Does education expenditure lead or lag GDP ? Malaysian evidence

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Abstract:

This study focuses on the lead-lag relationship between education expenditure and GDP. Malaysia is taken as a case study. Given numerous initiatives and efforts introduced by the government to develop the education sector, it is interesting to investigate whether GDP drives education expenditure or the other way around. Based on rigorous methodology of standard time series techniques, in particular the Generalized variance decompositions (GVDC), the estimates tend to indicate that it is the GDP that is driving education expenditure and not the other way around. This finding is plausible and has strong policy implications for a developing country like Malaysia. Therefore, the budget and policies on education expenditure would be driven and determined by the overall economic performance embodied in GDP.

Keywords: GDP, Education expenditure, VECM, VDC, Malaysia

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1.0 INTRODUCTION

1.1 Motivation of the study

The foremost inspiration of this research is to substantiate and attest the relevance of the *Maqasid* (objectives) of Shariah in Islam. One of the paramount important factors in the *Maqasid* is to educate the individuals or *"Tahdhib al-Fard"* which is universally agreed upon by all Islamic scholars (Omar, 2013). Notionally, the Islamic countries which uphold the *Maqasid* of Shariah should have positive correlation on the economy. Through Islamic perspective, the economy shall be more socio-economy oriented that promotes education, welfare and establishing justice (Hameed, 2010). According to Rehman and Askari (2010), majority Muslim countries or Muslim dominated countries failed to live upto the expectation of the Islamicity index as a whole. These countries showed poor and frail performance compared to non-Muslim countries in numerous aspects which include the overall economy performance which include the education sector. The only Muslim nation which moderately scored above the other OIC[1] nations is Malaysia, ranked at number 38 while surprisingly; Ireland scored the most index and rated first.

Malaysia had the "Vision 2020" which is envisioned by the former Prime Minister whereby the country will gain developed nation status and hoped to join the elites of high income nations by the year 2020. Already reputable among the Islamic nations, Malaysia is prominently leading OIC nations in many areas and sectors which include financial sector, technology and educations. The nation is transforming from agrarian-dependent to be more variant in terms of national income. Being a small economy with small population, to achieve the great vision was paramount but not impossible. Numerous economy transformation initiatives have been implemented by the government and supported with comprehensive national budget throughout 1990 till 2014. One of the many initiatives being implemented was the enhancements of the human capital sector by promoting growth in education sector.

The education evolutions in Malaysia are remarkable. Formerly, Ministry of Education and Ministry of Higher Education are separated department, but the government took the prospect to

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[1] The Organization of Islamic Cooperation (OIC) which has a membership of 57 Muslim nation states spread over four continents. The Organization was established 25 September 1969 as a result of criminal arson of Al-Aqsa Mosque in occupied Jerusalem by the Israelis.

unify it together to increase its efficiencies. Later on, National Education Blueprint 2013-2035 is launched to revamp and revised the curriculum of the education sector where is also considered the professional and public expectations towards the teaching and learning process. It aimed to nurture creative and critical rational among students while in the same time, produce holistically balanced student; behaviors and intellectual. Statistically, the country has a number of matriculation center[2], private and public universities and supported by the community colleges, vocational and certificate focusing training centers. From only four[3] public universities in the early years after post-independence, the number of public universities has increased to nearly fivefold of its initial number. Similarly, the private colleges and universities are also complementing the growth with more than 15 colleges alone in the Klang Valley[4]. Therefore, to facilitate the growth, the government founded Perbadanan Tabung Pendidikan Tinggi Nasional ("PTPTN") in 1997 to facilitate the students to finance their tuition fee besides creating deposit scheme for education purposes. Given the objectives of PTPTN, more students especially those from lower and middle class have better chances to further and continue their study in the tertiary education, while at the same time, helping to develop these universities by indirectly financing them through the students' loans. Nevertheless, the government is still awarding scholarships to the deserving students through MARA[5], JPA[6] and various states government trustee and foundation. Hence, it is captivating and intriguing to see if there is any evidence and causal relationship and results of this investment towards the national growth of Malaysia.

1.2 Objective of the study

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[2] Matriculation is equivalent to pre-degree preparation or foundation study.

