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The Relationship between Higher Education and Job Opportunities in Malaysia

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ABSTRACT

This paper aims to examine the relationship between higher education and job opportunities in Malaysia. Annual data on higher education and unemployment rate from 1982 to 2012 were collected. The Johansen co-integration method was conducted and the results show that there is a long-run relationship between higher education and unemployment rate. However, the relationship between the variables does not exist in the short-run.

Keywords: unemployment rate, higher education

1.0 INTRODUCTION

Higher education plays an important role in developing Malaysia's economy. Ismail (1996) believed that education can result in higher production. Most developed and developing countries put much emphasis on the enhancement of educational sector (Dollar & Gatti, 1999). Malaysia has established 20 public universities and 53 private universities. Five of the 20 public universities have been labeled as research universities. The number of students' enrolment at universities especially public universities exhibits an increasing trend. The Malaysian government always fork out a whopping amount of money to enhance the higher education sector. In addition, the government makes an effort to internationalize this sector.

However, it comes to the fore when a large number of graduates remain unemployed. An inexorable increase in graduate unemployment has been reported in many countries including Malaysia. This does not reflect that higher

education can boost job opportunities. Therefore, this study aims to examine the relationship between higher education and unemployment rate. According to the Ministry of Higher Education, only 45% of 155, 278 graduates were employed in 2009. This obviously implies that majority of the graduates looked for jobs but could not get one. Malaysia experienced a wave of graduate unemployment. Nevertheless, its overall unemployment rate was recorded low at 3.3% in 2012 (Chiew, 2013). Social problems might transpire as graduates cannot avail themselves of job opportunities. Tan (2010) stated that there is a linkage between unemployment and crime rate. The crime rate is on the rise as more people are unemployed.

Numerous factors have been argued to justify why they have no job after striving for degrees. They should not be deprived of jobs as they are imbued with higher education. One of the factors is skill mismatches which contribute to higher possibilities of not being accepted by employers. According to a report by the Human Resource Management ASIA (2012), many graduates were not able to secure their jobs and could hardly find any job. In addition, Idumange (2004) stated that graduates' jobs have nothing to do with the courses that they have studied at universities.

Therefore, higher education institutions have taken a move to ensure that all graduates are skilled to meet employers' need. Good quality graduates are indicative of companies' productivity. Higher education institutions introduced entrepreneurial subjects at universities and revised the higher education curriculum (Shafiq 2011).

2.0 LITERATURE REVIEW

Most studies explored the relationship between education and economic growth such as Asteriou and Agiomirgianakis (2001), Chaudhary et al. (2009) as well as Seetanah (2006). Asteriou and Agiomirgianakis (2001) examined the correlation between human capital and economic development in Greece using the Johansen co-integration method. The study found that there is a positive long-run relationship between economic growth and education. Education can promote economic growth. Boopen Seetanah (2006) found the same results in 40 African countries for the period from 1980 to 2000. The study used Generalized Methods of Moments (GMM).

Chaudhary et al. (2009) investigated the role of higher education in economic growth in Pakistan. The data from 1972 to 2005 were analyzed using the Johansen Co-integration and Toda & Yamamoto Causality approaches. The

empirical analysis revealed that there is a long-run relationship between economic growth and higher education. The empirical results of causality test indicate that there are unidirectional causalities running from economic growth to higher education.

Several studies examined the linkage between higher education and unemployment (Mirică, 2014; Li et al. 2014; Klein, 2015; Lucifora & Biagi, 2008). Mirică (2014) examined the long run relationship between unemployment and higher education in Romania. The study used data on the demand for higher education. The Engel-Granger method was employed and the findings explained that the link between unemployment and higher education demand does exist. This is slightly different from the study by Li et al. (2014) which examined the effects of the unemployment of college graduates in China. The study used national representative population surveys from 2000 and 2005. The results show that higher regional mobility of college can reduce the unemployment rate.

Lucifora and Biagi (2008) analyzed the effects of demographic and education changes on unemployment rates in Europe. The study used a panel data analysis for the period from 1975 to 2002. The findings show that unemployment can be influenced by population age. In addition, unemployment can also happen due to changes in the education structure and labor market institutions.
Aurangzeb and Asif (2013) investigated the determinants of unemployment in India, China and Pakistan. The period of 1980 to 2009 was analyzed using Co-integration and Ganger Causality. The data on unemployment, inflation, gross domestic product, exchange rate and the increasing rate of the population were collected. The results of Co-integration show that there are significant relationships among all variables in all countries. However, the result of granger causality shows there is no significant relationship among the variables.

