



The Co-integration Test between Employment, Unemployment and the Enrolment of Higher Education and Economic Growth in Malaysia

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Abstract

There are several factors that have a high impact on Malaysia such as human resources, human resources can be regarded as an engine that drives the Malaysian economy. As such, this study looks at the issues that exist in human resources such as employment and unemployment and other issues such as higher education enrolment that contribute to an economy from 1990 to 2020. This study utilised the dynamic approach namely Augmented Dickey-Fuller unit root test and Johansen Juselius Co-integration test. The test results suggest that, all variables are integrated in first different (I(1)). In addition, Johansen Juselius co-integration test suggested that there is no long-term relationship. In conclusion, the relationship between employment, unemployment and higher education enrolment to economic growth is significant. While this study shows no long-term relationship, these variables can be considered important in generating production and economic sector activities that will ultimately lead to growth in the economy of the country. Hence, such aspects need to be emphasized in order for economic growth in line with the growth of the world economy. Hence, the nation's economic growth based on production to a knowledge-based economy is an excellent step in dealing with world economic growth. This is because Malaysians are more towards the increasingly demanding globalization era. However, this situation does not necessarily have a positive effect, but vice versa. Hence, community expertise in various angles needs to be continuously upgraded so that the state of the economy continues to grow from an economic point of view, or other angles.

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Key Words: Employment, Unemployment, High Education Enrolment, Augmented Dickey Fuller, Johansen Juselius Cointegration Test.

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Introduction

After Malaysia achieved independence in 1957, the country's economic situation was rapidly growing. The Government has taken various strategic measures to modernize and develop key sectors such as agriculture, fisheries, forestry and mining. In the early 1960s, major production outcomes (major sectors) contributed to 70% (export earnings), 28% (government revenues) and 36% (total employment). New Economic Policy (NEP), 1971-1990 has been enacted with two goals namely eradicating poverty and restructuring the society. The NEP is designed to provide good inputs and facilities in agricultural areas, the

implementation of modern agriculture and provide employment opportunities. In addition, education, health, housing and utilities are also available to the public. Subsequently, in the 1980s, the country's economy began to slow down, as this was the result of the recession of oil prices, this situation had a negative impact on the country's exports. As a result, the country is experiencing deficits related to government budget and the state's balance of payments.

Between 1991 and 1997, country revenues grew by 8.5%. However, the financial crisis took place in 1998.

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The crisis is triggered by currency speculation attacks in some East Asian countries including Ringgit Malaysia. However, the country's economy survived the worsening effects of the crisis such as high unemployment, poverty and bankruptcy in several other countries. Therefore, the National Economic Action Council (MTEN) was established in 1998 to advise the government on measures and strategies to curb severe economic deterioration and restore economic growth. This move has significantly reversed the economy, resulting in surpluses in current accounts and balance of payments, raising investment from abroad and restoring confidence of the people and foreign investors. As a result, country growth grew by 7.5% in two years, 1999 and 2000.

Subsequently, based on the past six years in particular since 2010, total employment has seen a positive increase. This is seen as a result of a labor market characterized by a robust matching between demand and supply of labor and the creation of a comprehensive labor market system. The 10th Malaysia Plan Outcome (10MP), 2011-2015, progress has been achieved is an increase in employment opportunities and the strengthening of the labor market institutions. Subsequently, in 2016, the implementation of the Eleventh Malaysia Plan (RMKe-11), 2016 - 2020, has been implemented, a range of strategy shifts has been developed to improve the wage structure and create quality employment opportunities, streamline labor laws and labor market information, and managing low-skilled foreign workers more effectively. Initial results of the 11th Plan, the number of employments increased. In addition, in 2017 until in 2020, the government expects the 11th Plan to create a more dynamic and effective labor force wave.