[3] The earliest public universities in Malaysia include the dates of its establishment are Universiti Malaya (1949), Universiti Kebangsaan Malaysia (1970) and Universiti Putra Malaysia (1971) and Universiti Teknologi Malaysia (1975).

[4] Klang Valley covers the state of Selangor and the Federal territory of Kuala Lumpur, Cyberjaya and Putrajaya.

[5] Majlis Amanah Rakyat (MARA) established on 1 March 1966 as a statutory body by an Act of Parliament as a result of the first Bumiputera Economic Congress resolution in 1965.

[6] Jabatan Perkhidmatan Awam (JPA) is a public service department under the Government of Malaysia.

Malaysia has allotted huge sum from its national budget and capability to improve the education sector over the past decade. However, from the economy perspective, the investment granted for the education purposes might also be assigned for other economy purposes which have higher probability to yield more direct financial benefits. Therefore, the query of opportunity cost arise, is the investment much more valuable if it is invested in other profitable economy sector. Anyhow, the fact that Malaysia GDP have been growing steadily during pre and post global financial crisis, does it mean the education sector has somehow contributed towards the economic growth? Therefore, this paper is aimed to seek either the allocation for education primarily for enhancing the human capital can promote the national growth and to endorse whether the decision to nurture the human capital sector is definitely correct judgment by the Malaysian government. If so, would Malaysia be able to continue to lead the OIC nations in promoting knowledge and education and rise to the same level with the western developed nations in terms of economic growth?

1.3 Theoretical Underpinnings

Human capital is intangible assets that can be defined as the collective attributes of knowledge, talents, skill, abilities, experience, training and ability to nurture critical thinking. Almost all of these attributes can be discovered in the education sectors either in the primary, secondary and tertiary sector. Although there are many arguments that human capital in the workforce extended beyond the education features, it is also non-controversial that this segment is a continuous resource of fresh, talented and up-to-date workforce. Many criticism have been thrown on and question what are the exact components of human capital but majority economist firmly agreed that education can be considered as the major component that shaped the human capital. Skilled human capital contributed more productive output compared to unskilled workers.

Theoretically, accurate and strategic domestic government expenditure should have positive nexus towards the economic growth of the nation (Freeman and Webber, 2009). The GDP growth can be sustained by steady population growth to increase the domestic consumption while in the same time supported by constant resource of labor in the workforce. Workforce constituted with skilled human capital would eventually attracts foreign direct investment to invest in the country given there is balance between the incurred cost and benefits. Later on, the citizens would be benefited with more employment opportunity, increased in the disposable income which leads to increase in

their savings and later contributed to the investment sector which is facilitated by the financial institutions. In contrast, inadvertently incorrect fiscal policies implemented by the government may negatively affect the progress while focusing expenditure in unproductive sector could retard the growth.

2.0 LITERATURE REVIEW

The idea of labor specialization is first raised in 18th century by Adam Smith (1776) where he opined that every individual is the same, but what differentiating them from the rest are their level of the education, skills, experience, and knowledge. Afterwards, numerous of research tries to figure out the long run relationship between the economy and the labor market which includes Cobb-Douglas (1927-47), Swam (1956) and Solow (1957). In the past, economic forte may be designated by the variant of tangible assets which supporting the businesses whereas the labor is the main element, but the increase of its value come from the productivity of the labor. Becker (1993) agreed that aside from proper healthcare system, he concurred that education played the key to decisive increase in the economic outputs for the nation.

Barro (2013) found that growth can be contributed by giving utmost attention towards to the human capital in the education sector. Time spends for education purposes (i.e. schooling years) are certainly correlated with growth. In addition, educated workforce assist to the newly technology introduced, therefore the reducing the adjustment and adaptation phase between the technology and the labor.

In addition, the economy growth could be impaired if there a lack of skilled labor worker. Nevertheless, constants flow of required skilled workers can be supplied by the young graduates and the training programs specifically tailored for the required sector. The government needs to critically adjust so that the supply will be sufficient to fill up the growing demand. Nations that are highly dependent on the skilled workers shall not come short to produce sustainable expendable workers (Salmenhaara, 2009).

