measurement. It is concluded that single-item measurements do reflect the respondent's subjective happiness. Ng (2003) also reviews the comparability and validity of the subjective measurement of happiness. It is found that the self-reported single item happiness has remarkable correlation with other measurements of happiness including objective, physical and multiple-item. Similarly, in the field of marketing research, single-item measures are found to have equally high predictive validity as multiple-item measures (Bergkvist and Rossiter, 2007). Thus, the single-item measurement of overall life happiness is used in the present paper.

Since the 1990, due to the increasing supply of graduates in the countries such as United States, United Kingdom and Singapore, there is a scepticism that the over supply of graduates has forced significant amount of graduates to take up non-graduate jobs (Hecker, 1992; Tamsin & Harvey, 2004; Appold, 2005). However, some studies have rejected this scepticism. For instance, Gottschalk & Hansen (2003) and Cardoso (2007).

The study by Cardoso (2007) is of particular interesting, especially for Malaysia – it investigated the issue of over-educated graduates in Portugal that faces growing university enrollment and increasing graduate unemployment problem, as Malaysia. Cardoso (2007) concluded that there is no evidence of increasing graduates in non-graduate jobs over the time period of 1986 to 1999. This finding is robust to different job classification of university and non-university jobs. The estimated model of Cardoso (2007) also suggested that the female is more likely to hold a non-graduate job. However, some studies such as Dolton & Silles (2008) and Hung (2008), found that male is more likely to be overeducated.

The other suggested significant determinants of overeducation are types of degree, academic attainment, family background and some socio-demographic variables (Frenette, 2004; Dolton & Silles, 2008; Hung, 2008; Patrinos, 1997; Green, Kler & Leeves, 2007). This highlights that, similar to the problem of graduate unemployment, the problem of over-educated graduate, is not burdened equally across the graduates.

From the theoretical perspective, Human Capital Model (Becker, 1964; Mincer, 1974) and Job Competition theory (Thurow, 1976) provide explanation on existence of overeducation. According to Human Capital Model, an individual's investment in education is motivated by

returns to education. If overeducation exists in labour market, the return to education drops. As a consequence, supply of skilled labour reduces and the return to education will rise back to the equilibrium level. As such, Human Capital Model predicts that overeducation is a short run problem.

On the other hand, Job Competition theory suggests that there are two queues in labour market. First, job queue which ranks job by its earnings. Second, labour queue which ranks the persons by their education level. Persons in the top of labour queue signal their high ability and thus, low training costs. Persons in the top of the queue will be matched into the top jobs in job queue. Thus, to compete in labour market, individuals have to invest on education or they will be “crowded” out from the high earning jobs. This suggests that overeducation could lead to more overeducation. Unlike Human Capital, Job Competition theory predicts that overeducation is a long run problem. Thus, it is important to test these two theories in the context of Malaysian graduates labour market.

In terms of happiness, unemployment is found to have a negative impact on one’s happiness. This negative impact of unemployment (coined as negative psychological impact of unemployment) is even found larger than some life-change events like divorce or marital separation (Clark & Oswald, 1994) and having bad health (Winkelmann & Winkelmann, 1998). In Malaysia, this negative impact of unemployment is also found (Morshidi Sirat, *et al.*, 2004; Lim, 2008b). Some empirical studies have confirmed that there is a negative association between overeducation and job satisfaction. For example, using a sample of Flemish school leavers, Verheest and Omey (2008) found that overeducation has significant and negative impact on job satisfaction and thus they concluded that overeducation is largely involuntary. Thus, negative association between happiness and unemployment is clearly established in literature. The question that follows is: what is the association between overeducation and happiness?

The remainder of this paper is organized as follows. The second section presents data and methodology. Result and findings of this paper are discussed in section three. The fourth section concludes the findings.

