The Role of Education Expenditure on Economic Growth under Recovery Regime of World Economic Crisis

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Abstract: *The purpose of this study is to investigate the role of government education expenditure on economic growth in Malaysia. This study emphasizes on the recovery regime, which is after world economic crises in 2008 as a sample of study. The augmented non-linear Cobb Douglass model is adapted for the study to achieve its objective. Moreover, the study adopts Ordinary Least Square testing procedure in investigating the determinant's magnitude value of each variable. The result suggests that capital, unemployment and education expenditure are crucial in explaining the dependent variable, economic growth, at 95 percent significance level. In addition, the literacy rate is important in explaining the economic growth at 90 percent significance level. The study implies that augmentation of government expenditure on education is necessary in order to reduce the unemployment rate in Malaysia during crisis scenario. Realistically, well educated, technically skilled and physically fit workers will further enhance their opportunities in the job market that would lead towards the reduction in Malaysia's unemployment. Consequently, it is recommended that government should expand its education expenditure ratio and spend more on improving the literacy rate in Malaysia. In effect, increase investments in these two promising factors are essential in the decline of unemployment level in the country in the long run. For future study, dynamic modeling is useful to examine the short run and long run relationships among the variables.*

Key words*: Economic growth, Education expenditure, Economic crisis, Cobb-Douglas Model, Ordinary Least Square.*

I.   INTRODUCTION

Being one of high middle income countries, Malaysia has been a successful developing country in Asia and has forged ahead in becoming a developed nation. To illustrate, GDP in Malaysia had shown annual drastic increase from 1988 until 2018. In fact, there have been numerous factors that have influenced Malaysia's economic growth. A study done in [1] stated that economy in globalized era had been exposed to external factors through economic, political and social relationships. Therefore, the country needs knowledgeable human capital in generating its economic growth to ensure its sustainable and balanced development. Based on the statement, Malaysian government had introduced knowledge economy (K-Economy) in 2000 to improve its economic growth. Researchers [2], [3], and [4] believe that

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growth is influenced by highly educated and skilled human capital. In other words, individuals have the ability to increase level of productivity and, in turn, contribute to the economic growth.

This argument is also supported by [5], [6] and [7], they predict that individual literacy will result in positive economic growth, social and political development at national level. Hence, the role of government expenditure on education and literacy level has welcomed vast debates among the academic scholars. Indisputably, literacy level as well as government expenditure bring positive and significance impacts on economic growth. Reasonably, according to [8], rising literacy level in the population will lead to favorable high productivity in the country. My point being, the level of readiness among societies for better living standard can be observed through their literacy level. Nonetheless, discussions regarding the impact of literacy level on county performance are hard to find due to the difficulty to obtain the results of data extraction results at the macroeconomic level.

Apart from that, unemployment is an undesirable issue that occur in every nation worldwide. In contrast with positive impact of government education spending on a country's economic growth, unemployment negatively affected economic growth. Referring to [9], they claim that unemployment will lead to the incidence of depreciation to the country.

Besides, since this study focuses on a specific period of time, it may produce different results on the same area of study. The idea of the inclusion of regime is extracted from [10], [11] and [12]. For instance, the crisis regime may represent the situation during periods of economic crisis, financial crisis or during certain exchange rates regime (fixed exchange rates or floating exchange rates). The specific time periods may yield dissimilar implications, which can change the relationships between variables, positive to negative or vice versa. Therefore, this study will focus on a specific time period in order to observe the changing of the relationship between variables. Many studies including [13] and [14], have claimed that economic crisis have brought significant impact on economic growth in many countries.

In line with its aim to investigate the role of government spending on education and literacy levels in the country's economic growth, under recovery regime after world economic crisis in 2008, some macroeconomic variables are considered as control variables in this study. Using monthly time series data from 1980 to 2018, this study looks at the effect of these selected macroeconomic variables, namely capital, unemployment, education, literacy rate and economic crisis on the country's GDP. The findings of this study are aimed to provide clear overview of macroeconomic issues in the country and help policymakers in understanding the impact of the variables in the long run. Additionally, this study identifies some ideal solutions to ensure the stability of Malaysian economy during the crisis. Figure 1, shows the trends of education expenditure and services expenditure on education toward economic growth during the specific timeframe.