3.0 METHODOLOGY

This study uses the annual series data from 1982 to 2011. The data on unemployment rate and tertiary education are collected. All the data are extracted from the World Bank This study conducts several tests such Unit Root Test, Johansen Co-Integration Test, VECM, and Granger Causality test. The model specification is as follows:

$$UNt = \alpha 0 + \beta 1TEt\text{-}1 + \varepsilon t \quad (1)$$

where α0 is constant and β1 is slop coefficient. TEt is tertiary education in Malaysia in the year t, UEt is the unemployment in Malaysia in the year t and εt is the error term. The unit root test is conducted to examine the stationarity of data sets. The current paper uses the augmented Dickey-Fuller (ADF) unit root test to investigate the. The ADF test is based on the following regression,

$$\Delta Y_t = \boldsymbol{\mu} + \beta_{t-1}\mathbf{t} + \sum_{i=1}^{n} \gamma i\, \Delta Y_{t-i} + \varepsilon_t \quad (2)$$

where *t* is a linear time trend, ⊿ is the difference operator. *β* and γ are slop coefficients. *Et* is the error term. Then the Johansen co-integration test is used to examine the long-run relationship among the variables. The Johansen co-integration equation is as follows,

$$Xt = \mu + A1\, \Delta Xt\text{-}1 + A2\, \Delta Xt\text{-}2 + \ldots Ak{+}1\, \Delta Xt\text{-}p{+}1 + \varepsilon t \quad (3)$$

where Xt is a k ×1 vector of stochastic variables, μ is a k ×1 vector of constants, At is k × k matrices of parameters, and εt is a k ×1 vector of error terms. The model could be transformed into an error correction form:

$$\Delta Xt = \mu + \Gamma 1\, \Delta Xt\text{-}1 + \Gamma 2\, \Delta Xt\text{-}2 + \ldots \Gamma k{+}1\, \Delta Xt\text{-}p{+}1 + \pi Xt\text{-}1 + \varepsilon t \quad (4)$$

where π and Γ1…, Γk+1 are matrices of parameters. On the other hand, if the coefficient matrix π has reduced rank, r < k, then the matrix can be decomposed into π =αβ'. The Johansen co-integration test involves testing for the rank of π matrix by examining whether the eigenvalues of π are significantly different from zero. There could be three conditions: 1) r = k, which means that the Z k × k t is stationary at levels, 2) r=0, which means that the Zt is the first differenced Vector Autoregressive, and 3) 0<r<k, which means there exists r linear combinations of Xt that are stationary or co-integrated.

This study uses the Trace (Tr) eigenvalue statistics and Maximum (L-max) eigenvalue statistics. The likelihood ratio statistic for the trace test is:

$$Tr = -T \sum_{i=r+1}^{p-2} \ln(1 - \lambda i) \quad (5)$$

Where $\lambda_{r+1}, \ldots\ldots\ldots, \lambda_p$ are the smallest eigenvalues of estimated p – r. The null hypothesis for the trace eigenvalue test is that there are at most r co-integrating vectors. On the other hand, the L-max could be calculated as:

$$L - max = -T \ln(1 - \lambda i) \quad (6)$$

The null hypothesis for the maximum eigenvalue test is that r co-integrating vectors are tested against the alternative hypothesis of r+1 co-integrating vectors.

This study runs the Granger-causality test based on the VECM. The test was utilized to see the causal relationship between two distinguished variables. Apart from that, the test is also used to see the reaction between two variables. If the p values of the variable X significantly contribute to forecast the value of another variable Y, then X would have Granger causal relationship with Y and vice versa. The test is based on the equation below:

$$X_t = \varphi_0 + \sum_{z=1}^{p} \delta\, z\, X_{t-z} + \sum_{i=1}^{q} \Psi i\, M_{t-1} + \varepsilon_t \quad (7)$$

$$Y_t = \gamma_0 + \sum_{z=1}^{p} \gamma\, z\, M_{t-z} + \sum_{z=1}^{p} \lambda\, i\, x_{t-1} + \mu_t \quad (8)$$

where X_t is tertiary education and Y_t is unemployment which both are tested variables for this study, μ_t and ε_t are the terms for error, and *t* implies that the time period *z* and *i's* are the number of lags. The null hypothesis is $\lambda_i = \Psi_i = 0$ for all *i*. In the alternative hypothesis that $\lambda_i \neq 0$ and $\Psi_i \neq 0$ for at least some *i's* if the coefficient λ_i are significant but Ψ_i are not significant, then *X* is Granger causal to *Y*. The causality will run both ways if both coefficients are significant.