## 2. DATA AND METHODOLOGY

### 2.1. Data

The data was collected through two questionnaires surveys. The targeted population was the final year students in Universiti Utara Malaysia (UUM) and Universiti Tunku Abdul Rahman (UTAR) on year 2005. The participation was voluntary. The first survey was conducted from July 2005 to March 2006 (graduates were in their final year studies). Variables that measured in first survey provide a set of pre-determined independent variables.

The second survey was conducted from November 2006 to January 2007, after the graduates had been in labour market for at least six months. The two surveys produced a longitudinal data of 154 employed graduates with 308 observations. The employed graduates were asked whether the employment obtained is commensurate with their qualification or not. Those who

perceived their employment obtained as not commensurate with qualification is considered as overeducated.

The overall life happiness is measured (first and second survey) using one item: “In general, how happy are you at present with your life as a whole?”, using a likert-like scale ranges from 1 being very unhappy to 7 being very happy. This is a typical measurement of overall life happiness in literature (Lim, 2008a).

## 2.2. Methodology

Assume that for each employed graduates, there is a latent variable that represent his or her tendency to be overeducated. This overeducated tendency is associated with individual characteristics of the graduate ( $x_i$ ). Let  $y^*$  represent this latent variable and assume that  $y^*$  is a linear function of  $x_i$ , then,

$$y_i^* = \sum_{i=1}^n \beta X_i + \mu_i \quad \dots(1)$$

where

$y^*$  = the unobserved tendency to be overeducated

$x$  = the individual characteristics

$u$  = the error term

If  $y$  is the random variable that represent the observed outcomes,  $j$ , of the graduate, where  $j=1$  if overeducated,  $j=0$  if otherwise. Assume that the error term follows a normal distribution, we have the probit model. The probability of overeducated can be specified as below:

$$\begin{aligned} Prob(y = 1 | x) &= Prob(y^* > 0) \\ &= Prob(\beta x + u > 0) = Prob(u > -\beta x) \\ &= Prob(u < \beta x) = \Lambda(\beta x) \end{aligned}$$

## 3. RESULTS AND ANALYSIS

### 3.1. Descriptive statistics: sample characteristics

Table 1 presents the sample characteristics of the first survey. First survey solicits information about age, gender, ethnic group, types of university, hometown, car driving licence, and other socio-demographic variables (as listed in Table 1). These variables are predetermined (i.e., measured before graduates entered the labour market).

Table 1 shows that females dominate the sample (70.13%). This reflects the well-known population characteristic: most undergraduate students in Malaysia are female. Graduates have a mean age of 23.46 years. Other sample characteristics of the first survey are presented in Table 1. Appendix 1 provides further details about the definition and measurement of these variables.

**Table 1:** Sample characteristics (first survey)

<b>Categorical variable</b>	<b>Category</b>	<b>%</b>
<i>Gender:</i>	Female	70.13
	Male	29.87
<i>Ethnic group:</i>	Non-Malay	77.92
	Malay	22.08
<i>University:</i>	UUM	68.83
	UTAR	31.17
<i>Home town (rural):</i>	No	43.51
	Yes	56.49
<i>Car driving licence:</i>	No	13.64
	Yes	86.36
<i>Father economically inactive:</i>	No	90.67
	Yes	9.33
<i>Mother economically inactive:</i>	No	40.41
	Yes	59.59
<i>Work during uni vacation:</i>	No	34.64
	Yes	65.36
<i>Practicum/ind training:</i>	No	51.03
	Yes	48.97
<i>Types of degree:</i>		
UUM:	Economics	9.09
	Public Mgt	3.25
	Business Admin	11.04
	Accounting	9.74
	Communication	4.55
	Info Technology	6.49
	Others <sup>1</sup>	6.49
	HumanRes/SocW	5.19
	International Bus	5.84
	Finance/banking	7.14
UTAR:	Business Admin	9.09
	Accounting	11.04
	IT/Comp Sciences	5.84