Thus, the government has adopted fiscal policy and appropriate monetary policy to stabilize foreign currency exchange rates. The measures introduced have reinvested investments from within and outside the country. Thus, the unemployment rate was successfully maintained at full employment rate until the next year. In 2010, the country has developed better economic strategies in achieving its target of achieving low unemployment rates by 2015. This is stated in the Tenth Malaysia Plan (10MP), 2011-2015. The earlier economic crises helped by the government to design a more sustainable and comprehensive economic strategy. in 2016. Unemployment has been analyzed in rates and shows at an unattractive level. However, the

unemployment rate recorded by the Department of Statistics shows an increase in 2016.

In addition, the issue that needs to be explained is the issue of enrolment in higher education in Malaysia. Therefore, the history of higher education needs to be demonstrated. The development and growth of the world of higher education in Malaysia began with the establishment of the University of Malaya in 1949 in Singapore. This merger resulted from the merger of two King Edward VII Medical colleges and Raffles College. However, only certain groups are given the opportunity to study there. In 1959, the University of Malaya was fully transferred to Kuala Lumpur. In 1962, this institution was fully recognized as a university. Since then, the university is growing rapidly in terms of the number of students and programs offered. However, the development of the university is not able to offer the need for higher education demand in the country which is due to the changes and policy building done by the government and the impact of rapid economic development of the country. Among the policy changes made by the government which had a great impact on higher education was the implementation of the NEP in the Tun Abdul Razak era. The implementation of this policy saw more *bumiputera* residents gain higher education, thus spurring the wave of development of the higher education system in Malaysia, based on its objective of eradicating poverty and restructuring the society. This development has led to the establishment of new universities. In the 1960s and 1970s, several universities were established, namely Universiti Sains Malaysia (1969), Universiti Kebangsaan Malaysia (1970), Universiti Pertanian Malaysia (1971) and Universiti Teknologi Malaysia (1975). The establishment of Malaysian universities does not stop there, until 2016 there are 21 public universities established.

Literature Review

Among the studies conducted in Malaysia are the study by Selamah and Rizaudin (2005). The study shows that the variable affects the economic growth in Malaysia. The results of the Granger's causes test showed that there was a one-way relationship. Additionally, according to Idris and Rahmah (2010), employment was able to impact the economic growth in Malaysia (1981-2007). This statement can be demonstrated through its study on the impact of quality and labor productivity on



economic growth in Malaysia. Researchers use various forms of tests such as root unit tests (Augmented Dickey-Fuller), root units (Phillips-Perron), and regression. The results of the tests show that employment is significant and has a positive relationship to economic growth in Malaysia.

In addition, according to Chan and Janice (2011), there is a relationship between employment and economic growth in Malaysia. Test results using the Augmented Dickey-Fuller unit test and Johansen's co-integration test on the 1970 series of time series data, selected variables showed that there were significant relationships at the 5% and 10% significance levels. In addition, Aslam (2013) also conducts research on these variables. The study uses foreign investment (FDI) and employment as dependent variable and economic growth (1980-2010) as independent variables. The results show that FDI has no significant impact on economic growth. While employment has a significant impact on economic growth, this effect is seen more dependent on capital accumulation and low skilled employment. In addition, studies conducted by Norlida et. al. (2015) related to the analysis of manpower requirements in the tourism sector found that there was a relationship between these two variables. The results of the output input model test using data in 2015 found that the impacted economic growth caused employment in the tourism sector was also affected.

Among the studies conducted in Malaysia are the study of Nurul and Nora (2007). The researchers found that there was a link between unemployment and economic growth in Malaysia under Okun's Law. The results of root unit tests (Augmented Dickey-Fuller) and root unit tests (Phillip-Perron) show inverse relationships between the two variables. In addition, this research has shown that there are causal relationships between the variables. In addition, Tingi and Lingii (2011) also undertake a study to confirm whether there is a unemployment and economic growth in Malaysia. This researcher uses Okun's law as the main theory in this study. The findings of the study by the Autogressive Distributed Lag (ARDL) approach show the relationship between unemployment and economic growth is a stable negative and long-term relationship. In addition, Norhayati, Ishak and Rahmah (2012) also confirm that there is a relationship between the two variables. The results of the Autogressive Distributed Lag (ARDL) approach show that there is a long-term

