The Dynamic of Macroeconomics Elements in Malaysia: Further Insight into Causality Analysis

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Abstract **- This paper intends to explore the causality effect between Growth Domestic Product (GDP), population and unemployment in Malaysia. Based on the observation of Malaysia's historical data, there is a distinct movement in each of these individual macroeconomics components over the years. Past literature within the same area has illustrated various patterns on the possibility of a causal relationship that each variable has on one another. Several stages of analysis are conducted to verify the presence of causality effect from Malaysian economic perspective, which includes unit root test that employs the Augmented Dickey Fuller (ADF), Phillips-Perron (PP) and Kwiatkowski-Phillips-Schmidt-Shin (KPSS) procedures, followed by Johansen and Juselius test of cointegration and Granger-causality test based on Vector Error Correction Model (VECM) using E-views software. Each procedure is conducted using Malaysia's time series data for each of the three elements from 1980 to 2013 obtained from Malaysia's Department of Statistics. Our findings revealed that there is one cointegration detected for the tested variables; whereas the results indicate that population can Granger cause unemployment in the short run. Furthermore, it is found that unemployment solely bears the effect from short run adjustment to bring about the long run equilibrium within the tested framework. This study is important for the policy maker to understand the reason behind the causality effect that could jeopardize the rate of unemployment in Malaysia. As the attention is given specifically to three variables particularly GDP, population and unemployment, this study is aimed at broadening the prospect for further investigation within the same area of macroeconomics.**

Keywords: *Gross Domestic Product, unemployment, population, causality*

I. Introduction

With 32 million multi-ethnic populations estimated in 2017, Malaysia is characterized as a developing economy largely driven by services and manufacturing sector (Department of Statistics Malaysia, 2017). As of the third quarter of 2017, the services sector constitutes 54.4 percent contribution to the country's Gross Domestic Product (GDP), followed by the manufacturing sector with 22.8 percent. Meanwhile, the overall Gross Domestic Product grew stronger at 6.2 percent in an increasing trend since the first two quarters of the year, at 5.6 percent and 5.8 percent respectively (Department of Statistics Malaysia, 2017).

As witnessed in past literatures, studies in the area of economic development are frequently associated with a country's total output, population and unemployment. Okun (1962) outlined the inverse interaction between unemployment and economic growth that later applied in a number of empirical analyses using various countries' economic data such as Malaysia (Noor, Nor & Ghani, 2007), Greece, France, Spain (Rigas, Theodosiou, Rigas & Blanas, 2011), Jordan (Kreishan, 2011) and Nigeria (Michael, Emeka & Emmanuel, 2016). As for population and economic growth, Jung and Quddus (1986) initiated a novel attempt to explain the association between these variables in 44 countries consist of both developed and developing countries. Successive studies were then developed based on economic and geographic regions such as developing countries (Kapuria-Foreman, 1995), and Asian countries (Tsen & Furuoka, 2005), as well as country-specific such as India (Dawson & Tiffin, 1998). Furthermore, the relationship between population and unemployment has also been tested to identify the influence of these variables on one another. Flaim (1990) explained the growing population in the United States during the 60s to 80s as the stimulator of unemployment in the country. This has enticed the emergence of more empirical evidences in different countries such as China, India, Pakistan (Aurangzeb & Asif, 2013) and the Philippines (Urrutia, Tampis & Atienza, 2017).

