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Estimating Psychological Impact of Unemployment: the Case of Malaysian Graduates

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Abstract: The objective of this paper is to estimate the psychological impact of unemployment for a group of 240 Malaysian graduates during their transition from university to labour market. There is evidence of negative psychological impact of unemployment. Results also reveal that treating employment or unemployment as a homogenous state is subject to state aggregation bias.

Keywords: Aggregation bias, graduate unemployment, happiness, psychological impact of unemployment
JEL classification: J64; Z19

1. Introduction

During the past one decade, despite some disagreements on validity, reliability and comparability of happiness measurement, we have witnessed a growing literature on happiness in economic studies. Ng (1997) suggested happiness is the ultimate objective for most people, if not all.

Various determinants of happiness have been identified in the literature. For instance, it is found that income, employment status, age, and marital status are significant determinants (Clark and Oswald 1994; Winkelmann and Winkelmann 1998; Easterlin 2001; Blanchflower and Oswald 2004). One of the most consistent findings in happiness studies is the negative psychological impact of unemployment. This finding is of particular importance because it highlights the cost of unemployment to be much larger due to this non pecuniary cost, in addition to the pecuniary cost.

The negative psychological impact of unemployment is found to be greater than some life-change events such as divorce or marital separation (Clark and Oswald 1994), and having bad health (Winkelmann and Winkelmann 1998). Winkelmann and Winkelmann (1998) segregated the cost of unemployment into a pecuniary cost (reduction in household income) and a non pecuniary cost (reduction in life happiness). They found that non pecuniary cost is larger than pecuniary cost.

Using cross-section data on Malaysian graduates, Morshidi *et al*. (2004) observed that the mean scores of negative psychological attributes (such as being sad, feeling worried and thinking negatively) for unemployed graduates are higher than for employed graduates. Frey and Stutzer (2002) classified the happiness determinants into five categories: personality factors, socio-demographic factors, economics factors, contextual and situational factors,

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and institutional factors. Employment status is one of the main determinants of happiness. Unemployment is suggested to have a negative impact on one's happiness by Frey and Stutzer (2002).

Thus, the negative psychological impact of unemployment is clearly established in the literature. The questions that follow are: What is the psychological impact of unemployment for fresh graduates who are in their transition from university to labour market? Will gaining employment improve one's life happiness regardless of types of employment? Is there any aggregation bias on estimating the effects of employment status towards happiness? These are the research questions that the present study will attempt to examine.

In evaluating the psychological impact of unemployment, binary aggregation of employment status into 'unemployed' against 'employed' is subject to aggregation bias. It is possible that employment status at a disaggregated level has a different psychological impact. For instance, for those who are economically inactive (those who withdrew from the labour force due to disappointment or discouraged worker effect), the psychological impact might differ from being unemployed. To quote Dockery (2003: 1), "*…it is dangerous to treat 'employment' as a homogenous, alternative state to unemployment*."

Hence, the psychological impact of unemployment ought to be evaluated at a disaggregated level of employment status, such as unemployed, economically inactive, part-time employment, self-employment, and full-time employment that commensurate or does not commensurate with qualification. Indeed, it is imperative to compare the psychological impact of the different employment status. The evaluation that is based only on binary aggregation of 'unemployed' and 'employed', is subjected to aggregation bias (Edin 1989; Lim 2007).

Furthermore, the graduates know that upon completing their studies, they will enter into a phase of unemployment. Their expectation on the duration of unemployment might be different. For example, given two graduates with similar unemployment duration of 8 months, if the first and second graduate expect their unemployment duration to be 2 and 7 months respectively, the negative psychological impact for the first graduate is expected to be higher than the second graduate, *ceteris paribus*. Thus, expectation may play an important role in determining the psychological impact of unemployment.

In addition, happiness is expected to decline with the increase in actual unemployment duration. Empirically, this negative duration dependency is substantiated by past findings (for example, Clark and Osward 1994; Lucas *et al.* 2004)). In short, the graduates' observed individual heterogeneities including self-expected and actual unemployment duration, and use of disaggregated employment status, are important considerations in estimating the psychological impact of unemployment.

Morshidi *et al*. (2004) appears to have carried out the only study focusing on the psychological impact of unemployment for Malaysian graduates. However, their binary aggregation of employment status (employed versus unemployed) has subject their findings to aggregation bias.

This paper consists of four sections. Section 1 which contains the introduction includes a brief literature review on happiness and aggregation problem. Section 2 presents the data and methodology. The analysis and finding are discussed in Sections 3 and 4. The final section concludes the findings of this paper.

2. Data and Methodology

2.1 Data

The present study used panel data that comprise 240 respondents from two surveys. The first survey was implemented from July 2005 to March 2006 targeting final year students from Universiti Utara Malaysia (UUM) and Universiti Tunku Abdul Rahman (UTAR). A total of 430 responses (304 from UUM and 126 from UTAR) were collected. Targeting these 430 respondents, the second survey was implemented from November 2006 to February 2007 which obtained 240 returned questionnaires.

The overall life happiness measured during the second survey using one question that asked, 'In general, how happy are you at present with your life as a whole?' It was followed by a Likert-like rating scale ranging from '1' being very unhappy to '7' being very happy. This is a typical measurement of life happiness adopted in previous literature (Lim 2008).