Figure 1 Trend analysis of Education expenditure in Malaysia
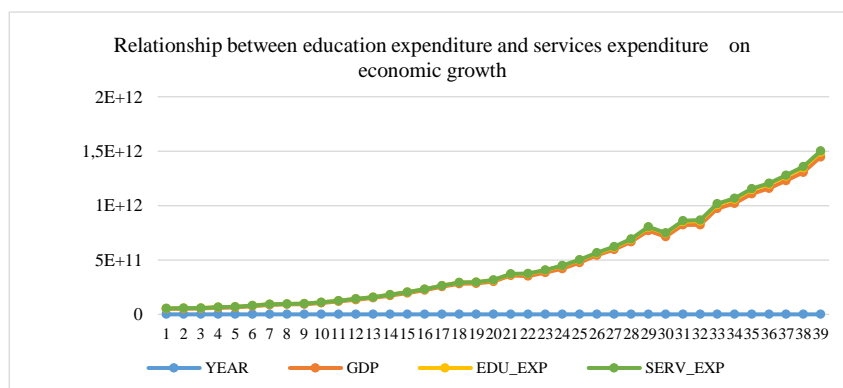
II. LITERATURE REVIEW

Previous discussions on the issues of education expenditure and economic growth, give insightful guidelines in choosing the precise determination for the current study. Thus, this section does in depth discussions about past literature review before setting up a model to rigorously test the long run relationships and estimate the magnitude values of the independent variables. Along with many studies, this current study focuses on four selected macroeconomic variables in explaining Malaysian economic growth in the long run, comprising capital, unemployment, government expenditure on education and literacy rate. Earlier study by [1], has confirmed the role of education expenditure in improving long run economic growth. According to [1], the progress in the economy of a country can be measured by the increase in the workforce of a country, whereby the increase in government spending on education is vital in producing better human capital. This statement is later supported by many studies. Undeniably, many studies demonstrate positive relationship between education expenditure and economic growth, the relationship mentioned in studies done by [15], [16], [17], [18], [7] and [19] among others. They point out that education expenditure and economic growth have positively related and statistically significant in short run and long run. Contrastingly, in a study of [20], the finding result indicates that education expenditure is negatively impacted economic growth in short run while [7] shows negative impact in the long run. Though uncertain, recent studies involving the role of government spending in education is still in dire need to be carried out and studied when dealing with specific economic situations, such as in the event of an economic crisis or shock, spread of diseases such as Covid-19 that can potentially disrupt a force in the country's economy. As emphasized earlier, the focus of this study is merely on the regime after the global financial crisis in 2008.

Likewise, there are several studies that examine the relationship between the fixed capital formation, representing country's capital flow, and economic growth. Those studies find that fixed capital formation significantly affects future economic growth. The argument is consistent with a study conducted by [21]. Nevertheless, [22] claim that the fixed rate of capital formation does not guarantee economic growth. They suggest better efficient level of resource allocation from low to high productivity can produce better economic growth. This is coherent with the finding by [23], where capital formation does not affect economic growth. Moreover, [24] examines causal relationship between gross fixed capital formation and economic growth using panel data analysis. The result reveals significant relationship between capital and economic growth across selected developing countries. The study is consistent with the result by [4], where the finding unveils short and long run relationship between capital and economic growth in Malaysia. From the regime analysis point of view, previous studies still neglect the idea of regime analysis. As mentioned earlier, for analysis purposes, this study focuses on recovery regime in Malaysia after world economic crisis in 2008. This effort will further enhance the existence literature on the related studies.

III. METHODOLOGY, DATA AND MODEL SPECIFICATION

Initially, this study is inspired by [1] and [4]. However, those studies do not put their emphases on world crisis recovery regime. Thus, the current study fills the research gap by investigating the relationship between Malaysian government spending on education and its economic growth. In order to achieve this study aims, this research employs the deterministic econometrics tools, by utilizing ordinary least square approach in developing multiple linear regression model. According to [25], [26], [27], [28] and [29], the method is one of powerful approaches, among other econometrics tools, to estimate the magnitude values of independent variables in the long run. The ordinary least square estimator can produce the minimum variance, thus the estimated result is efficient. In our case, capital, government expenditure on education, literacy level and unemployment are used as independent variables whereas economic growth is considered as dependent variable.