relationship. Additionally, the error correction (VECM) test shows significantly at the 1% significance level. This means there is a short and lasting relationship for a long period of time. Hashim, Rambeli, Abdul Jalil, Zulkifli, Hashim and Abdul Karim (2019) the results further suggest that, in the short run, a two-way causality exists between unemployment and economic growth. Moreover, the results show that unemployment affects economic growth, both in the short and the long term. By implication, this suggests the government should pay particular attention, in both the short and long term, to the unemployment rate, in order to bring this to a desirable level. In this respect unemployment can be reduced by enhancing employment opportunities throughout both governmental and private sectors of the country.

According to Ramesh and Rohana (2008) in school qualitative studies, education inequality and economic growth through PTR test. The calculation results show that education has a significant relationship at the 10% significance level when educational inequalities decline, economic growth will increase, and vice versa. Ishak and Zainizam (2009) reviewed the economic growth and the need for higher education in Malaysia. They use the estimation method of regression equation. The results of model I found that high education enrolment variables had a significant relationship at the 10% significance level. In addition, the results of the model II find that higher education enrolment variables have a significant relationship at the 5% significance level. The overall result shows that higher education enrolment has led to economic growth in Malaysia. According to Nashraf (2011), studies on higher education and economic growth in Malaysia. Researchers use the VAR model to assess the relationship between higher education and economic growth in Malaysia. The findings show that there is a causal relationship between Granger between higher education to economic growth at 5% level of significance. In addition, Shahidan (2014) studies the linkages between education levels (informal, formal, low, medium and high) with economic growth in Malaysia. This study uses three methods ie the root unit test, Johansen's co-integration test and the Granger cause tests. The root unit test results show that the level of education has a significant relationship at the 1% significance level on economic growth in Malaysia. Johansen's co-integration test found that the test could be carried



out and had a relationship between the two variables. Granger's cause test shows relationships like Johansen's causal test. Thus, these three tests show that education has a link to economic growth.

Methodology and Results

This study employ the dynamic econometric approach namely Augmented Dickey Fuller Unit root test and Johansen Juselius co-integration test. Inspired by Hashim, Rambeli, Abdul Jalil, Zulkifli, Hashim and Abdul Karim (2019), the model specification is as follows;

$$KDNK_t = \alpha_0 + \alpha_1 EMPLOY_t + \alpha_2 UNEM_t + \alpha_3 ENROL_t + v_t \quad (1)$$

Where,

- KDNK = Gross Domestic Product
- EMPLOY = Employment
- UNEM = Unemployment
- ENROL = Enrolment to High education level
- t = time series data
- v = error term

Descriptive Analysis

Table 3.1. Descriptive Analysis of Changeable Variables

| | KDNK | EMPLOY | UNEM | ENROL |
|--------------|----------|---------|----------|---------|
| Mean | 26.79260 | 16.1247 | 12.6319 | 12.5244 |
| Median | 26.7606 | 16.1418 | 12.7469 | 12.4553 |
| Maximum | 27.8375 | 16.4722 | 13.1006 | 13.1943 |
| Minimum | 25.5030 | 15.7614 | 10.2541 | 11.9692 |
| Std. Dev. | 0.7113 | 0.2184 | 0.5204 | 0.3746 |
| Skewness | -0.1762 | -0.0017 | -3.6721 | 0.3369 |
| Kurtosis | 1.8565 | 1.9434 | 17.493 | 1.9722 |
| Jarque-Bera | 1.6107 | 1.2559 | 296.9813 | 1.6991 |
| Probability | 0.4469 | 0.5337 | 0.0000 | 0.4276 |
| Observations | 27 | 27 | 27 | 27 |

To see the statistical features of the time series data used, some summaries can be summarized based on the descriptive tests as in Table 3.1. Based on the table, the mean value of economic growth (GDP) is 26.7926. Whereas for the variable of employment recorded a mean value of 16.1247, unemployment recorded a mean value of 12.6319, and higher education enrolment recorded a mean

value of 12.5244. In addition, standard deviation analysis is aimed to determine the variation in each variable. The findings show that variables have a low variation where the highest variation value is recorded by the economic growth variable of 0.7113 and the lowest variation is 0.2184.