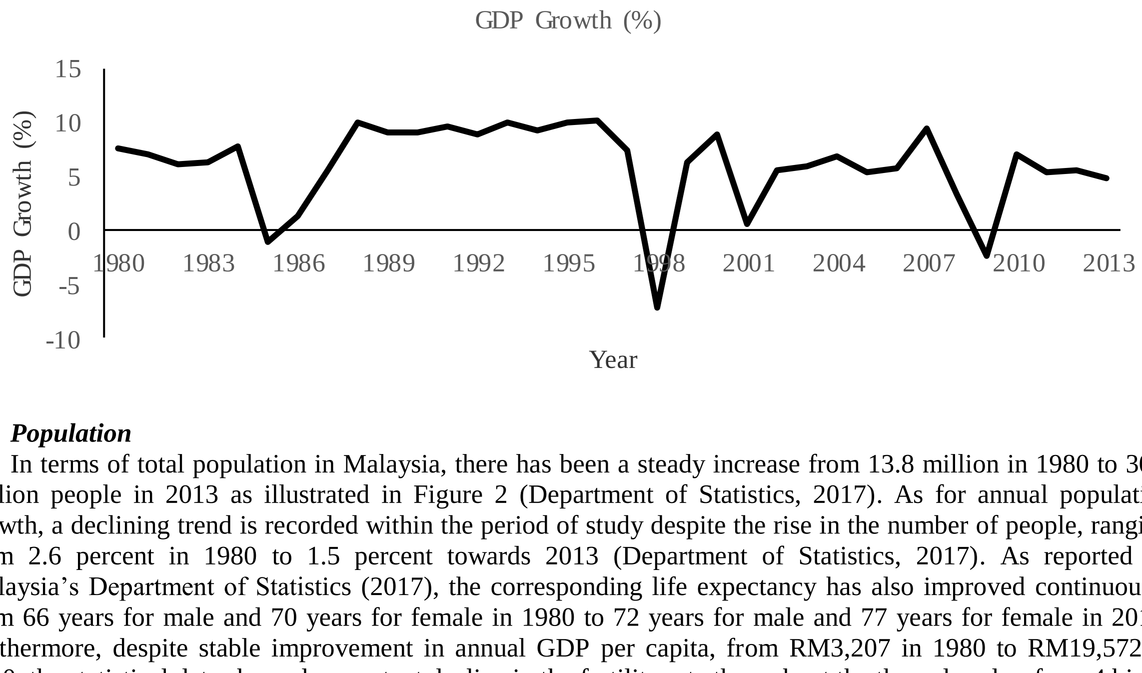
This study aims to provide further insight on causality relationship between economic growth, population and unemployment in Malaysia. To follow up on previous researches done in this area, the presence of both short run and long run cointegration and causal relationship between these three variables are tested using Malaysia's time series data from 1980 to 2013.

The Overview of Malaysian Economy

Gross Domestic Product

The growth of Gross Domestic Product in Malaysia has shown fluctuating trends from 1980 to 2013 as can be seen in Figure 1 (World Bank, 2017). In the early 1980s, Malaysia experienced sustainable annual GDP growth rate at an average of 7 percent with the acceleration in the manufacturing sector through the establishment of heavy industries, followed by the massive decline in 1984 and 1985 due to economic downturn resulted from high interest rate policy in the United States (Athukorala, 2010). The period from 1986 to 1996 saw the golden phase in the Malaysian economy with the introduction of more effective policies that boosted the economy such as privatization policy and the promotion of foreign direct investments. The Asian financial crisis in 1997 started in Thailand left a significant negative impact to the country's economy, to which Athukorala (2010) termed Malaysia as "the innocent victim of speculative attack that happened in the neighbor country" resulted from the liberation policy of capital market announced in early 1990s. Consequently, Malaysia recorded negative growth rate at 7.4 percent within this period. In 2008-2009, the global financial crisis triggered by the speculative bubble in the United States' housing market sparked yet another crack in the Malaysian economy in the form of decline in the share prices of the country followed by contraction in export earnings (Athukorala, 2010). Thus, GDP growth dropped significantly from 3.3 percent to -2.5 percent during this phase. As pointed by Munoz Moreno *et al.* (2016), the country's highly open economic environment has caused this fluctuation, whereby Malaysia is prone to external shocks resulted from the world's economic vulnerability.

Figure 1. Gross Domestic Product growth of Malaysia from 1980 to 2013
Source: World Bank, 2017.



Population

In terms of total population in Malaysia, there has been a steady increase from 13.8 million in 1980 to 30.2 million people in 2013 as illustrated in Figure 2 (Department of Statistics, 2017). As for annual population growth, a declining trend is recorded within the period of study despite the rise in the number of people, ranging from 2.6 percent in 1980 to 1.5 percent towards 2013 (Department of Statistics, 2017). As reported by Malaysia's Department of Statistics (2017), the corresponding life expectancy has also improved continuously from 66 years for male and 70 years for female in 1980 to 72 years for male and 77 years for female in 2013. Furthermore, despite stable improvement in annual GDP per capita, from RM3,207 in 1980 to RM19,572 in 2010, the statistical data showed a constant decline in the fertility rate throughout the three decades, from 4 births per woman throughout her reproductive life in 1980 to 2 births per woman throughout her reproductive life in 2013 (Department of Statistics, 2017). Ismail, Rahman and Hamid (2015) also addressed similar observation in their conference proceeding where the elderly population in Malaysia has increased to 5.4 percent in 2014 as compared to 3.3 percent in 1970, while the percentage of young population less than 14 years old declined from 44.8 percent in 1970 to just 26.1 percent in 2013.