Although many research done have been done to find the exact determinant and relationship between education and economic growth, but there are several questions which still remain unanswered pertaining to the 'expenses' for the education purpose. Does the calculation include

the expenditure exclusively from the government account or collectively include the public expenditure? In contrast, some economist opined that the calculation should be using individual expenditure to estimate in order to get more precise result and interpretation. But given the circumstances and limitation, it may seem cumbersome to estimate. Since there are no conclusive study on the exact structure of the education component and unavailability of more detailed data, this study used the Malaysian adjusted savings for education expenditure denominated in US currency.

In general, based on the literature reviews and limited resource of empirical evidences, the education and economic growth may also supported by other economic variables such as quality of the economic institution, export, trade openness, inflation, interest etc. Notably whole literature reviews on education to growth causality are not final and it need for more comprehensive study in a broader or particular spectrum.

This study will complement to the current literature on the subject of education and economic growth focusing on emerging country like Malaysia with data spans from 1975 until 2012. This paper will use data of Malaysia expenditure on education and time series methodology without ARDL is used. In addition, it will heighten the previous study and reiterate the connection of education to GDP in presence of other macroeconomic variables such as inflation rate, export and total numbers population. The findings of this study will definitely help the Malaysian government to whether to reconsider and restructure their investment on education sector.

3.0 DATA AND METHODOLOGY

In this research, the data used are annual data from year 1970 till 2012; a total numbers of 43 observations were obtained for five variables of economy indicators. The variables are Malaysia Gross Domestic Product (X1), adjusted savings; education expenditure for Malaysia (X2), Malaysia export for goods and services (X3), Malaysia Consumer Price Index (X4) and Malaysia Population (X5). All these data are retrieved from the World Data Bank through Data Stream platform and estimated using Microfit 5.0.

The estimation using time series techniques began with unit root test; to identify either the chosen variables are stationary or non-stationary. Non-stationary data in original form are essential since these data contains and long term trend information embedded within it. In contrast, after detrend differenced stationary data are ensure there is no long term information carried within the data. The unit test comprised of Augmented Dickey-Fuller ("ADF") and Phillip Perron ("PP") test. ADF rectified only autocorrelation problem while PP rectified both; autocorrelation and heterokedasticity problem. Later, number of lag will be determined before proceeds to the test the cointegration between the variables.

Subsequently, by using 'Engle-Granger' and 'Johansen Test' to test for the cointegration, we can check the movement of the variable if it's either unidirectional or bidirectional. The data only can be assumed to be cointegrated if the variables found out to be move together. Later, Long Run Structural Model ("LRSM") is used to see the long run relationship between the variables by checking the significance level of the model coefficients.

Afterwards, Vector Error Correction Model ("VECM") is used to see the causality between the variables. Endogeneity and exogeneity will be determined using the test. Next, Vector Decomposed Model ("VDC") technique will used to point out the relative exogeneity and endogeneity of the variables by decomposing the variance of the forecast error of a variable into proportions attributable to shocks in each variable in the system including its own (Masih et al, 2008).

Then, we will examine the dynamic response of the variable if we applied one period standard deviation shock the using Impulse Response Function analysis ("IRF"). Finally, the persistence profile step will be applied to approximate the speed on how long for the system to get back to equilibrium whenever there is a system wide-shock.

4.0 EMPIRICAL RESULT AND INTERPRETATION

4.1 Augmented Dicky Fuller (ADF) & Philips Perron (PP) Test

The variables are estimated using ADF and PP Test by creating their log and difference from using Microfit to check either the data are stationary or non-stationary. The variables are X1 (GDP), Expenditure for Education (X2), Export (X3), Inflation (X4) and Population (X5). Whenever these variables in log form, there are written as LX1, LX2, LX3, LX4, LX5 while in difference form are

DX1, DX2, DX3, DX4, DX4, and DX5. Difference form variables are expected to be stationary since it infers to short term information. The null hypothesis for both test is the data is stationary (t statistic < critical value). Therefore in both test we expect to accept null hypothesis for log form and reject null hypothesis and accept alternate hypothesis for difference form. The next steps of time series techniques only can be carried out if this condition fulfilled. The table 1 and 2 below summarizes the results for both tests:-