**Table 1:** Sample characteristics (first survey) (*cont*)

Categorical variable	Category	%
Continuous variables	Mean	Std Deviation
Age	23.46	1.71
Health	4.42	0.98
Father's education level <sup>3</sup>	4.21	1.79
Mother's education level <sup>3</sup>	3.91	1.75
Family size	6.04	1.66
Self-perceived marketability	4.52	1.17
Happiness (predetermined)	4.96	1.09

- Notes:** 1. UUM Others: Tourism/Education/Technology Management/Decision Sciences  
 2. UTAR Others: Chinese Studies/Journalism /Public Relations  
 3. Education level of parent is measured on ordinal scale from 1 (no formal schooling) to 7 A level). See Appendix 1. Treated as continuous variable, where mean of 4.21 implies father education level of 'not completed secondary school'.  
 4. Please refer to Appendix 1 for definition and measurement of these variables.  
 5. For follow-up survey (second survey), personal information (name, contact number, email and postal address) are solicited as well as in first survey.

Table 2 presents information (solicited in second survey) about overeducation, happiness (current), training for job interview/search, sharing of labour market information, CGPA, unemployment duration and financial difficulties faced while unemployed.

**Table 2:** Sample characteristics (second survey)

Categorical variables	Category	%
Training for job interview/search:	No	79.22
	Yes	20.78
Sharing labour market information:	No	1.99
	Yes	87.01
Overeducation	No	59.09
	Yes	40.91
Non-categorical variables	Mean	Std Deviation
CGPA	3.08	0.28
Happiness (current)	4.56	1.57
Unemployment duration	56.83	53.05
Job application submitted	15.16	20.45
Financial difficulties	2.90	1.17

- Notes:** Please refer to Appendix 1 for explanation on definition and measurement of these variables.

From Table 2, it is found that there is low variation among the employed graduates regarding their CGPA. Nevertheless, there is large variation in their duration of unemployment and number of job application submitted. Other sample characteristics of the second survey are presented in Table 2. Appendix 1 provides further details about the definition and measurement of these variables.

### 3.2. Descriptive statistics: overeducation and happiness

Table 3 summarises descriptive statistics on overeducation and overall life happiness (predetermined and current). From Table 3, it is found that around a quarter (40.91%) of the employed graduates are overeducated, i.e., in employment not commensurate with their qualification. This number is considerably higher in comparison to other countries, such as 16% of Greek graduates, around 30% of Canadian graduates and 32.3% of Northern Ireland graduates (Patrinos, 1997; Frenette, 2004; McGuinness and Bennett, 2007); however, it is lower than UK graduates (42.7%) and Taiwan graduates (45%) (Dolton and Silles, 2008; Hung, 2008).

**Table 3:** Overeducation and overall life happiness

Variable	%	
<i>Overeducation</i>	Yes	40.91
	No	59.09
	<b>Overall life Mean</b>	<b>Happiness (predetermined) Std Deviation</b>
<i>Overeducated: Yes</i>	4.81	0.94
<i>No</i>	5.14	1.10
	<b>Overall life Mean</b>	<b>Happiness (current) Std Deviation</b>
<i>Overeducated: Yes</i>	4.29	1.67
<i>No</i>	5.10	1.33

Relating to the overall life happiness (predetermined, measured before occurrence of overeducation), as predicted by the ‘hypothesis of selection’, predetermined happiness and overeducation are negatively associated: the mean happiness of overeducated graduates (4.81) is lower than that of adequately educated graduates (5.14). A similar result is also found between current happiness and overeducation, as predicted by the ‘hypothesis of exposure’.

In short, results of descriptive statistics show that there is a substantial percentage of overeducated graduates. Overall life happiness, either predetermined or current, is negatively associated with overeducation.