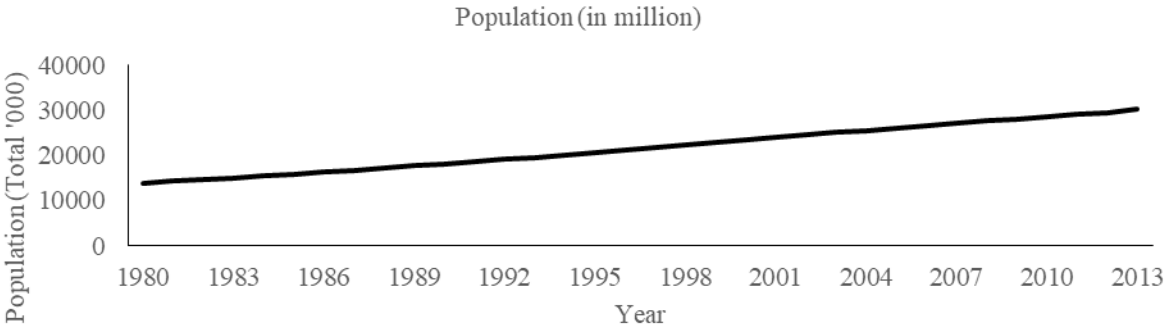


Figure 2. Total population of Malaysia from 1980 to 2013
Source: Department of Statistics Malaysia, 2017.

Unemployment

The level of unemployment in Malaysia registered an annual rate in varying magnitudes from 1982 to 2013 as shown in Figure 3 (Department of Statistics Malaysia, 2017). From the statistics, the annual unemployment rate is relatively higher in the 1980s, reaching its peak in 1986 at 7.4 percent. Noor *et al.* (2007) attributed the soaring unemployment rate from 1984 to 1988 with the wide spread recession that caused significant dip in both internal and external demand particularly in the infant manufacturing sector during the period. From 1990 onwards, the rate of unemployment in the country has stabilized within the range of 3 percent to 4 percent annually. Overall, a declining pattern is observed on the rate of unemployment in Malaysia throughout the period of study.

Figure 3. Unemployment rate (in percentage) of Malaysia from 1980 to 2013
Source: Department of Statistics Malaysia, 2017.

II. Literature Review

The relationship between unemployment and economic growth has long been the subject of argument among researchers. Arthur Okun (1962) in his original work stated that there is a negative interaction between these two macroeconomic elements, whereby 1 percent point decline in the US's unemployment rate would increase the national output by 3 percent. In Malaysia, the cointegration and Granger-causality analysis based on Okun's law by Noor *et al.* (2007) using time series data of the country from 1970 to 2004 indicate the presence of bidirectional causality between unemployment and the growth of Gross Domestic Product (GDP). Furthermore, there exist a negative interaction between these two variables. In another study, the validity of Okun's law in today's economic environment is further examined on three countries; Greece, France and Spain (Rigas *et al.*, 2011). It is revealed that two-way causality does not exist between GDP growth and unemployment rate in any of the countries. Similar result is obtained by Kreishan (2011) in the case of Jordan where changes in economic growth in Jordan does not explain the problem of unemployment in the country despite the presence of long-run cointegration between the variables. More recently, Michael *et al.* (2016) investigated the causality between unemployment and real Gross Domestic Product in Nigeria and found a unidirectional relationship between these two variables where causality is running from the latter to the former.