Table 1: ADF Test

Variable	T-Statistics	Critical Value	Result
Variable in Level form			
LX1	3.3450	3.5273	Non-stationary
LX2	3.4072	3.5273	Non-stationary
LX3	2.5640	3.5273	Non-stationary
LX4	2.1528	3.5273	Non-stationary
LX5	1.0800	3.4588	Non-stationary
Variable in difference form			
DX1	4.6690	3.0002	Stationary
DX2	5.4902	3.0002	Stationary
DX3	4.7763	3.0002	Stationary
DX4	2.5562	3.0002	Stationary
DX5	0.7180	3.0002	Non-stationary

Table 2: PP Test

Variable	T-Statistics	Critical Value	Result
Variable in Level form			
LX1	2.8122	3.4806	Non-stationary
LX2	2.4231	3.4806	Non-stationary
LX3	1.3886	3.4806	Non-stationary
LX4	2.3741	3.4806	Non-stationary

LX5	0.70251	3.4806	Non-stationary
Variable in difference form			
DX1	5.0593	2.9324	Stationary
DX2	5.8138	2.9324	Stationary
DX3	5.7427	2.9324	Stationary
DX4	3.8698	2.9324	Stationary
DX5	4.3970	3.5513	Stationary

Based on the estimated results, we have accepted the null hypothesis for the level form and rejected the null hypothesis for difference form. The test statistic estimated from ADF and PP Test are based on highest value of AIC and SBC. Result proved that all variables are I(1).

4.2 VAR Order of Lags

Vector auto regression (VAR) estimate is required to determine the lag order of the variable. Since all lag order from 0 to 5 surpass adjusted LR Test more than 5% and qualified to be chosen, table 3 below will show only selected order of lag based on the highest AIC and SBC. The test result as follow:-

Table 3: VAR Test

Highest	AIC	SBC
Order of lag	5	3

Expected contradicting result, AIC gave higher orders of 5 lags while SBC gave lower orders of 3 lags. To proceed, higher order of 5 lags is chosen to optimize the VECM results. In addition, AIC is stronger compared to SBC. To validate, we estimated a serial-correlation test to seek if any serial-correlation might present if we were to choose lag 3. Serial-correlation is presence if P-value less than 5%. The results are shown in the following table 4.

Table 4: Tests for serial-correlations

Variable	P-value (LM)	Result
DX1	0.218	No serial-correlation problem
DX2	0.087	Serial correlation problem
DX3	0.009	Serial correlation problem
DX4	0.221	No serial-correlation problem
DX5	0.000	Serial correlation problem

Serial-correlation problem exist in three variables; DX2, DX2 and DX5. Therefore if order of lag 3 is chosen, our empirical testing will encounter serial-correlation effect and will produce bogus and spurious result.

4.3 Cointegration Test

Cointegration are important since it will test either the selected variables are moving unidirectional or bidirectional together. Variables that moved together are theoretically related, have share common trend and equilibrium relationship (Granger 1988, Miller and Russek 1990). Therefore, Engle-Granger Test and Johansen Test will be used. Below are the results of both tests:-

Table 5: Johansen Test

	Null	Statistic	95% C.Value	90% C.Value
Maximal	r = 0	30.1737	31.790	29.130
Eigenvalue	r <= 1	20.3964	25.420	23.100
Trace	r = 0	64.4929	63.000	59.160
	r <= 1	34.3192	42.340	39.340
AIC	r = 4	181.0242		
SBC	r = 1	151.8746		

Johansen test created stationary error term by giving hypothetical value coefficient. It will determine numbers of cointegration exist. Based on the above table, it showed that one cointegration existences between the variables, given 90% critical value. SBC also point out there is 1 cointegration presence.

In contrast, Engle-Granger only checks for the existence of integration between the variables without giving any indication total numbers of integration. The null hypothesis for this test is there is no cointegration between variables. Anyhow, the results produced are contradicted with the Johansen test as per below:-

Table 6: Engle Granger

Test

Variable	T-Statistics	Critical Value	Result
LX1	2.5945	4.8026	No Cointegration
LX2	3.7570	4.8026	No Cointegration
LX3	2.1309	4.8026	No Cointegration
LX4	2.9443	4.8026	No Cointegration
LX5	1.2126	4.8026	No Cointegration

Given the contradiction between Johansen and Engle Granger test, we still proceed towards to next level of estimation since Johansen has higher degree of reliability due its capacity to determine the number of cointegration which exists between the variables.