Augmented Dickey Fuller (ADF) Unit Root Results

Tables 3.2 and 3.3 show the results of unit root tests conducted through the Dickey Fuller unit root test (ADF). The tests take into account tests that include short and short intervals with time trends. As mentioned in Hashim et al. (2019) the optimal lag time for the ADF test can be determined by examining the minimum value of the Akaike Information Criteria (AIC).

Table 3.2. Unit Root Test using Augmented Dickey Fuller Test (ADF) Level Form

| | $\tau\mu$ | $T\tau$ |
|-------------------|---------------|----------------|
| Level Form | | |
| KDNK | -1.9644 (1) | -2.3388 (0) |
| EMPLOY | -0.5026 (0) | -3.4681*** (4) |
| UNEM | -3.6594** (0) | -4.4693* (0) |
| ENROL | 0.296(0) | -2.4190 (0) |

Note: ADF test; $\tau\mu$ no trends; $T\tau$ with trends
 Marks (*), (**) and (***) each indicate a stupidity at the significance level of 1%, 5% and 10%.
 All the variables are in the form of logs.
 The value in brackets is the optimum lat value determined using the AIC criteria.

Based on Table 3.2, the table shows the results of an ADF test analysis at the level of the level without trends and trends. A variable is said to stationary or significantly if the probability value is smaller than 0.05 or lower than the t value at a certain level of significance. The value of economic growth variables on the no trace test is - 1.9644. Whereas the probability value is 0.2995 and higher than 0.05, then the variable is not stationary. Whereas, the value of the economic growth variables in the trend test is -2.3388. Whereas the probability value is 0.4002 and higher than 0.05, then the variable is not stationary. On the other hand, the value of the variable in the no trace test is - 0.5026. Whereas the probability value is 0.8755 and higher than 0.05, then the variable is not stationary. Meanwhile, the value of the labour force in the test is -3.4681 and significant at the 10% significance level. Whereas the probability value is 0.142 and larger than 0.05, then the variable is not stationary.



In addition, the unemployment variable value in the non-trending test is - 3.6593 and is significant at the 5% significance level. Whereas the probability value is 0.1113 and lower than 0.05, then the variable is not stationary. Meanwhile, the unemployment variable value in the test is -4.4692 and significant at the 1% significance level. Whereas the probability value is 0.0678 and larger than 0.05, then the variable is not stationary. In addition, the value of higher education enrolment in the non-trending test is 0.2961. Whereas the probability value is 0.9734 and higher than 0.05, then this variable is not stationary. Whereas, the higher education enrolment variable value in the test is -2.4190. Whereas the probability value is 0.3620 and higher than 0.05, then the variable is not stationary. In conclusion, the ADF test at the level of the level shows that the variables and unemployment are significant and stationary i.e. there is no problem with the root cause of the unit.

Table 3.3. Unit Root Test using the Augmented Dickey Fuller Test (ADF) First Difference Form

| | $\tau\mu$ | $T\tau$ |
|----------------------------------|--------------|--------------|
| First Different Form I(1) | | |
| KDNK | -3.8540* (1) | -4.5307* (1) |
| EMPLOY | -5.0961* (0) | -5.0010* (0) |
| UNEM | -8.3758* (0) | -8.2331* (0) |
| ENROL | -6.3518 *(0) | -6.3824 *(0) |

Note: ADF test; $\tau\mu$ no trends; $\tau\tau$ with trends
 Marks (*), (**) and (***) each show a stutter at the significance levels of 1%, 5% and 10%.
 All the variables are in the form of logs.
 The value in brackets is the optimum lat value determined using the AIC criteria.