For analysis purpose, this study uses the E-views software, in estimating the magnitudes of the variables (β_i). This study employs the time series data, in monthly frequency basis, from 2010 to 2018 with total number of observation is 216 (N=216). Due to unit differences between variables, data has been converted to a linear form of natural logarithm to avoid problems in the model specification. Equation (1), presents the augmented non-linear Cobb Douglass model. For estimating purpose, this non-linear form will be transformed into linear form as in equation (2). The non-linear Cobb-Douglas model is as follows;

$$GDP_t = \alpha CAP^{\beta 1} UNP^{\chi 2} EDU^{\beta 3} LIT^{\beta 4} \ell^{\mu t} \qquad (1)$$

From equation 1, the general estimation modelling is transformed in to linear form as follows:

$$\ln GDP_t = \alpha + \beta_1 \ln CAP_t + \beta_2 \ln UNP_t + \beta_3 \ln EDU_t + \beta_4 \ln LIT_t + \mu_t \qquad (2)$$

Where,

$\ln GDP_t$ = Economic growth in RM million

$\ln CAP_t$ = Real capital value measured from gross investment in RM million

$\ln UNP_t$ = Total of unemployment in a thousand people

$\ln EDU_t$ = Education expenditure in RM million

$\ln LIT_t$ = Literacy rate in percent

μ_t = Error term

t   = Monthly time series data

α = Constant

β_i = Magnitude values (i=1,2,3,4)

IV. RESULTS AND DISCUSSION

Accordingly, below is the general estimated model for this study;

$$\ln GDP_t = 0.364 + 0.443 \ln CAP_{1t} - 0.270 UNP_{2t} + 0.403 \ln EDU_{3t} + 0.003 \ln LIT_{4t}$$

SE = (0.176)   (0.038)   (0.063)   (0.028)   (0.002)

t*   = (2.067) (11.667)***   (-4.306)***   (14.442)***   (1.750)*

F* = 1594.696, R^2 = 0.997, $\bar{R}^2$ = 0.996, DW = 1.440

Note: Level of Significance;

          *** 99% significance level

    ** 95% significance level

  * 90% significance level

Table 1: t-test Results

Variables	Hypothesis	Statistical Test	Critical Value	Result	VIF	Rank
CAP_t	$\beta_1 = 0$ $\beta_1 \neq 0$	11.667	1.960 (at α=5%)	Reject H_0	4.567	2
UNP_t	$\beta_2 = 0$ $\beta_2 \neq 0$	-4.306	-1.960 (at α=5%)	Reject H_0	5.671	3
EDU_t	$\beta_3 = 0$ $\beta_3 \neq 0$	14.442	1.960 (at α=5%)	Reject H_0	3.219	1
LIT_t	$\beta_4 = 0$ $\beta_4 \neq 0$	1.750	1.960 (at α=5%)	Accept H_0	5.776	4

Table 1 simplifies the t-test results for all analyses under recovery regime in Malaysia. The critical value from statistical table is 1.960 for two tail test $(t_{\alpha/2} = 1.960)$. Thus, Table 1 delineates the results for t-test procedure. Consistent with the result table, the total capital (CAP_t), shows that its statistical value (t^*=11.667) is larger than critical value (t_α= 1.960), hence, the null hypothesis (H_0) is rejected. This simply means the capital level (CAP_t) is important in explaining the Malaysian economic growth, at 99 percent significance level. This result supports the previous outcomes including [30], [31], and [32] along with other studies. Undeniably, capital accumulation plays an important role in generating positive impact on economic growth. It means that the rise in capital indirectly increase labour productivity in the long run. Hence, capital accumulation, through enlargement in the production scale and specialization, increases economic production and productivity; thereby promotes economic growth. The above statement is in line with the indicators of the positive relationship between capital and the country's economic growth found in this study.

The second result of significance test is performed on β_2, the total unemployment (UNP_t) displays larger statistical value (t^*=-4.306) than its critical value (t_α= -1.960), therefore, null hypothesis (H_0) is rejected. Subsequently, unemployment (UNP_t) is imperative in explaining economic growth at 95 percent significance level. Naturally, unemployment has negative relationship with economic growth. This finding supports the previous results by [9] and [14], among other studies. Should the unemployment decreases, the labour force that contributes to generate productivity is rising, thus produce better economic growth to the country.