### 3.3. Estimated Probit Model

Table 4 presents the estimated probit model. Model I is the estimated model with control variables, whereas Model II is the estimated model without any control variables. Footnote 3-6 of Table 4 summarises various tests on goodness of fit of the estimated model (Model I). Overall fit tests on null hypothesis of all covariates' coefficients being zero jointly are found significant at the 1% level. The estimated model has percentage correctly predicted (85.59%), substantially higher than the naïve model using sample proportion (51.65%). To evaluate the influence of multicollinearity, all insignificant independent variables (as found by t-test) are tested for joint insignificance. It is found that they are also jointly insignificant with p-value of 0.9763. The general specification test shows no evidence of specification error on the estimated model. Thus, it is concluded that this estimated probit model has high goodness of fit statistically.

**Table 4:** Estimated probit model

Variable	Model I Coefficient	Model II Coefficient
<b>HAPPINESS</b>		
Happiness (predetermined)	-0.3020(0.1495)**	-0.1989(0.0955)**
<b>OTHER CONTROL VARIABLES</b>		
<i>Types of degree:</i>		
UUM Economics	2.1941(0.9635)**	-
UUM Public Mgt	2.3317(0.9453)**	-
UUM Business Admin	2.5106(0.9442)***	-
UUM Info Technology	1.1513(0.9749)	-
UUM Others	1.0413(0.7919)	-
UUM HumanRes/SocWork	-1.3216(1.2597)	-
UUM International Business	1.4463(0.8054)*	-
UUM Finance	1.7977(0.8888)**	-
UTAR Business Admin	-2.1071(0.9383)**	-
UTAR Accounting	-0.6386(0.8564)	-
UTAR IT/Computer Sciences	0.1888(1.0569)	-

**Table 4:** Estimated probit model (*cont*)

Variable	Model I Coefficient	Model II Coefficient
<b><i>Family background:</i></b>		
Father economically inactive	1.0737(0.5922)*	-
Father education level	-0.0831(0.1242)	-
Mother economically inactive	-0.0808(0.3651)	-
Mother education level	-0.0877(0.1433)	-
Family size	0.2443(0.1292)*	-
<b><i>Other variables:</i></b>		
Age	0.2002(0.1803)	-
Male	0.1764(0.3897)	-
Malay	2.3878(0.8201)***	-
Health	-0.0927(0.1749)	-
Rural	0.1621(0.3482)	-
Car driving licence	-0.7233(0.7332)	-
CGPA	0.1199(0.6558)	-
UTAR	2.4279(1.1124)**	-
Unemployment duration	0.0212(0.0071)***	-
Unemployment duration <sup>2</sup>	-0.0001(0.0000)***	-
Job application	-0.1024(0.0323)***	-
Job application <sup>2</sup>	0.0014(0.0004)***	-
Training	-0.4254	-
Share information	-0.9886(0.5023)**	-
Degree marketability	-0.4203(0.1962)**	-
Work during uni vacation	0.0466(0.3790)	-
Practicum	-0.5829(0.4923)	-
Financial difficulties	-0.1461(0.4470)	-
Financial difficulties <sup>2</sup>	0.0266(0.0779)	-
Constant	-2.3737(5.0493)	0.7500(0.4906)

- Notes:**
1. \*\*\*, \*\*, and \* significant at 1%, 5%, and 10% levels, respectively
  2. See Appendix 1 for definition and measurement of variables.
  3. Overall goodness of fit test (Wald test) significant at 1% level, with pseudo R<sup>2</sup> of 0.4405.
  4. Overall percentage correctly predicted of estimated model is 85.59%. Overall percentage correctly predicted using naïve model of actual sample proportions is 51.65%.
  5. Restriction test (on all insignificant independent variables) insignificant with p-value of 0.9763.
  6. General specification test found no evidence of wrong functional form at 5% level with p-value of 0.3541.
  7. Value in parenthesis represents estimated robust standard error.

From Table 4, either Model I or II, happiness (predetermined) is found to be a significant determinant on a graduate's probability of being overeducated. Results reveal that graduates who are happier in their overall life happiness (predetermined) tend to have lower probability of being overeducated. Since this overall life happiness is pre-determined, we might conclude that statistically being happy reduces one's chances of being overeducated. Thus, there is clear negative and significant impact of predetermined happiness (with or without control variables). This finding is as expected and the 'hypothesis of selection' is supported empirically.