Based on table 3.3, the table shows the results of ADF test analysis at the first difference level without trends and trends. A variable is said to be stationary or significantly if the probability value is smaller than 0.05 or lower than the t value at a certain level of significance. The value of the economic growth variables in the non-trend test is -3.8543 and signify at the 1% significance level. Whereas the probability value is 0.007 and lower than 0.05, then the variable is stationary. Whereas, the value of the economic growth variables in the test is -4.5306 significance at the 1% significance level. Whereas the probability value is 0.0075 and lower than 0.05, then this variable is stationary. Meanwhile, the value of the variable in the non-trends test is -0.5096 and is significant at the 1% significance level. Whereas the probability value is

0.004 and lower than 0.05, then the variable is stationary. Meanwhile, the value of the labour force in the test is -0.5009 and significant at the 1% significance level. Whereas the probability value is 0.0025 and lower than 0.05, then the variable is stationary.

In addition, the unemployment variable value in the no trending test is - 8.3757 and is significant at the 1% significance level. Whereas the probability value is 0.0000 and lower than 0.05, then the variable is stationary. Meanwhile, the unemployment variable value in the trend test is - 8.2331 and is significant at the 1% significance level. Whereas the probability value is 0.0000 and lower than 0.05, then the variable is stationary. In addition, the value of higher education enrolment in the test without trends was - 0.6351 and significant at the 1% significance level. Whereas the probability value is 0.0000 and lower than 0.05, then the variable is stationary. Whereas, the higher education enrolment variable value in the test is - 6.3823 and significant at the 1% significance level. Whereas the probability value is 0.000 and lower of 0.05, then this variable is stationary. In conclusion, the ADF test at the first difference level shows that all variables significant and stationary.

The Optimum Lag Length Results

Based on the Vactor Autoregression (VAR) approach, the optimum selection of lag length is found. In this study four criteria of lag period selection are used consisting of Final Prediction Error (FPE), Akaike Information Criterion (AIC), Schwarz Information Criterion (SIC) and Hannan-Quinn Information Criterion (HQ).

Table 3.6. Lag Duration Determination Test (Lag Length) Based on the VAR Budgeting Method

| Ujian tempo h | Final | Akaike | Schwarz | Hannan - |
|---------------|-------------|-----------------|-----------------|-----------------------------|
| lag | Predictio n | Informati on | Informati on | Quinn |
| | Error (FPE) | Criterion (AIC) | Criterion (SIC) | Informati on Criterion (HQ) |
| 0 | 4.7607 | -3.2057 | -3.0106 | -3.1516 |
| 1 | 1.6309* | -8.9077* | -7.9326* | -8.6372* |
| 2 | 3.4709 | -8.2637 | -6.5086 | -7.77693 |

Note: *indicates the lag selected by the criteria based on the minimum value



Based on table 3.6 above, the result of the analysis suggests the lag selected is lag 1 because the lag selection is based on the smallest value for each criterion. This is because the value of Final Prediction Error is 1.6309, Akaike Information is -8.9077, Criterion Schwarz Information Criterion is -7.9326 and Hannan - Quinn Information Criterion is -8.6372. All of these values are the smallest compared to the lag periods 0 and 2. Therefore, the main criterion of the Akaike Information Criteria (AIC) shows a lag 1 for the study, then this lag 1 will be used for the cointegration test.

Johansen Juselius Cointegration Test Results

The long-term cointegration of variables can be examined through multivariate cointegration techniques Johansen and Juselius (1990) as all the variables involved in this study have the same level of intensity ie I (1). This study will use lag 1 as suggested by the AIC criteria in previous result. If the statistical trace stats and eigen-values statistic exceed the critical values at a certain level of significance, the null hypothesis that no co-integration will be rejected. This means that there is a long-term relationship between the variables.

Table 3.7. Testing of Multiple Johansen and Juselius Coordination Determination Test (Trace Statistics)

| Model | Hypothesis | Statistic | Critical | Variables | Coefficient | Results |
|-------|------------|-----------|----------|-----------|-------------|---------------------------------------|
| | Null | Trace | Value | | | |
| | | | (5%) | | | |
| | $r \leq 0$ | 29.4961 | 47.8561 | KDNK | 1.0000 | No co-integration in system equation. |
| | $r \leq 1$ | 13.9424 | 29.7971 | EMLOY | -2.5780 | |
| | $r \leq 2$ | 5.7858 | 15.4947 | UNEM | 1.1948 | |
| | $r \leq 3$ | 1.6625 | 3.8415 | ENROL | -2.2249 | |

Note : *Significant at 5 percent.