4.4 Long Run Structural Model (LRSM)

LRSM will determine the theoretical long run relationship between the variables by estimating the variable of coefficients by imposing restrictions based on the theories, we will check either the coefficients of the variables are statistical significant. In exact-identifying the coefficient of interested variable is set to equal to one for normalization. While in over-identifying, it test the computed coefficients against the theoretically expected coefficients. If the t-ratio is greater than 2, then it is considered as statistically significant. Otherwise, it is insignificant.

Based on the table below, through exact identifying, only one cointegrated vector is significant since its t-statistic value is more than 2 which is LX4; the consumer price index. The other remaining vectors are statistically insignificant. While in over identifying, we retest each LX1, LX3 and LX5 separately and collectively by putting a restriction to zero in a way to discover their

insignificance in the model. The result gives P value in Panel B, Panel C, Panel D and Panel E bigger than 5% which mean the restriction imposed is correct.

Table 7: Panel A : Exact identifying; Panel B-E : Over identifying

Variable	Panel A	Panel B	Panel C	Panel D	Panel E
	A2=1	A2=1;A1=0	A2=1;A5=0;	A2=1;A3=0	A2=1;A1=0; A3=0;A5=0
LX1	0.042971	0.000	0.194	0.09583	0.000
	(0.34811)	(*NONE*)	(0.20440)	(0.14187)	(*NONE*)
LX2	1.0000	1.0000	1.0000	1.0000	1.0000
	(*NONE*)	(*NONE*)	(*NONE*)	(*NONE*)	(*NONE*)
LX3	0.050993	0.085035	0.099	0.000	0.000
	(0.30364)	(0.12676)	(0.13303)	(*NONE*)	(*NONE*)
LX4	1.3902	1.375	1.4779	1.4301	1.45
	(0.43066)	(0.41876)	(0.39954)	(0.35529)	(0.28672)
LX5	1.4341	1.6849	0.000	1.050	0.000
	(2.5226)	(1.4887)	(*NONE*)	(1.0879)	(*NONE*)
Trend	0.069028	0.075832	0.034162	0.05919	0.042359
	(0.063549)	(0.031485)	(0.012453)	(0.024738)	(0.010770)
Chi-Square	(*NONE*)	0.014818[.903]	0.32872[.566]	0.028905[.865]	1.0162[.797]

Mathematically, based on the result above, it seems that we need to exclude LX2, LX3 and LX5 since these variables do not contribute a significant impact towards the study. Anyhow, from the previous test indicated that these variables are cointegrated. In addition, from theoretical underpinnings, it is correlated since there are many studies and research supporting the idea that exports, expenditure on education, inflation and population growth have relations towards the economy growth. From the estimated result, the cointegration equation can be written as, (numbers in parentheses are standard errors):-

0.05LX1+LX2+0.05LX3+1.4LX4+1.4LX5 →I(0)
(0.35)   *(0.3)*   *(0.43)*   *(2.52)*

Point to note that LRSM does not indicate the causality between the variables but only able to recognize the cointegration between the variable.

4.5 Vector Error Correction Model (VECM)

In general, exogenous variable leads and endogenous variable is follower. Under VECM test, through Granger Causality, an equation with the equality sign is established. The error correction terms within the variables contain the long term information which is theoretically important and the rest variables within the equation hold the short-term information. Previously, Johansen test point out that there is one cointegration. Therefore we can say that error correction term represent all variables in the equation and verify the truthfulness of the finding. In VECM we develop and test equation for each variable individually.