2.2 Methodology

Following the latent variable framework of Blanchflower and Oswald (2004) which assumed that for each graduate, there is a latent variable which represents his or her underlying happiness. This latent variable is associated with individual characteristics of the graduate which are obtained at first and second surveys (X_i). Let Y^* represents this latent variable and assume that Y^* is a linear function of X_i, thus

$$Y_i^* = \beta X_i + u_i \tag{1}$$

where

Y_i^* = underlying change in happiness (unobservable)
X = independent variables (first and second survey)

The model assumes that the observed happiness (Y) is related to the Y^* (which is unobservable) and also the six boundary parameters (or cut-off points), μ_j, where j=1,2,…,6 and $\mu_1 < \mu_2 < ... \mu_6$. The observed happiness (Y) might take the ordered category of 1,2, …, 7. Then, the value of Y is observed as

$$Y = \begin{cases} 1 \text{ if } -\infty \le Y^* < \mu_1 \\ 2 \text{ if } \mu_1 \le Y^* < \mu_2 \\ 3 \text{ if } \mu_2 \le Y^* < \mu_3 \\ : \\ 7 \text{ if } \mu_6 \le Y^* < \infty \end{cases}$$

Assuming that the error term in the latent equation (1) is logistically distributed, the probability that the graduate 'achieves' the happiness level of J (J=1,2,…,7) is given as:

$$P_{ij} = \begin{cases} \text{Prob}\,(Y_i = 1) = \Lambda\,(\mu_1 - X_i\beta) \\ \text{Prob}\,(Y_i = 2) = \Lambda\,(\mu_2 - X_i\beta) - \Lambda\,(\mu_1 - X_i\beta) \\ \text{Prob}\,(Y_i = 3) = \Lambda\,(\mu_3 - X_i\beta) - \Lambda\,(\mu_2 - X_i\beta) \\ : \\ \text{Prob}\,(Y_i = 7) = 1 - \Lambda\,(\mu_6 - X_i\beta) \end{cases}$$

Λ is the cumulative logistic distribution function. The maximum likelihood parameter estimates (MLE) are obtained by maximising the following log likelihood function:

$$LF(\beta,\mu) = \sum_{i=1}^{240}\sum_{j=1}^{7} z_{ij} \ln(P_{ij}) \quad (2)$$

with respect to β and μ, where z_{ij} is an indicator variable equal to unity if graduate *i* has self-reported rating of happiness of j and zero otherwise. The model will be estimated with the robust variance estimates (Huber/White/sandwich estimator of variance).

3. Results and Analysis I: Descriptive Statistics

Table 1 presents the employment outcomes and mean of happiness. It is found there is substantial percentage of unemployed graduates (25%). About 40.63 per cent of the graduates are in full-time employment commensurate with qualification (FT1). Nearly a third of graduates (28.13%) are in full-time employment not commensurate with qualification (FT2). Less than seven per cent (6.25%) of the graduates are in self and part-time employment (SEPT).

In terms of mean of life happiness, Table 1 illustrates that unemployed graduates have the lowest value (3.96) while employed graduates with FT1 have the highest value (5.10). This implies that unemployment is positively associated with a lower level of life happiness.

The respondents' characteristics and their mean of happiness are presented in Table 2. With respect to the discrete or continuous variables, only two variables are found to have significant correlation with happiness: unemployment duration (-0.20) and financial difficulties faced (-0.28).

Relating to the categorical variables, Christian/Catholic graduates consist of only less than seven per cent (6.73%) of the sample. Nevertheless, their mean value of life happiness is the highest (5.43). The mean value is significantly different from the overall sample mean (4.57). The majority of the respondents are female (72.32%). The mean value of life happiness also differs across different types of degree, from the lowest value of 3.71 (UUM Finance) to 5.24 (UUM and UTAR Business Administration). These mean values are also significantly different from the overall sample mean. The other sample characteristics are shown in Table 2.

Figure 1 presents the estimated 95 per cent confidence interval of life happiness at different lengths of unemployment duration. In general, life happiness decreases over the

Table 1. Employment outcomes and happiness

	%	Mean happiness
Unemployed	25.00	3.96
Full-time employment commensurate with qualification (FT1)	40.63	5.10
Full-time employment not commensurate with qualification (FT2)	28.13	4.29
Self/part-time employment (SEPT)	6.25	4.38

Note: The overall sample mean of happiness is 4.57.

Table 2. Respondents' characteristics and happiness

Discrete/continuous variables	Mean	Correlation with happiness
Self-expected unemployment duration (weeks)	2.48	0.03
Unemployment duration (days)	70.81	-0.20***
Self-perceived marketability of degree studied	4.63	0.07
Financial difficulties faced	2.72	-0.28***
Father's education level	4.32	0.11
Family size	6.31	-0.06
English language proficiency	6.75	0.11
Academic attainment	3.08	-0.04
Age	23.37	0.10
Health	4.34	-0.09
Categorical variables	**%**	**Mean happiness[2]**
Religion		
Islam	34.08	4.53
Buddhism	44.84	4.63
Christianity/Catholic	6.73	5.43*
Others	14.35	4.19
Types of degree		
UUM Economics	8.52	3.88
UUM Public/Development Managment	4.93	4.55
UUM Business Administration	10.76	5.00
UUM Accounting	7.62	5.24**
UUM IT	12.56	4.28
UUM Other degrees	7.62	4.67
UUM Human Resource/Social Work	5.83	3.91
UUM International Business/Issues Management	5.38	4.09
UUM Finance	6.73	3.71*
UUM Communication	4.48	4.20
UTAR Business Administration	7.62	5.24**
UTAR Accounting	8.07	4.83
UTAR IT/Computer Sciences	5.38	4.91
UTAR Other degrees	4.48	5.00
Gender		
Male	27.68	4.75
Female	72.32	4.50
Home town		
Rural	57.59	4.63
Non-rural (big cities and state capitals)	42.41	4.49
Car driving license		
No	21.97	3.98**
Yes	78.03	4.72