In studying the association between population and economic growth, a number of researches cited the novel attempt by Jung and Quddus' (1986) Granger-causality analysis on annual data of population growth and economic development based on per-capita GNP of 44 countries including 19 developed countries and 25 developing countries. Their results however show no clear evidence on causality characterization between the two variables in these countries. Out of all 44 countries, only Ecuador, Tunisia and Sri Lanka passed the causality test with positive sign among developing countries. For developed countries, only Denmark and Japan supported the causality hypothesis between population growth and economic development. Kapuria-Foreman (1995) conducted similar analysis with smaller scope to 15 developing countries and found a distinct pattern of interaction between population and economic growth, measured by Gross Domestic Product per capita. Out of all 15 countries, this interaction was found only in India, China, Turkey and Chile. While the direction of causality is positive in China, Turkey and Chile, the population growth in India reacts negatively towards per capita income of the country. Dawson and Tiffin (1998) narrowed down the focus of the study further, where cointegration and Granger-causality procedure was employed to test the relationship between population and economic growth specifically in India. The time series analysis from 1950 to 1993 indicates the absence of long-run interaction between the two variables. Furthermore, population growth neither Granger causes economic growth in India nor is caused by it. In a more recent study by Tsen and Furuoka (2005) using time series data of 10 Asian countries including Malaysia from 1995 to 2000, mixed results are derived from the association between these two variables. A bidirectional causal relationship exists between population and economic growth in Japan, Korea and Thailand, whereby in China, Singapore and the Philippines, causality is present in one way movement from population to economic growth. In contrast, it is revealed that economic growth Granger causes population in Hong Kong and Malaysia, and not vice versa. While for Taiwan and Indonesia, no evidence is found on Granger causality between the two elements. Based on these findings, they conclude that there is no straightforward relationship between population and the growth of Gross Domestic Product as an indicator of economic development.

Moving to the interaction between population and unemployment, there are several studies conducted in the past in this particular area. Flaim (1990) observed an upward trend in unemployment rate in the United States during 1960s until 1970s along with growing population. Moreover, as the generation mature a decade later in 1980s, unemployment corresponded accordingly with relatively lower rate than the previous two decades. Hence, he confirmed that changes in age and population have an impact on unemployment. In a cross-country analysis to identify the determinants of unemployment in India, China and Pakistan, Aurangzeb and Asif (2013) did not find any bidirectional causal relationship between population and employment in any of the three countries despite there exists long run cointegration between variables under investigation. In the following year, Aqil, Qureshi, Ahmed and Qadeer (2014) attempted to discover the macroeconomic factors that influence unemployment particularly in Pakistan. Four variables namely economic growth measured using GDP, inflation, foreign direct investment (FDI) and population were tested against unemployment to examine their impact on the latter. Regression models were developed based on these variables using standard correlation procedure. While GDP and inflation are found to be insignificant to influence unemployment, it is revealed that FDI and population spill negative effect on unemployment. Urrutia *et al.* (2017) employed similar approach done by Aurangzeb and Asif (2013) in conducting a time series analysis from 1988 to 2004 to assess the presence of causal relationship among six macroeconomic elements including population and unemployment in the Philippines. Their findings indicate the significance of population in affecting unemployment in both short run and long run in a way that the former Granger causes the latter.

III. Research Method

Source of Data

Three macroeconomic variables; Gross Domestic Product, population and unemployment rate are selected for this study using time series data from 1980 to 2013 obtained from Department of Statistics Malaysia. The data are converted into logarithm form to reflect time series attribute in the subsequent analyses including unit root, cointegration and causality test.

Unit Root Tests

For the unit root test, the Augmented Dickey Fuller (ADF), Phillips-Perron (PP) and Kwiatkowski-Phillips-Schmidt-Shin (KPSS) procedures are conducted to ascertain the stationarity of the variables and to determine the order of integration of the data series (Hussain, Siddiqi & Iqbal, 2010). The presence of unit root in the variables are subject to "spurious regression" (Gujarati, 1995) hence indicates the data are non-stationary in levels and will be tested in first and second order difference. Michael *et al.* (2016) noted that stationary time series imply the reliability of the data series to predict future movement in economic activities.

Cointegration Test

The subsequent procedure involves Johansen-Juselius (JJ) cointegration test, with the purpose to investigate the long run interaction among variables, in a way two or more variables move closely together and eventually reach at equilibrium point (Michael *et al.*, 2016). In this test, the rejection rule of the null hypothesis happens when the t-statistic is bigger than critical value, or when the p-value is smaller than the chosen level of significance (Johansen & Juselius, 1990). According to Mahmud (2015), this test is "widely applicable for time series data with more than one cointegrating relationship".