Quantitatively, for Model II (without control variables), one unit increase in happiness (7-point ordinal scale) will reduce the probability of being overeducated by 7.7% (based on the estimated marginal effect); whereas, on controlling the influence of other variables (Model I), this impact (of one unit increase in happiness) is increased to 11.37% (based on the estimated marginal effect). Thus, in terms of magnitude, controlling the influence of other variables is imperative.

To test the 'hypothesis of exposure', i.e., to ascertain the association between overeducation and current happiness, a two-population independent t-test was performed. Results of two-population independent t-test are presented in Table 5.

**Table 5:** Two-population independent t-test

	Happiness (current)	
	Mean	Std Error
Adequately educated	5.10	0.14
Overeducated	4.29	0.21
Mean difference (p-value = 0.0012)	0.81	0.24

From Table 5, it is found that the mean of current happiness for overeducated graduates (4.29) is significantly lower than for those who are adequately educated (5.10), with p-value of 0.0012. It is clear that overeducation and current happiness are negatively associated, such that those who are overeducated have a lower mean of current happiness. Thus, the 'hypothesis of exposure' is supported empirically.

Combining results from Table 4 (on negative effect of predetermined happiness on overeducation) and Table 5 (on negative association between current happiness and overeducation), one might conclude that those with low level of predetermined happiness tends to be overeducated and this overeducation is likely to be prolonged due to low level of current happiness (overeducation is associated with low level of current happiness). Thus, overeducation is found to be a persistent phenomena ('hysteria' of overeducation).

From Table 4, in line with the findings of previous studies on graduate employment performance indicator (see Lim, 2007), the present paper found that types of degree have significant influence on graduate incidence of overeducation. This is in line with the predictions of job mismatch and human capital model. Graduates with an economically inactive father (Father economically inactive) are also found to have higher probability of being overeducated. In terms of ethnic group, compared to non-Malay graduates, Malay graduates are found to have higher probability of being overeducated. Graduates who are sharing labour market information among friends are less likely to be overeducated.

#### 4. CONCLUSION

It is found that there are substantial numbers of overeducated graduates and significant association between overeducation and happiness. The predetermined and current levels of happiness are found to be significantly and negatively related to incidence of overeducation. This finding has two important implications. First, it suggests that overeducation has an adverse effect on one's happiness and this calls for an immediate attention to issues of overeducation which is largely ignored in the Malaysian society.

Second, *ceteris paribus*, overeducation can be a long run phenomenon, because of its negative association with predetermined and current level of happiness. Imagine a graduate's life cycle: a graduate who has a low level of happiness before entering the labour market is likely to be overeducated ('hypothesis of selection' supported). Then, this incidence of overeducation will reduce his/her current happiness ('hypothesis of exposure' supported). In turn, this reduction in current happiness will strengthen the probability of being overeducated. The process goes on and thus, 'hysterias' of overeducation emerge (similar to the well known unemployment hysterias in economics literature). Influence of happiness, as predicted by the 'hypothesis of selection' and 'hypothesis of exposure', might thus offer a partial explanation on persistent and durable overeducation observed by previous studies. In this context, this paper provides empirical evidence which supports the Job Competition theory – overeducation could be a long run problem.

Overeducated workers might appear beneficial to employers. For instance, employers are employing a graduate as clerk in their companies. However, in long run, overeducated workers tend to be unhappy workers. Unhappy workers are more likely to leave their jobs, or even if they are not leaving, their motivation and productivity will be at a low level. Thus, overeducated workers could bring negative impacts to employers. It is suggested that on the job trainings to be provided for overeducated workers for job promotions.

The significant influences of 'father being economically active in labour market' and 'sharing of labour market information', highlight that access to labour market information is imperative to avoid overeducation. Hence, it is suggested that government policy on helping graduates to get employment commensurate with their qualification should focus on efficiency of disseminating labour market information. On the other hand, the finding that Malay graduates are most vulnerable to incidence of overeducation also indicates that to reduce this,

understanding of issues faced by Malay graduates needs to be addressed. Future research is suggested to investigate further this contention.