Government expenditure on education (EDU_t) is also significant in influencing economic growth, when the statistical value (t^*=14.442) is larger than its critical value (t_α= 1.960), null hypothesis (H_0) is rejected. Simply put, the education expenditure by the Malaysian government is extremely important in promoting economic growth at 95 percent significance level. This result supports previous empirical findings by [4], [33], [34], [35] and [36], among other studies. Rationally, the education expenditure, which is a measure of education quantity, presents human capital formation which can produce highly skilled labour force. These highly skilled labours can generate high productivity; in return, it will enhance positive economic growth. This statement is in line with the study result of the positive relationship between education expenditure and economic growth. From the result, should the expenditure on education increase by 1%, it will lead to an increase in economic growth at 0.403%.

The fourth result of significance tests is performed on β_4, total literacy rate (LIT_t). The result discloses that the statistical value (t^*=1.750) is less than critical value (t_α= 1.960), thus null hypothesis (H_0) is accepted at 95 percent significance level. Yet, the variable, i.e. literacy rate is still significant determinant of economic growth at 90 percent significance level. This result validates previous empirical findings by [1] and [37], among others studies. Still, it is viable to say that the economy is improved when learners have higher literacy levels. Therefore, the positive relationship between literacy levels and economic growth are in proportion to the government expenditure on education in this study.

Table 2: Results for F-Test

Model	Hypothesis	α	1-α	Statistical value	Critical value	Result
		0.01	99%	1594.696	3.41	Reject H_0

General Model	$H_0 = \alpha_1 = \alpha_2 = \alpha_3 = \alpha_4 = \alpha_5 = 0$ $H_1 = \alpha_1 \neq 0$	0.05	95%	1594.696	2.42	Reject H_0
		0.10	90%	1594.696	1.97	Reject H_0
		0.25	97.5%	1594.696	1.36	Reject H_0

Table 2 presents the results of F-test procedure. Overall, the combinations of all independent variables are good in explaining the dependent variables at 99% significance level (as well as at 95%, 90% and 97.5%). The estimated model has also passed the diagnostic testing procedure namely, heteroscedasticity, multicollinearity and autocorrelation. In ranking order, the significant variables in this study are capital, education, unemployment and finally literacy rate. In addition, the result insinuates that three economic indicators, capital, education and unemployment, are significant at 99% significance level. Meanwhile, literacy level is significant at 90% significance level (refer to Table 1).

V. CONCLUSION

In short, this study have identified the determinants of economic growth under recovery regime according to rank, specifically total of capital (CAP), total of education (EDU), total of unemployment (UNP) and finally, total of literacy rate (LIT). Customarily, high unemployment is considered as the worst scenario that could happen to any nations as it will lead toward depreciation. Thus, the unhealthy economic condition will indirectly affect economic growth in the long run. Therefore, it can be concluded that, in order to reduce the unemployment rate, the optimal effort should be done by the authority's bodies such as increasing education expenditure on part of the government. Convincingly, unemployment level will likely to drop whenever better educated, technically skilled and physically fit workforces are available in the country. This statement is fully supported by [38] and [39].

The study implies that augmentation of government expenditure on education is necessary in order to reduce the unemployment rate in Malaysia then support to improve the economic growth. Realistically, well educated, technically skilled and physically fit workers will further enhance their opportunities in the job market that would lead towards the reduction in Malaysia's unemployment.

It is proposed that government has to expand education expenditure ratio and literacy rate to further obstruct unemployment level from increasing in Malaysia. Huge investment and capital in education sector infer more schools will improve literacy among the masses; as a result, the situation will lead to a reduction in unemployment in the long run. Overall, it can be concluded that Malaysia's economic growth is largely driven by education and capital under recovery regime of world crisis in 2008. These two economic indicators are great contributors in generating better economic growth. Therefore, to achieve sustainability in economic growth, high level of productivity and improved competitiveness of the nation cannot be neglected. Positive efforts to improve the efficiency of production factors should be given greater emphasis. For future study, the dynamic model is needed in order to investigate the relationship between the variables in both short and long run.

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VI. REFERENCES

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