Causality Test

Once the long run cointegration is confirmed among variables, the next procedure of Granger-causality method takes place to determine the nature of relationship between two variables whether there exist bidirectional, unidirectional or no causal interaction between them (Michael *et al.*, 2016). In this procedure, we employed Vector Error Correction Model (VECM) to identify "the short run dynamics and cointegrating equation in data series" (Michael *et al.*, 2016) to achieve long run equilibrium. The VECM readings infer the changes in the dependent variable corresponding to the cointegration disequilibrium as captured by the error-correction term as well as changes in other explanatory variables (Mahmud, 2015). F-test for additional generating intervals and t-test for lag parameter error correction are used to identify the causes of short run and long run relationship respectively (Granger, 1986). The following equation illustrates VECM through VAR model constraints:

$$\Delta Y_t = \sum_{i=1}^{n} A_i \Delta Y_{t-1} + \sum_{i=1}^{y} \varsigma i \Theta t - 1 + v_t$$

The equation above demonstrates the variable Y_t in the form of vectors, with A_i and ζ_i serve as the parameter estimator, Δ as the differential operator and v_t as the vector that explains the unexpected movement in Y. Any error correction cointegrating vector coefficient, r as derived from the Johansen maximum likelihood estimation is included in Θ.

IV. Findings and Discussion

1. Unit Root Test

Table 1(a) ADF Unit Root Test Results

Augmented Dickey-Fuller (ADF) Test of Unit Root				
VAR	**Type**	**Level**	**1st Diff**	**Order**
LGDP	Intercept	0.324539	-4.874001**	I(1)
	Trend & Intercept	-2.038309	-4.877008**	
LPOP	Intercept	1.375257	-4.207565**	I(1)
	Trend & Intercept	-2.663708	-4.287510**	
LUNEMP	Intercept	-1.141581	-3.125200**	I(2)
	Trend & Intercept	-1.633154	-3.116026	

Table 1(b) PP Unit Root Test Results

Phillips-Perron (PP) Test of Unit Root				
VAR	**Type**	**Level**	**1st Diff**	**Order**
LGDP	Intercept	0.359119	-4.840920**	I(1)
	Trend & Intercept	-2.038309	-4.830368**	
LPOP	Intercept	1.060011	-4.194894**	I(1)
	Trend & Intercept	-2.591510	-4.306156**	
LUNEMP	Intercept	-1.623320	-3.115705**	I(2)
	Trend & Intercept	-2.062281	-3.103555	

Table 1(c)
KPSS Unit Root Test Results

Kwiatkowski-Phillips-Schmidt-Shin (KPSS) Test of Unit Root				
VAR	**Type**	**Level**	**1st Diff**	**Order**
LGDP	Intercept	0.735534	0.136429	I(1)
	Trend & Intercept	0.088100	0.059380	
LPOP	Intercept	0.662757**	0.287487	I(1)
	Trend & Intercept	0.138098	0.177268**	
LUNEMP	Intercept	0.322744	0.084477	I(2)
	Trend & Intercept	0.074456	0.077293	

Table 1(a), 1(b) and 1(c) unveil the results of stationary test from ADF, PP and KPSS unit root tests respectively. The integration order of each variable is identified at 5 percent level of significance. The (*) symbol indicates that t-statistic value is higher than significance level and thus, implies that the null hypothesis is rejected at 5 percent level of significance. The results conclude that LGDP and LPOP are stationary at first difference while LUNEMP is stationary at second difference. All variables tested with ADF and PP are detected with unit root problem at level except for KPSS test. As the conclusion, LGDP and LPOP are I(1) variables while LUNEMP is I(2) variable.