4.0 FINDINGS AND ANALYSIS

First of all, the unit root test was performed to see the stationary of all variables. Before we can proceed to the Johansen co-integration test, we have to make sure our chosen variables are stationary at level but they become stationary at first difference.

	Level		1st difference	
	Constant with no trend	Constant with trend	Constant with no trend	Constant with trend
UR	-1.224145	-2.184472	-3.428686*	-3.382603**
TE	0.300127	-2.119081	-4.226913*	-4.175216*

Note: * and ** are significant respectively to 1% and 5%

Table 1: Unit Root Test

Table 1 shows results of the unit root test. The results indicate that the variables are non-stationary at level. However, they become stationary at first difference. Thus, the Johansen co-integration test can be conducted. Before the Johansen co-integration test is conducted, we should determine the lag length. This study used Akaike Information Criterion (AIC) and lag 2 was selected as it is the lowest AIC as reported in Table 2.

Table 2: Lag Length Selection

Lag Length	AIC
0	10.76251
1	5.651300
2	5.559199*
3	5.667294

AIC denotes the Akaike Information Criterion
*indicates optimal lag length selected by the AIC

Results of the Johansen co-integration test are presented in Table 3. Both Trace Eigenvalue test and Maximum Eigenvalue test indicate that there is a long-run relationship between the unemployment rate and higher education. This is proven by the existence of one co-integration equation.

Table 3: Johansen Co-Integration Test

	Trace Statistic	Critical Value	Max-Eigen Statistic	Critical Value
None*	44.21623	25.87211	35.79989	19.38704
At most 1	8.416341	12.51798	8.416341	12.51798

* indicates 1 co-integrating equation at the 0.05 level

Long run co-integration when the variables are normalized by co-integrating equation can be explained by the following equation.

UR = 0.702TE – 0.884 Trend

This co-integrating equation shows that there is a positive long-run relationship between higher education and the unemployment rate. The Granger Causality method based on the VECM was conducted to examine the short-run causal relationship between the unemployment rate and higher education. Results of the Wald test are presented in table 4. The findings show that the error correction term (ECT) is statistically significant and negative. This suggests that it confirms that there is a long-run relationship between higher education and the unemployment rate.

Table 4: Granger-Causality Test based on VECM

Independent variables	Dependent variables	
	UR	TE
ECT	-0.294898	-0.115176*
UR	-	7.904627
TE	7.261569	-

Table 4 shows the results of the Granger Causality test based on VECM. The findings indicate that there is no causal relationship between higher education and the unemployment rate. It suggests that higher education does not influence the unemployment rate.

Table 2.5: Pairwise Granger Causality

NULL HYPOTHESIS	OBS	F-Statistic	Prob.
TE does not Granger Cause UR	29	1.28859	0.2941
UR does not Granger Cause TE		2.17573	0.1354

Apart from the Wald test, this study also employs the Pairwise Granger Causality to determine the direction of the relationship between higher education and the unemployment rate. The results show that it is consistent with the findings of the Wald test.

5.0 CONCLUSIONS

This study aims to examine the relationship between higher education and the unemployment rate. Since results of the unit root test show that all the variables are non-stationary at the level and they become stationary at first difference, the Johansen co-integration method was conducted to examine the long run relationship. The results show that there is a long-run positive relationship between higher education and the unemployment rate. However, in the short run, results of the Granger Causality test indicates that there is no relationship between higher education and the unemployment rate.

These findings are very important for policy makers to formulate policies. The unemployment will increase as higher education increases in the long run. Therefore the government should formulate several policies to ensure that graduates will have jobs. The government can provide courses for graduates to enhance their skills to meet employers' need. The revision of curriculum at universities is also a good move to intensify graduate employability.

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