Table 8: VECM Short Run Causality

| Dependent Variables	dLX1	dLX2	dLX3	dLX4	dLX5
dLX1	.46056[.648]	1.1187[.271]	-.13551[.893]	.38714[.701]	.44519[.659]
dLX2	.73326[.468]	.54420[.590]	.99692[.326]	1.0595[.297]	-3.0728[.004]
dLX3	-.16617[.869]	-.98057[.334]	.20240[.841]	.39554[.695]	-.54228[.591]
dLX4	-.43867[.664]	.41223[.683]	-.76084[.452]	2.0760[.046]	-1.4183[.165]
dLX5	.042686[.966]	.30802[.760]	.98163[.333]	.82686[.414]	63.6801[.000]
ecm	-1.1827[.245]	-2.4609[.019]	-.54071[.592]	.17210[.864]	10.1789[.000]

Table 9: VECM Exogenous Endogenous Result

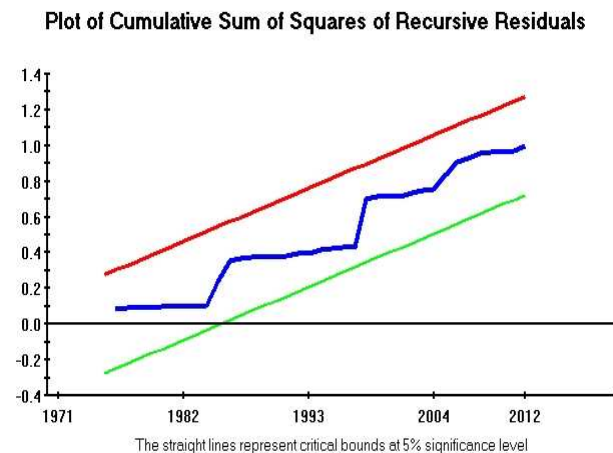| Variables	T-Ratio[P value]	Indicator	Interpretation
LX1	-1.1827[.245]	>5%	Exogenous
LX2	-2.4609[.019]	<5%	Endogenous
LX3	-.54071[.592]	>5%	Exogenous
LX4	.17210[.864]	>5%	Exogenous
LX5	10.1789[.000]	<5%	Endogenous

Based on the Table 8 and 9 above which are extracted from VECM test results, we can easily distinguish between exogenous and endogenous variable. If T-ratio significant or more than 2 and P-value less than 5%, such variable is identified as endogenous. Likewise, if T-ratio less than 2 and P-value more than 5%, such variable is identified as exogenous.

Therefore we can conclude that GDP, Exports of goods and services, and the Inflation rate are the exogenous variables and education expenditure and populations are endogenous variable.

In addition, throughout the year of 1970 till 2012 the coefficients are relatively stable, there is no structural break of the parameters since CUSUM and CUSUM SQUARE test shows that graph does not cross the critical borders. No dummy variable are required to correct the structural break.
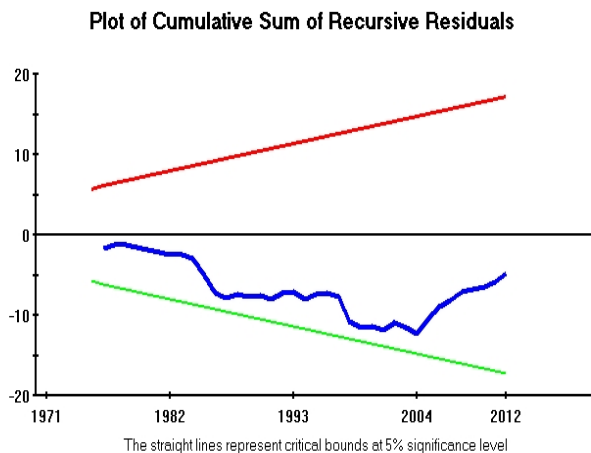
Figure 1: CUSUM Test

Figure 2: CUSUM SQUARE Test

4.6 Variance Decomposition (VDC)

VDC test is used to find the relative endogeneity or exogeneity of the variables since VECM only can determine which variable but not the relative. Hence, VDC can estimate the relative endogeneity or exogeneity of variables by recognize proportion of the variance that explained by its own past. The variable which is mostly explained by its own past shocks is considered to be the most leading variable of all and the least explained by its own past shocks is the weakest lagging variable. VDC test consist of orthogonalized VDC and generalized VDC.