2. Cointegration Test

Table 2 Johansen and Juselius Cointegration Test Results

Johansen-Juselius Test of Cointegration					
Null	**Alternative k = 1 r = 0**	**λmax**		**λtrace**	
		Unadjusted	**95 percent critical value**	**Unadjusted**	**95 percent critical value**
r = 0	r = 1	27.12330*	21.13162	33.17713*	29.79707
r ≤ 1	r = 2	6.015181	14.26460	6.053832	15.49471
r ≤ 2	r = 3	0.038650	3.841466	0.038650	3.841466

Note: k is the lag number, r is the number of cointegrating vectors, λmax = λMax-Eigen value

The Johansen and Juselius (JJ) test was carried out based on cointegration technique. Gonzalo (1994) provides the optimal lag length for the Vector Autoregressive (VAR) to support JJ procedure through a likelihood ratio statistic for determining the cointegration rank. Based on Table 2, the computed test statistic value for both max and trace statistics are greater than the critical value of 95 percent. As a conclusion, there is one cointegrating vector detected for the tested model based on the suggested result of Max-Eigen statistic with 2-lag length that indicates there is long run relationship between the variables LGDP, LPOP and LUNEMP.

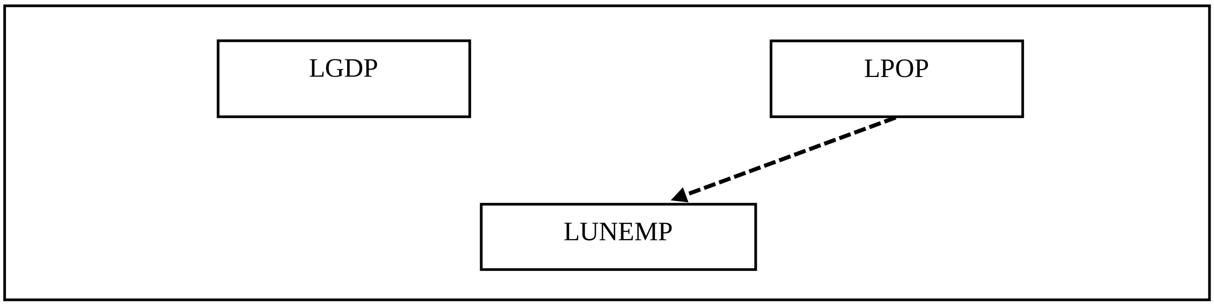
3. Causality Test

Table 3 Granger-Causality Test Results

Granger-Causality Test					
Dependent variable	**Independent variable**			**ECT**	
	ΔLGDP	**ΔLPOP**	**ΔLUNEMP**		
	χ2 statistics			**Coefficient**	**t-ratio**
ΔLGDP	-	1.6772 (0.4323)	1.6016 (0.4490)	0.0417	0.5573
ΔLPOP	0.3448 (0.8416)	-	0.8970 (0.6386)	-0.0084	-2.3810
ΔLUNEMP	2.4862 (0.2885)	10.5313 (0.0052)*	-	-0.3120*	-3.6654

The notation (*) indicates that p-value is significant at 5 percent level of significance. The respective p-values are recorded in parentheses. The * at the ECT denotes the correct ECT.

Table 3 shows Granger-causality test results estimated through Vector Error Correction Model (VECM). In the short run, LPOP Granger causes LUNEMP at 5 percent level of significance. This result indicates the ability of the population variable in predicting the occurrence of unemployment in our research framework. Hence, the outcomes obtained by Aqil *et al.* (2001) and Urrutia *et al.* (2017) in their discussion of causality impact of population on unemployment by using similar analysis are consistent in the case of Malaysia. On top of that, the results reveal that LPOP share unidirectional relationship with LUNEMP. ECT represents the long run relationship that explains the speed of adjustment of the variables back to equilibrium level. The ECT of LUNEMP in the tested model is statistically significant at 5 percent level of significance. Thus, LUNEMP is the dependent variable within our tested framework. LUNEMP solely bears the effect from short run adjustment to bring about the long run equilibrium. The ECT coefficient of LUNEMP is -0.3120, which means that 31.2 percent of adjustment happens annually or in other words, it takes approximately 3.2 years for the model to achieve long run equilibrium. The causal relationship between LGDP, LPOP and LUNEMP is illustrated as follows:



Note:
LGDP ⇢ LUNEMP implies one-way causality relationship at 5 percent significance level.