Notes:

1. *, **, and *** represent significance at 10%, 5% and 1% levels, respectively.
2. One-sample *t*-tests were performed to test whether these mean happiness were significantly different from the overall sample mean (H_0: $\mu = 4.57$).

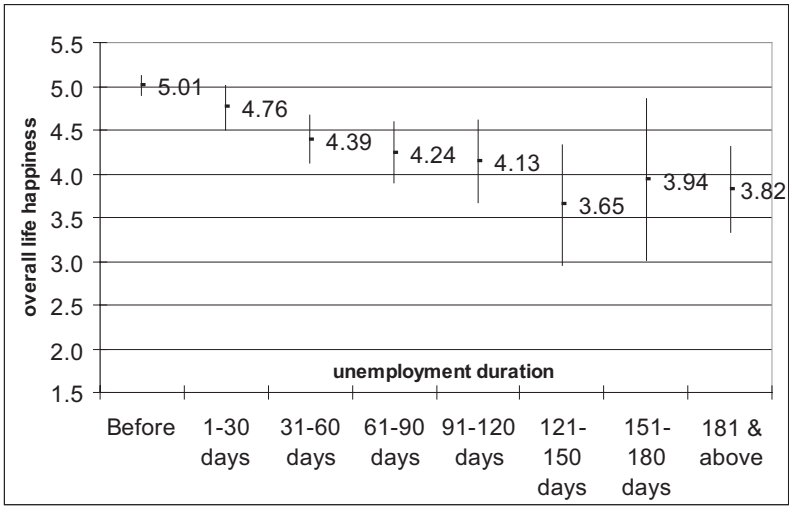

Figure 1: *Unemployment duration and life happiness*

unemployment duration. The lowest value of mean life happiness (3.65) occurs at 121-150 days of being unemployed. The mean happiness drops from 'happy' (more than 4) to 'unhappy' (less than 4) from 121 days of being unemployed and onwards.

4. Results and Analysis II: Ordered Logit Model

4.1 Diagnostics Tests

Table 3 summarises the results of diagnostics tests on goodness-of-fit of the estimated ordered logit model (presented in Table 4).

From Table 3, overall goodness-of-fit (hypothesis null being all the independent variables are insignificant jointly) is found to be significant with a *p*-value of almost zero. Restriction test (restricted the individually insignificant independent variables, at 10 per cent level, being equal to zero jointly) shows that individually insignificant variables are also insignificant jointly, with a *p*-value of 0.4523. Results of the general specification test also indicates no evidence of wrong functional form at 5 per cent significance level (*p*-value of 0.1920).

The overall percentage correctly predicted for the estimated model (36.76%) is found to be higher than the naïve model (19.11%). In terms of order dimensions, five out of the six estimated boundary parameters (μ_s) were found to be significant. In short, there is a good fit between the estimated model with data.

4.2 Estimated Ordered Logit Model

Table 4 presents the estimated ordered logit model. Appendix 1 presents definitions and measurements of the independent variables. Appendix 2 presents the comparison of estimated ordered logit and ordered probit model. High similarities were found among the estimated

Table 3. Goodness-of-fit tests

	Null hypothesis	P-value
1. Likelihood ratio test Test on all independent variables are jointly insignificant	All jointly insignificant	0.0003
2. Restriction test Restricts the 9 independent variables (that found insignificant in *t*-test individually) are jointly insignificant	Jointly insignificant	0.4523
3. General specification test		0.1920
		%
4. Overall percentage correctly predicted (Hit-and-Miss Table) Estimated model Naïve model (use sample proportion)		 36.76 19.11
5. Estimated boundary parameters μ_1 to μ_6		 Significant

standardised coefficients and *p*-values between the ordered logit and ordered probit model, in particular employment status (see Appendix 2).

Based on Table 4, graduates in full-time employment, that is, commensurate with their qualifications (FT1) were found to be happier than the unemployed graduates with odds ratio of 2.47. It is important to note that there are seven levels of happiness. This odds ratio of 2.47 can be interpreted as the odds of getting a self-report happiness rating of 1 (very unhappy) versus the combined happiness rating of 2-7, is 0.41 time[1] smaller for graduates in FT1 than unemployed graduates, *ceteris paribus*.

The proportional assumption of ordered logit model implies that the odds ratio remains similar regardless of the different combinations on the levels of happiness. For instance, we can also interpret this odds ratio of 2.47 as the odds of getting a self-reported happiness rating of 1 and 2 versus the combined happiness rating of 3-7 is 0.41 time smaller for graduates in FT1 than unemployed graduates, *ceteris paribus*. Thus, for simplicity, the present study interprets this odds ratio as the odds of getting happier in life for those in FT1 are 2.47 times greater than those who are unemployed, *ceteris paribus*. Other odds ratios of the present study are also interpreted in a similar vein.