Table 10: Orthogonalized

Variables	Horizon	LX1	LX2	LX3	LX4	LX5
LX1	10	90.62%	8.63%	0.46%	0.29%	0.00%
LX2	10	58.30%	23.15%	2.86%	15.63%	0.07%
LX3	10	79.82%	2.83%	15.15%	1.59%	0.61%
LX4	10	46.28%	3.01%	9.13%	41.25%	0.33%
LX5	10	30.23%	43.73%	8.59%	9.58%	7.88%

Based on the orthogonalized estimation above, it denotes that LX1 (GDP) is the leading variable while LX5 (total number of population) is the least following variables. Anyhow, the results can be questioned as it depends on the particular ordering in VAR. Thus, normally, the leading variable or the most exogenous variable is the first variable. In addition, it also assumes that whenever a particular variable is shocked, then other variables are switched off. In contrast, it would not be the case in generalized VDC. The estimation is repeated using the technique and showed below:-

Table 11: Generalized

Variables	Horizon	LX1	LX2	LX3	LX4	LX5	Ranking
LX1	10	41.05%	14.27%	37.22%	6.52%	0.94%	2
LX2	10	25.87%	33.54%	17.00%	18.36%	5.23%	4
LX3	10	35.46%	13.77%	43.00%	6.00%	1.77%	1
LX4	10	21.02%	17.26%	21.78%	38.29%	1.64%	3
LX5	10	19.34%	46.47%	3.40%	0.94%	29.85%	5

Based on the results, LX3 (Export) are the most exogenous variable and the followed by least exogenous variables which is LX5 (Population). In fact, LX5 remains the most lagging variable in orthogonalized and general VDC while the most exogenous variables are different in both estimation where LX1 in orthogonalized VDC and LX3 (Exports) in general VDC. Given the fact

that the country is among the largest commodity exporter in the world (i.e. crude palm oil, rubber and net crude oil exporter); and other semi-conductor and electronic goods, it seems to be more statistically it seems to be more sensible to consider LX3 (Exports) is the leading exogenous variable compared to LX1 (GDP). Macro economically, net export will positively reflected in the nation Balance of Payment (BOP) account and eventually, the additional income will be reinvested domestically and lead to economy growth. But we still proceeds to choose GDP as the leading exogenous variable.

4.7 Impulse Response Function (IRF)

Through graphical presentation, IRF will map and illustrates the dynamic response path of the other variables if shock is applied to one the variable and the time estimation before the variables reaches equilibrium. The following figures show the impact on other variables and how long to get back to equilibrium when each of variables is shocked:-
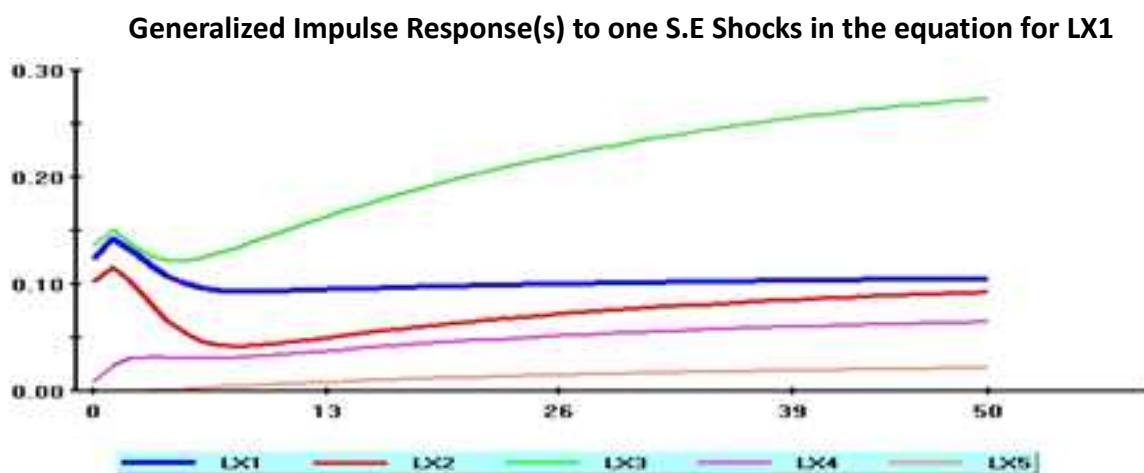