The estimated probit model suggests that the group at high risk of being overeducated are those Malay, non-accounting UTAR graduates, from large sized families with an economically inactive father, having a low level of life happiness, enduring longer duration unemployment and submitting more job applications, with perceived low marketability of the degree studied, and those who do not share labour market information among friends.

There are some caveats on the findings of this paper and suggestions for future research. Firstly, the panel data used consist of only two surveys, with measurement of overeducation only in the second survey. Thus, we were not able to control and examine the influences of unobserved heterogeneity. Future research is suggested to explore this dimension. Secondly, the data collected were limited to only two universities in Malaysia. It is suggested that future research includes more universities in Malaysia and, in particular, foreign university graduates.

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## APPENDIX

### Appendix 1: Definition and measurement of variables

Variable abbreviation	Definition and measurement
<i>Types of degree:</i>	
UUM Economics	Dummy variable for UUM Economics (comparison group: UUM Accounting)
UUM Public Mgt	Dummy variable for UUM Public Management (comparison group: UUM Accounting)
UUM Business Admin	Dummy variable for UUM Business Admin (comparison group: UUM Accounting)
UUM Info Technology	Dummy variable for UUM Information Technology (comparison group: UUM Accounting)
UUM Others	Dummy variable for UUM Tourism/Edu/TechMgt/Decision Sc (comparison group: UUM Accounting)
UUM HumanRes/ SocWork	Dummy variable for UUM Human Resource/SocWork (comparison group: UUM Accounting)
UUM International Business	Dummy variable for UUM International Business (comparison group: UUM Accounting)
UUM Finance	Dummy variable for UUM Finance/Banking (comparison group: UUM Accounting)
UTAR Business Admin	Dummy variable for UTAR Business Admin (comparison group: UUM Accounting)
UTAR Accounting	Dummy variable for UTAR Accounting (comparison group: UUM Accounting)
UTAR IT/Comuter Sciences	Dummy variable for UUM IT/Computer Sciences (comparison group: UUM Accounting)
<i>Family background:</i>	
Father eco inactive	Dummy variable for father being economically inactive
Father education level	Father's education level: 1=no formal schooling; 2=primary not completed; 3=primary completed; 4=secondary not completed; 5=secondary completed; 6=O level or equivalent; 7=A level and above
Mother eco inactive	Dummy variable for mother being economically inactive
Mother education level	Mother's education level: 1=no formal schooling; 2=primary not completed; 3=primary completed; 4=secondary not completed; 5=secondary completed; 6=O level or equivalent; 7=A level and above
Family size	Family size

**Appendix 1: Definition and measurement of variables (cont)**

<b>Variable abbreviation</b>	<b>Definition and measurement</b>
<i>Other variables:</i>	
Age	Age in years
Male	Dummy variable for being male
Malay	Dummy variable for being ethnic group Malay
Health	Self-reported health condition: ordinal scale from 0 'poor' to 6 'excellent'
Rural	Dummy variable for home town rural
Car driving licence	Dummy variable for having car driving licence BRIT ENGLISH
Happiness	Overall life happiness: ordinal scale from 1 'being very unhappy' to 7 'being very happy'
CGPA	Cumulative Grade Point Average
UTAR	Dummy variable for UTAR graduate (comparison group: UUM graduate)
Unemployment Duration	Unemployment duration (days)
Unemployment Duration <sup>2</sup>	Unemployment duration squared
Job application	Number of job applications submitted
Job application <sup>2</sup>	Job applications squared
Training	Dummy variable for having attended training for job search/interview techniques
Share info	Dummy variable for sharing labour market information among friends
Degree marketability	Self-perceived marketability of degree studied: Ordinal scale: 1 'low marketability' to 7 'high marketability'
Work during uni vacation	Dummy variable for work during university vacations
Practicum	Dummy variable for having practicum /industrial
Financial difficulties	Financial difficulties faced (Ordinal scale: 0 'no fin difficulties' to 6 'high fin difficulties')
Financial difficulties <sup>2</sup>	Financial difficulties squared
Constant	Constant