Figure 4. The causal relationship between LGDP, LPOP and LUNEMP

V. Conclusion

Outcomes from our analysis unveiled the presence of causality effect between Gross Domestic Product, population and unemployment in Malaysia. It is revealed that population can be used as an element to forecast the problem of unemployment in the country. According to Aurangzeb (2013) in his research , he founds out that factor like populations growth might worsening the unemployment. This is because when there are too many people living in a country but too little amount of avaiable jobs, people tend not know what to do. Nano P. (2017) also found out that, in the long term, the relationship between population will significantly affect the number of unemployment. Therefore, past information on population contains the useful information to assist policy makers to predict and subsequently implement the necessary measures to curb the issue of unemployment in the country. In other words, along with the growing population, it indicates the likelihood of unemployment to occur after a certain period. The government of Malaysia has introduced a number of initiatives that are consistent with this situation. One of the existing implementations is the introduction of 1Malaysia Training Scheme (*Skim Latihan 1Malaysia*) in 2011 "to enhance employability and to equip graduates with the necessary skills" (Economic Planning Unit of Malaysia, 2017). This effort is seen as a noble initiative by the government to address the issue of unemployment while at the same time accommodates the needs of Malaysians through employment creation. Aurangzeb (2013) also suggested that training opportunities should be developed and the government also need to create job opportunities not only to educated people, but also for the uneducated people.Hence, with larger population expected to grow in the coming years, more initiatives such as entrepreneurial programs that incorporate the exposure to global market should be introduced to achieve the objective of reducing the level of unemployment in the country. An example of such programs is 'Young Entrepreneurship Program' that was introduced in Sydney in 2017 which provides professional guidance to the Chinese community in Australia to engage in a cross-cultural business environment. Throughout the program, participants were given intense hands-on experience to conduct their business across borders and capitalize on the lucrative marketplace between Australia and China (Xinhua, 2017). It is recommended that future studies in this area should include more elements in order to provide better illustration on the interaction between multiple macroeconomic variables. With the ever-changing state of the economy, the outcomes might differ from country to country, thus cross-sectional studies by geographic and economic regions can be conducted for benchmarking and comparison purpose.

References

Aqil, M., Qureshi, M. A., Ahmed, R. R., & Qadeer, S. (2014). Determinants of unemployment in Pakistan. *International Journal of Physical and Social Sciences, 4*(4), pp. 676-682.

Athukorala, P. C. (2010). Malaysian economy in three crises. *Working Papers in Trade and Development*, Retrieved from http://rspas.anu.edu.au/economics/publications.php

Aurangzeb & Asif, K. (2013). Factors effecting unemployment: A cross-country analysis. *International Journal of Academic Research in Business and Social Sciences, 3*(1), pp. 219-230.

Dawson, P. J., & Tiffin, R. (1998). Is there a long-run relationship between population growth and living standards? The case of India. *Journal of Development Studies, 34*(5), pp. 149-156.

Department of Statistics Malaysia. (2017). Gross domestic product third quarter 2017. Retrieved November 18, 2017,https://www.dosm.gov.my/v1/index.php?r=column/cthemeByCat&cat=100&bul_id=M3ZGdXNNYTA4SExGWEhvb2F4T3ZEQT09&menu_id=TE5CRUZCblh4ZTZMODZIbmk2aWRRQT09

Department of Statistics Malaysia (2017). Time series data: Employment [Data file]. Retrieved from https://www.dosm.gov.my/v1/uploads/files/3_Time%20Series/Malaysia_Time_Series_2015/21Guna_Tenaga.xls

Department of Statistics Malaysia (2017). Time series data: National accounts [Data file]. Retrieved from https://www.dosm.gov.my/v1/uploads/files/3_Time%20Series/Malaysia_Time_Series_2015/01_Akaun_Negara.xlsx

Department of Statistics Malaysia (2017). Time series data: Population statistics [Data file]. Retrieved from https://www.dosm.gov.my/v1/uploads/files/3_Time%20Series/Malaysia_Time_Series_2015/22Perangkaan_Penduduk.xls

Economic Planning Unit of Malaysia. (2017). Introduction of 1Malaysia training scheme. Retrieved November 18, 2017, from http://www.epu.gov.my/en/sl1m/introduction

Flaim, P. O. (1990). Population changes, the baby boom and the unemployment rate. *Monthly Labor Review, 113*(8), pp. 3-10.