For those who are employed with full-time employment that does not commensurate with their qualifications (FT2), self-employed and part-time employed (SEPT), there seems to be evidence of negative psychological impacts of unemployment. From Table 4, the odds

[1] 1/2.47 = 0.41; see Long (1997: 139).

Table 4. Estimated ordered logit model

Variables	Odds ratio	Std error
Employment status [3a]		
Full-time employment commensurate with qualification (FT1)	2.4740	1.2867*
Full-time employment not commensurate with qualification (FT2)	1.4276	0.7762
Self-employment/part-time employment (SEPT)	1.6211	1.1510
Job search related		
Self-expected unemployment duration (EXPUNE)	0.9451	0.1363
Unemployment duration (UNEDUR)	0.9876	0.0060**
Interaction between EXPUNE and UNEDUR	1.0025	0.0018
Self-perceived marketability of degree studied	0.7932	0.1499
Financial difficulties faced	0.7590	0.0893**
Religion[3b]		
Buddhism	0.3621	0.2156*
Christianity/Catholic	1.6083	1.8216
Other religions	0.2703	0.1767**
Types of degree[3c]		
UUM Public/Development Management	3.5020	2.6658*
UUM Business Administartion	6.3412	4.3326***
UUM Accounting	4.8041	3.7154**
UUM IT	3.5400	2.6381*
UUM Other degrees	4.2971	4.0224
UUM Human Resource/Social Work	2.0528	1.9984
UUM International Business/Issues Management	2.6704	2.1765
UUM Finance	1.6939	1.3873
UUM Communication	1.2170	0.8845
UTAR Business Administration	4.9483	4.3404*
UTAR Accounting	5.3921	4.7526*
UTAR IT/Computer Sciences	5.0689	3.5708**
UTAR Other degrees	5.8297	5.2089**
Family background		
Father's education level	1.1458	0.1102
Family size	1.0540	0.1172
English and academic related		
English language proficiency level	1.1947	0.1370
Academic attainment	1.4938	1.1307
Socio-demographic related		
Age	1.2006	0.1256*
Male	1.3547	0.5252
Health	1.0244	0.1888
Home town: rural	1.6340	0.5475
Car driving license	1.9642	0.7817

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Table 4. continued

Variables	Odds ratio	Std error
Boundary parameters:	Coeff	Std Error
μ_1	3.8752	3.6085
μ_2	4.7839	3.6512*
μ_3	5.7584	3.6359*
μ_4	7.1192	3.6352**
μ_5	8.2887	3.6630**
μ_6	10.3755	3.7577***

Notes:
1. *, **, and *** represent significance at 10%, 5% and 1% levels, respectively.
2. Explanation and measurement of variables are presented in Appendix 1.
3. Comparison group of dummy variables of:
   a. employment status: unemployed
   b. religion: Islam
   c. types of degree: UUM Economics

of having a happier life for those in FT2 and SEPT are higher (1.42 and 1.62 times higher respectively) than those who are unemployed. However, these differences are insignificant.

An alternative model is estimated using FT1 (category with the largest number of respondents) as comparison category (see Appendix 3). It is found that the FT2 and SEPT have lower odds of getting a happier life than FT1. However, these differences are also insignificant. Thus, one might conclude that those who are employed with FT2 or SEPT have a lower chance of getting a happier life than those who are in FT1. On the other hand, the chance will be higher than for those who are unemployed. Nevertheless, these differences are insignificant statistically. Hence, the finding of 'getting employed with FT2 or SEPT makes no significant difference from being unemployed'.

Although there is evidence that unemployment deteriorates the graduates' happiness, meaning that being 'employed' alone will not necessarily increase their happiness significantly. It is only getting FT1 that will significantly improve a graduate's happiness. Unemployment duration is found to have a significant influence on a graduate's happiness. For a one-day increase in unemployment duration, the odds of getting a happier life happiness decreased by a factor of 0.99, *ceteris paribus*.

Nevertheless, the effect of unemployment is subject to aggregation bias which is analogous to the aggregation bias of combining different employment status, as pointed out by Dockery (2003). Hence, it is inappropriate to treat unemployment as a homogenous state.

To avoid this aggregation bias, the present study estimated an alternative specification model of ordered logit model which disaggregates unemployment into four dummies[2]: Very short-term unemployment (less than 31 days), short-term unemployment (31-60 days), very medium-term unemployment (61-90 days), and medium-term unemployment (more than 90

[2] I would like to thank the anonymous referee for pointing out this aggregation bias of unemployment states and suggesting the solution.