### Appendix 2: Estimated probit model

Probit estimates	Number of obs =	118
	Wald chi2(36) =	61.95
	Prob > chi2 =	0.0046
Log pseudolikelihood = -44.607498	Pseudo R2 =	0.4405

OVEREDU	Robust			z	P> z	[95% Conf.	Interval]
	Coef.	Std.	Err.				
age	.2001844	.1802755		1.11	0.267	-.1531491	.5535179
Dmale	.1764398	.389704		0.45	0.651	-.5873661	.9402456
DMalay	2.387804	.8200798		2.91	0.004	.7804772	3.995131
health	-.0926578	.1748599		-0.53	0.596	-.4353768	.2500612
DcityO	.162136	.3482191		0.47	0.641	-.5203609	.8446329
licensec	-.7232661	.7332122		-0.99	0.324	-2.160336	.7138034
happyLIF	-.3019937	.1494756		-2.02	0.043	-.5949604	-.0090269
DU_BEc	2.194068	.9635336		2.28	0.023	.3055771	4.082559
DU_PDev	2.331695	.9452604		2.47	0.014	.4790186	4.184371
DU_BBA	2.510566	.9441906		2.66	0.008	.6599866	4.361146
DU_BIT	1.1513	.9749215		1.18	0.238	-.7595108	3.062111
DU_OTH	1.04132	.7919384		1.31	0.189	-.5108508	2.593491
DU_HRSW	-1.321615	1.259715		-1.05	0.294	-3.790611	1.147382
DU_IntBA	1.446297	.8054456		1.80	0.073	-.1323471	3.024941
DU_BFin	1.797722	.8888315		2.02	0.043	.0556437	3.539799
DT_BBA	-2.107061	.938256		-2.25	0.025	-3.946009	-.2681125
DT_ACCT	-.6385897	.8564285		-0.75	0.456	-2.317159	1.039979
DT_ITCS	.1888094	1.056869		0.18	0.858	-1.882616	2.260235
DfempINA	1.073704	.5922269		1.81	0.070	-.0870391	2.234448
fathered1	-.0831301	.1241977		-0.67	0.503	-.3265531	.1602929
DmempINA	-.0808459	.3651414		-0.22	0.825	-.7965098	.634818
mothered1	-.0877431	.1433466		-0.61	0.540	-.3686972	.193211
familysi	.2442965	.1291975		1.89	0.059	-.008926	.4975189
cgpa_b	.1198967	.6557888		0.18	0.855	-1.165426	1.405219
DUTAR	2.427907	1.112361		2.18	0.029	.24772	4.608094
UneDuration	.0212005	.0070667		3.00	0.003	.0073501	.0350509
UneD2	-.0000595	.0000222		-2.68	0.007	-.0001029	-.000016
jobapp	-.1023704	.0322637		-3.17	0.002	-.165606	-.0391348
jobapp2	.0013829	.0004059		3.41	0.001	.0005873	.0021784
trainin	-.4254095	.5271726		-0.81	0.420	-1.458649	.6078297
share	-.9885643	.5023155		-1.97	0.049	-1.973085	-.0040441
market	-.4203456	.1962106		-2.14	0.032	-.8049113	-.0357799
workholi	.0465659	.3790002		0.12	0.902	-.6962609	.7893926
practicu	-.5829131	.4923124		-1.18	0.236	-1.547828	.3820015
financia	-.1460563	.4469701		-0.33	0.744	-1.022102	.7299891
financi2	.0266301	.0779068		0.34	0.732	-.1260644	.1793246
_cons	-2.373651	5.049315		-0.47	0.638	-12.27013	7.522824