Gonzalo, J. (1994). Five alternative methods of estimating long-run equilibrium relationships. *Journal of Econometrics, 60*(1-2), pp. 203-233.

Granger, C. J. W. (1986). Development in the study of cointegrated economic variables. *Oxford Bulletin of Economics and Statistics, 48*, pp. 213-228.

Gujarati, D. (1995). *Basic Econometrics* (3rd Ed.) McGraw-Hill, USA. ISBN: 9757860557.

Hussain, T., Siddiqi, M. W., & Iqbal, A. A. (2010). Coherent relationship between economic growth and unemployment: An empirical evidence from Pakistan. *International Journal of Economics and Management Engineering, 4*(3), pp. 288-295.

Ismail, N. W., Rahman, H. S. W. A., & Hamid, T. A. T. A. (2015). Does population aging affect economic growth in Malaysia? *Prosiding PERKEM, 10*, pp. 205-210.

Johansen, S., & Juselius, K. (1990). Maximum likelihood estimation and inference on cointegration with applications to the demand for money. *Oxford Bulletin of Economics and Statistics, 52*(2), pp. 169-210.

Jung, W. S., & Quddus, M. (1986). Economic development and population growth: International evidence based on causality tests. *Analisis Economico, 1*(1), pp. 33-46.

Kapuria-Foreman, V. (1995). Population and growth causality in developing countries. *Journal of Developing Areas, 29*(4), pp. 531-540.

Kreishan, F. M. (2011). Economic growth and unemployment: An empirical analysis. *Journal of Social Sciences, 7*(2), pp. 228-231.

Mahmud, M. A. (2015). Econometric model on population growth and economic development in India: an empirical analysis. *International Symposium on Emerging Trends in Social Science Research Chennai*, Retrieved from globalbizresearch.org/Chennai Symposium/conference/pdf/C539.pdf

Michael, E. O., Emeka, A., & Emmanuel, E. N. (2016). The relationship between unemployment and economic growth in Nigeria: Granger causality approach. *Research Journal of Finance and Accounting, 7*(24), pp. 153-162.

Munoz Moreno, R, Perotti, V., Revilla, J. E., Loayza, N. V., Teh Sharifuddin, S., Kunicova, J., Simler, K., Chuah, L. L., Habalian, R. A., Kim, Y. E., Amin, M., Testaverde, M., Rahardja, S., Kuriakose, S., De Luna-Martinez, J., & Campillo Diaz, S. (2016). *Malaysia economic monitor: the quest for productivity growth (English)*. Washington, D.C.: World Bank Group. Retrieved from http://documents.worldbank.org/curated/en/773621481895271934/Malaysia-economic-monitor-the-quest-for-productivity-growth

Nano P.(2017). The Analysis of Factors Influencing Unemployment in Indonesia During 1984-2013 The model of Vector Error Correction Model (VECM). *International Journal of Civil Engineering and Technology, 8(9),* pp. 18–25

Noor, Z. M., Nor, N. M., & Ghani, J. A. (2007). The relationship between output and unemployment in Malaysia: Does Okun’s law exist? *International Journal of Economics and Management, 1*(3), pp. 337-344.

Okun, A. M. (1962). Potential GNP: Its measurement and significance, *American Statistical Association, Proceedings of the Business and Economics Statistics Section* (pp. 98-103). Yale: Cowles Foundation for Research in Economics.

Rigas, J., Theodosiou, G., Rigas, N., & Blanas, G. (2011). The validity of the Okun’s law: An empirical investigation for the Greek economy. *Journal of European Economy, 10*(1), pp.16-38.

The World Bank, World Development Indicators (2017). GDP growth [Data file]. Retrieved from https://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG?end=2016&locations=MY&start=1976&view=chart

Tsen, W. H. & Furuoka, F. (2005). The relationship between population and economic growth in Asian economies. *ASEAN Economic Bulletin, 22*(3), pp. 314-330.

Urrutia, J. D., Tampis, R. L. & Atienza, J. B. E. (2017). An analysis on the unemployment rate in the Philippines: A time series data approach. *Journal of Physics: Conference Series, 820*(1).

Xinhua. (2017, February 15). Australia, China launch young entrepreneurship program. *China Daily*. Retrieved from http://www.chinadaily.com.cn/business/2017-02/15/content_28207250.htm