Table 5. Estimated ordered logit model (alternative specification) [4]

Variables	Model 1		Model 2	
	Odds ratio	Std error	Odds ratio	Std error
Employment status [3a]				
Unemployed: below 31 days (UNE <31)	0.5350	0.4529	-	-
Unemployed: 31-60 days (UNE 31-60)	0.4325	0.3121	-	-
Unemployed: 61-90 days (UNE 61-90)	0.2407	0.1928*	-	-
Unemployed: above 90 days (UNE >90)	0.2652	0.1833*	-	-
Unemployed (UNE)	-	-	0.3153	0.1574**
Full-time employment not commensurate with qualification (FT2)	0.5595	0.2633	0.5662	0.2649
Self-employment/part-time employment (SEPT)	0.6275	0.4182	0.6511	0.4286
Job search related				
Self-expected unemployment duration (EXPUNE)	1.1232	0.1139	1.1350	0.1061
Self-perceived marketability of degree studied	0.8217	0.1489	0.8119	0.1449
Financial difficulties faced	0.7667	0.0883**	0.7624	0.0862**
Religion[3b]				
Buddhism	0.4246	0.2293	0.4573	0.2471
Christianity/Catholic	2.0309	2.1664	2.1794	2.3177
Other religions	0.2887	0.1883*	0.2882	0.1891*
Types of degree[3c]				
UUM Public/Development Management	3.1176	2.5279	3.1541	2.3931
UUM Business Administration	6.0461	4.1063***	6.2876	4.1373***
UUM Accounting	4.2371	3.2127*	4.4334	3.2894**
UUM IT	3.6824	2.5676*	3.8914	2.5868**
UUM Other degrees	4.8571	4.6679*	5.0125	4.4749*
UUM Human Resource/Social Work	2.3073	2.1594	2.3893	2.2127
UUM International Business/Issues Management	2.3193	1.9371	2.3592	1.9172
UUM Finance	1.5577	1.1667	1.6017	1.1910
UUM Communication	1.6367	1.2473	1.6236	1.0764
UTAR Business Administration	4.4822	3.9787*	4.5496	3.9958*
UTAR Accounting	4.8610	4.3261*	5.1262	4.5006*
UTAR IT/Computer Sciences	4.3880	3.2928**	5.0364	3.5348**
UTAR Other degrees	5.3003	4.9712*	5.6684	4.9872**
Family background				
Father's education level	1.1603	0.1176	1.1523	0.1106
Family size	1.0666	0.1190	1.0648	0.1189
English and academic related				
English language proficiency level	1.1943	0.1392	1.1931	0.1392
Academic attainment	1.3625	1.0644	1.3019	0.9626

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Table 5. Continued

Variables	Model 1		Model 2	
	Odds ratio	Std error	Odds ratio	Std error
Socio-demographic related:				
Age	1.1864	0.1292	1.1720	0.1181
Male	1.3184	0.4872	1.3229	0.4915
Health	1.0337	0.1990	1.0407	0.1887
Home town: rural	1.6273	0.5932	1.6721	0.5844
Car driving license	2.1576	0.8184**	2.1283	0.7905**
Boundary parameters:				
m_1	3.7537	4.0340	3.3779	3.7196
m_2	4.6280	4.0610	4.2479	3.7390
m_3	5.5693	4.0484*	5.1791	3.7189*
m_4	6.8844	4.0353**	6.4863	3.7096**
m_5	8.0546	4.0513**	7.6595	3.7270**
m_6	10.1094	4.1377***	9.7171	3.8161***

Notes:
1. *, **, and *** represent significant at 10%, 5% and 1% levels, respectively.
2. Explanation and measurement of variables are presented in Appendix 1.
3. Comparison group of dummy variables of:
   a. employment status: Full-time employment that commensurate with qualification (FT1)
   b. religion: Islam
   c. types of degree: UUM Economic
4. Model 1: Estimated ordered logit model with disaggregate dummies on unemployment
   Model 2: Estimated ordered logit model with aggregate dummy on unemployment

days).[3] To illustrate the aggregation bias of unemployment, another model that aggregated unemployment into one dummy was estimated.

4.3 Estimated Ordered Logit Model: Alternative Specifications

Table 5 presents the two estimated ordered logit models. Model 1 is the estimated ordered logit models with disaggregated state of unemployment. Model 2 is the estimated ordered logit model with aggregated state of unemployment.

From Table 5 (Model 2), it is found that those who are employed with FT1 are more likely to have a happier life than those who are unemployed (UNE). The estimated odds ratio is significant at 5 per cent level. However, if we disaggregate the unemployment state into four dummies (see Model 1), those in FT1 are more likely to have a happier life than those who are unemployed for more than 60 days (UNE61-90 and UNE>90). For those who are unemployed for less than 61 days, their chances of having a happier life are not

[3] Due to low number of observations, we are not able to disaggregate the duration into more disaggregate dummies such as 91-120 days (only 7 observations), 121-150 days (12 observations), and 151-180 days (only 3 observations); 181-210 days (only 2 observations) and above 210 days (only 7 observations).

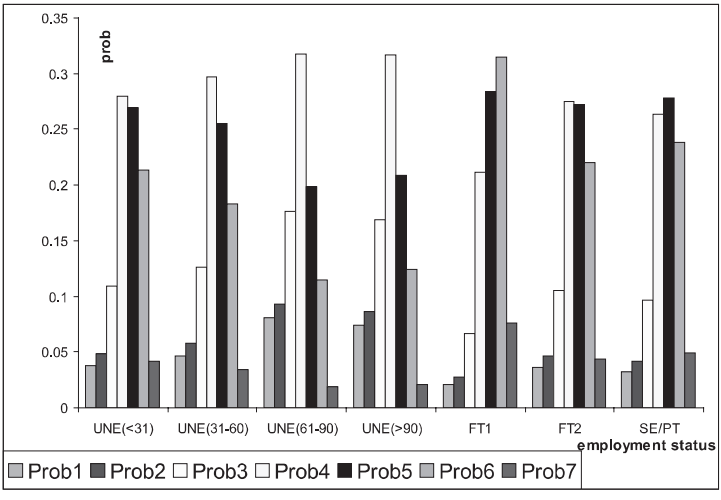

Figure 2: *Impact of employment status on happiness*

significantly different from those in FT1. This result clearly illustrates the aggregation bias of treating unemployment as a homogenous state.