Tables 3.7 and 3.8 failed to detect the co-integration in the system. This is evidenced by using the trace test, where null hypotheses are rejected when all variables show trace statistical

values are smaller than critical values, thus indicating that trace tests are not significant. Analysis performed on economic growth variables found that the trace value was 29.4691 and smaller than the statistical value of 47.8561. Whereas, the variables are 13.9424 and smaller than the statistical value of 29.7971. The unemployed variable finds that the value is 5.7858 and is smaller than the statistical value of 15.4947. The higher education enrolment variable found that the value was 1.6625 and smaller than the statistical value of 3.8415. In conclusion, based on the Johansen and Juselius co-integration tests for trace statistics show that vectors are not co integrated in the model. This shows that there is no long-term relationship between the variables studied for this analysis.

Table 3.8. Testing of Multiple Johansen and Juselius Coordination Determination Test (Max Statistics)

| Model | Hypothesis | Statistic | Critical | Variables | Coefficient | Results |
|--------|------------|-----------|----------|-----------|-------------|---------------------------------------|
| | Null | Trace | Value | | | |
| | | | (5%) | | | |
| Lag: 1 | $r \leq 0$ | 15.5537 | 27.5843 | KDNK | 1.0000 | No co-integration in system equation. |
| | $r \leq 1$ | 8.1566 | 21.1316 | EMLOY | -2.5780 | |
| | $r \leq 2$ | 4.1233 | 14.2646 | UNEM | 1.1948 | |
| | $r \leq 3$ | 1.6625 | 3.8415 | ENROL | -2.2249 | |

Note: *Significant at 5 percent.

Conclusion

In conclusion, the relationship between employment, unemployment and higher education enrolment to economic growth is significant. While this study shows no long-term relationship, these variables can be considered important in generating production and economic sector activities that will ultimately lead to growth in the economy of the country. Hence, such aspects need to be emphasized in order for economic growth in line with the growth of the world economy. Community expertise in various angles needs to be continuously upgraded so that the state of the economy continues to grow from an economic point of view, or other angles. In order to stimulate the country's economic growth to keep pace with economic growth in other developed countries. Therefore, the government should take some steps



to make such modifications as employment, reduction of unemployment and higher education enrolment can help the economy grow actively. The first implication implies that the government should take various efforts to improve existing efforts in improving quality employment. Among the important aspects is the development of human capital. This is because, human capital development is able to assist the country in producing innovative and productive employment and can improve the country's economic growth. Therefore, the government should also be committed to training more skilled and skilled workers for the needs of the country's economy.

In addition, Malaysia needs to continue to focus on implementing efforts to strengthen and enhance employment development through education and training. This is because efficient, high-quality and highly skilled workforce can produce high-quality products and thus boost the country's economy in the long run. In addition, there are basic implications that can be made so that unemployment can be reduced in Malaysia. Among efforts by the government is to increase liberalization in trade and implement fiscal policies that can contribute to economic growth, particularly in the long run. Measures capable of achieving this goal are through specific incentives to encourage foreign direct investment (FDI) entry. This is because FDI is able to create more job opportunities in the short term. However, the focus should be on high quality, high-tech FDI entry that can generate job opportunities that require high proficiency and professionalism in line with national goals to stimulate economic growth at optimum levels. Furthermore, among the basic implications of higher education enrolment is the government should provide incentives to existing human resources to further higher education in the field of science, technology, management, and other fields that are more dynamic and have high demand in the market. Although the government has provided a high level of commitment to education, the education expenditure has not necessarily guaranteed the quality and effectiveness of the education offered. In addition, the government needs to make changes to every level of human capital development so as to increase the skills of the higher workforce. Then there is a high potential and marketability.

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