Relating to FT2 and SEPT, those employed with FT2 and SEPT are not insignificantly different (in terms of their chances of having a happier life) than FT1. This finding is consistent with the finding in Table 4 (insignificant FT2 and SEPT).

To gain further insights, the influence of employment status on life happiness is predicted and plotted. These predictions are made by holding the other variables at their mean values respectively.

4.4 Predicted Probabilities of Happiness

Figure 2 presents the influence of employment status on a graduate's life happiness. Since the mid-point of the 7-point rating scale is 4 (Prob4), which is labelled as 'neither happy nor unhappy', the probability of obtaining point 1 to 3 (Prob1-3) can be interpreted as 'probability of being unhappy'. Whereas, probability of obtaining point 5 to 7 (Prob5-7) is interpreted as 'probability of being happy'.

From Figure 2, those who are unemployed have the highest probability of being unhappy. The probabilities are 35.06, 32.88, 23.1, and 19.54 per cent for being unemployed for above 90 days, 61-90 days, 31-60 days and below 31 days respectively. Then, it is followed by those who are employed with FT2 (18.85%), SEPT (17.15%) and FT1 (11.49%).

In terms of probability of being happy (Prob5-7), the unemployed graduates have the lowest probability. The probabilities are 35.4, 33.2, 47.19, and 52.5 per cent for being unemployed for above 90 days, 61-90 days, 31-60 days and below 31 days respectively. Then, it is followed by those who are employed with SEPT (53.62%), FT2 (56.46%) and FT1 (67.69%).

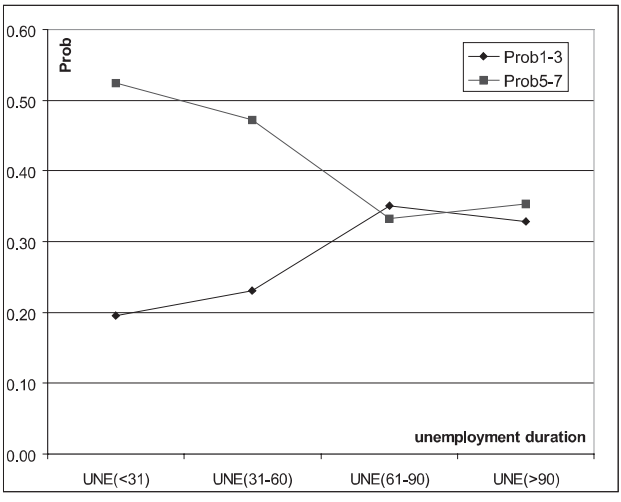

Figure 3: *Impact of disaggregate unemployment states on probability of being 'happy' and 'unhappy'*

Clearly, those who are unemployed for 61 days and above have a significantly lower (higher) probability of being happy (unhappy) than others including those who are unemployed for below 61 days.

To examine the effect of unemployment at disaggregated level, the effect of the four unemployment states (by unemployment duration: Below 31 days, 31-60 days, 61-90 days and above 90 days) on graduate's life happiness is presented (Figure 3). For simplicity of presentation, Prob 5 to 7 are combined as 'Happy' and Prob1 to 3 are combined as 'Unhappy'.

In general, the influence of this unemployment duration on the graduate's life happiness is negative. Figure 3 reveals that increasing duration of unemployment decreases (increases) the probability of being happy (unhappy). Specifically, during the 1st–60th day of unemployment, the probability of being happy is substantially higher than the probability of being unhappy. Then, after 60 days of being unemployed and onwards, the probability of being unhappy is approximately equal to the probability of being happy. This indicates that unemployment duration of below two months is not harmful psychologically (in terms of one's probability of having a happier life). Thus, the effect of unemployment on one's life happiness varies across different durations of unemployment.

5. Discussion and Conclusion

Descriptive analysis shows that the graduates' life happiness decreases over the duration of unemployment. Nevertheless, during the first 120 days of being unemployed, the graduates still reported as being "happy" in their overall life happiness. Results of estimated ordered logit model reveal no significant difference in happiness between those who are FT1 employed and those who are unemployed below 61 days.

In addition, for those who are unemployed below 61 days, the predicted probability of being happy is found to be substantially higher than the probability of being unhappy.

Thus, the first 60 days of being unemployed brings no harmful impact on happiness. This finding suggests that the duration of 'frictional' unemployment is two months (in terms of one's life happiness) for graduates in Malaysia. It is suggested that existing government programmes to assist unemployed graduate such as re-training courses should focus only on graduates who have at least endured more than two months of unemployment.

There is further evidence of negative psychological impact of unemployment. The statistical evidence also illustrates this negative impact varies according to quality of employment. In terms of happiness, FT1 employment is significantly different from those who are unemployed. This highlights the importance of disaggregating the state of 'being employed' ranging from less-quality jobs to good-quality jobs, instead of treating employment as a homogenous state. It is suggested that government statistics indicating graduate employment should not aggregate the employed into one homogenous state. Disaggregated statistics on employment status are needed to provide insights and better understanding of graduate unemployment in Malaysia.

In addition, unemployment cannot be treated as a homogenous state. In terms of life happiness, effect of unemployment varies across different levels of unemployment duration. State aggregation bias is not only applied to employment (due to quality of employment obtained), it is also applied to unemployment (due to different durations of unemployment). Hence, it is further suggested that the government statistics of graduate unemployment should disaggregate the unemployed into different states based on unemployment duration.

However, there are some caveats to the findings of this paper. First, potential endogeneity bias between happiness and employment outcomes cannot be ignored. Nevertheless, due to data limitation, this endogeneity problem cannot be examined in the present paper. Second, the data collected were limited to only two universities in Malaysia. It is suggested that future research include more universities in Malaysia and also investigate this potential endogeneity bias.

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Appendix 1. Definition and measurement of variables

Variable abbreviation	Definition
Employment status	
Full-time employment commensurate with qualification	Dummy variable for full-time employment commensurate with qualication (comparison group: unemployed)
Full-time employment not commensurate with qualification	Dummy variable for full-time employment not commensurate with qualication (comparison group: unemployed)
Self-employment/part-time employment	Dummy variable for self-employed or part-time employment (comparison group: unemployed)
Job search related	
Self-expected unemployment duration (EXPUNE)	Self-reported (number of weeks)
Unemployment duration (UNEDUR)	Number of days unemployed
Interaction between EXPUNE and UNEDUR	Interaction variable between EXPUNE and UNEDUR
Self-perceived marketability of degree studied	Self-perceived (ordinal scale: 1 'low' to 7 'high')
Financial difficulties faced	Financial difficultes faced while unemployed (ordinal scale: 0 'no' to 6 'high')
Religion	
Buddhism	Dummy variable for Buddhist (comparison group: Islam)
Christianity/Catholic	Dummy variable for Christian/Catholist (comparison group: Islam)
Other Religions	Dummy variable for Hindu/Taoism/others (comparison group: Islam)
Types of degree	
UUM Public/Development Management	Dummy variable for UUM Public Mgt and Development Mgt (comparison group: UUM Economics)
UUM Business Administration	Dummy variable for UUM Business Admin (UBBA) (comparison group: UUM Economics)
UUM Accounting	Dummy variable for UUM Accounting (UBACC) (comparison group: UUM Economics)
UUM IT	Dummy variable for UUM Info Tech (UBIT) (comparison group: UUM Economics)
UUM Other degrees	Dummy variable for UUM Others degree: Tourism / Education / Technology Mgt / Decicision Sciences (comparison group: UUM Economics)

UUM Human Resource/Social Work	Dummy variable for UUM Human Resource / Social Work Mgt (comparison group: UUM Economics)
UUM International Business/Issues Mgt	Dummy variable for UUM International Bussiness / Issues Mgt (comparison group: UUM Economics)
UUM Finance	Dummy variable for UUM Finance / Banking (comparison group: UUM Economics)
UUM Communication	Dummy variable for UUM Communication (comparison group: UUM Economics)
UTAR Business Administration	Dummy variable for UTAR Business Admin (comparison group: UUM Economics)
UTAR Accounting	Dummy variable for UTAR Accounting (TBACCT) (comparison group: UUM Economics)
UTAR IT/Computer Sciences	Dummy variable for UTAR Info System / Info System Engineering / Computer Sciences (comparison group: UUM Economics)
UTAR Other degrees	Dummy variable for UTAR other degrees: Chinese Studies / Journalism / Public Relations (comparison group: UUM Economics)
Family background	
Father's education level	1=no formal schooling; 2=do not complete primary; 3=complete primary; 4=do not complete secondary; 5=complete secondary;6=O level or equ; 7=A level & above
Family size	Number of persons in family
English and academic related	
English language proficiency level	Self-perceived proficiency of English (Ordinal scale: 0 'non user' to 12 'expert-user'
Academic attainment	Cumulative Grade Point Average
Social-demographic related	
Age	age in years
Male	Dummy variable for being male (comparison group: female)
Health	Self-reported health condition (ordinal scale: 0 'poor' to 6 'excellent'.
Home town: rural	Dummy variable for home town in rural (other than big cities or state capital)
Car driving license	Dummy variable for having a car driving license
Cut off-points:	
μ_1 - μ_6	The boundary parameters

Appendix 2. Comparison of ordered logit and ordered probit model [3]

Variables	Ordered logit model			Ordered probit model		
	Coefficient	y-standardised coefficient	P-value	Coefficient	y-standardised coefficient	P-value
Employment status[2a]						
Full-time employment commensurate with qualification (FT1)	0.9059	0.4141	0.0820	0.5091	0.4225	0.0520
Full-time employment not commensurate with qualification (FT2)	0.3560	0.1627	0.5130	0.2164	0.1796	0.4110
Self-employment/ part-time employment (SEPT)	0.4831	0.2208	0.4960	0.1862	0.1546	0.6190
Job search related						
Self-expected unemployment duration (EXPUNE)	-0.0565	-0.0258	0.6950	-0.0310	-0.0257	0.6880
Unemployment duration (UNEDUR)	-0.0124	-0.0057	0.0390	-0.0065	-0.0054	0.0180
Interaction between EXPUNE and UNEDUR	0.0025	0.0011	0.1670	0.0014	0.0012	0.1040
Self-perceived marketability of degree studied	-0.2317	-0.1059	0.2200	-0.0845	-0.0701	0.3590
Financial difficulties faced	-0.2757	-0.1261	0.0190	-0.1392	-0.1155	0.0200
Religion[2b]						
Buddhism	-1.0159	-0.4644	0.0880	-0.4849	-0.4025	0.0990
Christianity/Catholic	0.4752	0.2172	0.6750	0.3438	0.2853	0.5150
Other religions	-1.3081	-0.5980	0.0450	-0.7020	-0.5826	0.0430
Types of degree[2c]						
UUM Public/ Development Management	1.2533	0.5729	0.1000	0.6027	0.5002	0.1600
UUM Business Administartion	1.8471	0.8444	0.0070	0.9666	0.8023	0.0140
UUM Accounting	1.5695	0.7174	0.0420	0.8178	0.6788	0.0610
UUM IT	1.2641	0.5779	0.0900	0.6380	0.5295	0.1220
UUM Other degrees	1.4579	0.6665	0.1190	0.6940	0.5760	0.1650
UUM Human Resource/ Social Work	0.7192	0.3288	0.4600	0.2907	0.2413	0.5920
UUM International Business/ Issues Management	0.9822	0.4490	0.2280	0.4630	0.3843	0.2940

UUM Finance	0.5271	0.2409	0.5200	0.1889	0.1568	0.6710
UUM Communication	0.1964	0.0898	0.7870	0.0790	0.0655	0.8550
UTAR Business Administration	1.5991	0.7310	0.0680	0.7669	0.6365	0.1190
UTAR Accounting	1.6849	0.7702	0.0560	0.7834	0.6502	0.1010
UTAR IT/ Computer Sciences	1.6231	0.7420	0.0210	0.8525	0.7076	0.0590
UTAR Other degrees	1.7630	0.8059	0.0480	0.8479	0.7037	0.0870
Family background						
Father's education level	0.1361	0.0622	0.1570	0.0838	0.0695	0.1090
Family size	0.0526	0.0240	0.6360	0.0223	0.0185	0.6980
English and academic related						
English language proficiency level	0.1779	0.0813	0.1210	0.1098	0.0912	0.0610
Academic attainment	0.4013	0.1834	0.5960	0.0660	0.0547	0.8620
Socio-demographic related						
Age	0.1828	0.0836	0.0810	0.0932	0.0774	0.1210
Male	0.3036	0.1388	0.4340	0.2226	0.1848	0.2860
Health	0.0241	0.0110	0.8960	-0.0181	-0.0150	0.8530
Home town: rural	0.4910	0.2245	0.1430	0.2637	0.2189	0.1340
Car driving license	0.6751	0.3086	0.0900	0.4063	0.3372	0.0570

Notes:
1. Explanation and measurement of variables are presented in Appendix 1.
2. Comparison group of dummy variables of:
   a. employment status: unemployed
   b. religion: Islam
   c. type of degree: UUM Economics
3. Due to different assumption on the value of variance between the logistic and normal distribution, the estimated coefficients are not directly comparable. However, one may compare the standardised coefficients as suggested by Long (1997: 128-129).

Appendix 3. Ordered logit model: use FT1 as comparison category

Variables	Odds ratio	Std error
Employment status[3a]		
Unemployed (UNE)	0.4042	0.2102*
Full-time employment not commensurate with qualification (FT2)	0.5770	0.2640
Self-employment/part-time employment (SEPT)	0.6552	0.4532
Job search related		
Self-expected unemployment duration (EXPUNE)	0.9451	0.1363
Unemployment duration (UNEDUR)	0.9876	0.0060**
Interaction between EXPUNE and UNEDUR	1.0025	0.0018
Self-perceived marketability of degree studied	0.7932	0.1499
Financial difficulties faced	0.7590	0.0893**
Religion[3b]		
Buddhism	0.3621	0.2156*
Christianity/Catholic	1.6083	1.8216
Other religions	0.2703	0.1767**
Types of degree[3c]		
UUM Public/Development Management	3.5020	2.6658*
UUM Business Administartion	6.3412	4.3326***
UUM Accounting	4.8041	3.7154**
UUM IT	3.5400	2.6381*
UUM Other degrees	4.2971	4.0224
UUM Human Resource/Social Work	2.0528	1.9984
UUM International Business/Issues Management	2.6704	2.1765
UUM Finance	1.6939	1.3873
UUM Communication	1.2170	0.8845
UTAR Business Administration	4.9483	4.3404*
UTAR Accounting	5.3921	4.7526*
UTAR IT/Computer Sciences	5.0689	3.5708**
UTAR Other degrees	5.8297	5.2089**
Family background		
Father's education level	1.1458	0.1102
Family size	1.0540	0.1172
English and academic related		
English language proficiency level	1.1947	0.1370
Academic attainment	1.4938	1.1307

Socio-demographic related		
Age	1.2006	0.1256*
Male	1.3547	0.5252
Health	1.0244	0.1888
Home town: rural	1.6340	0.5475
Car driving license	1.9642	0.7817*

Notes:
1. *, **, and *** represent significance at 10%, 5% and 1% levels, respectively.
2. Explanation and measurement of variables are presented in Appendix 1.
3. Comparison group of dummy variables of:
   a. employment status: Full-time employment that commensurate with qualification (FT1)
   b. religion: Islam
   c. types of degree: UUM Economics