**Generalized Impulse Response(s) to one S.E Shocks in the equation for LX1**
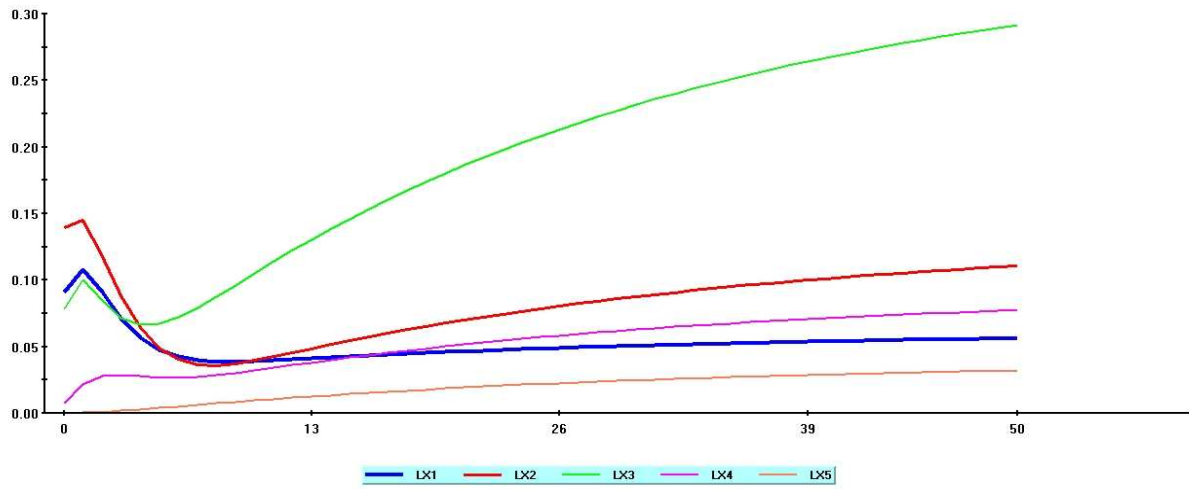
Generalized Impulse Response(s) to one S.E. shock in the equation for LX2

| | LX1 | LX2 | LX3 | LX4 | LX5 |

Generalized Impulse Response(s) to one S.E. shock in the equation for LX3

| | LX1 | LX2 | LX3 | LX4 | LX5 |

Generalized Impulse Response(s) to one S.E. shock in the equation for LX4

| | LX1 | LX2 | LX3 | LX4 | LX5 |

17

Generalized Impulse Response(s) to one S.E. shock in the equation for LX5

Legend: LX1, LX2, LX3, LX4, LX5
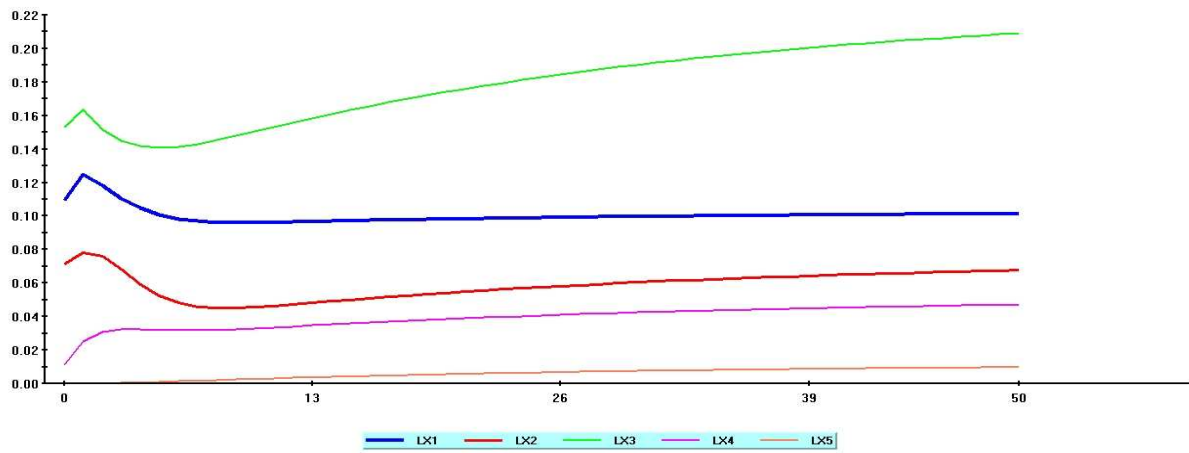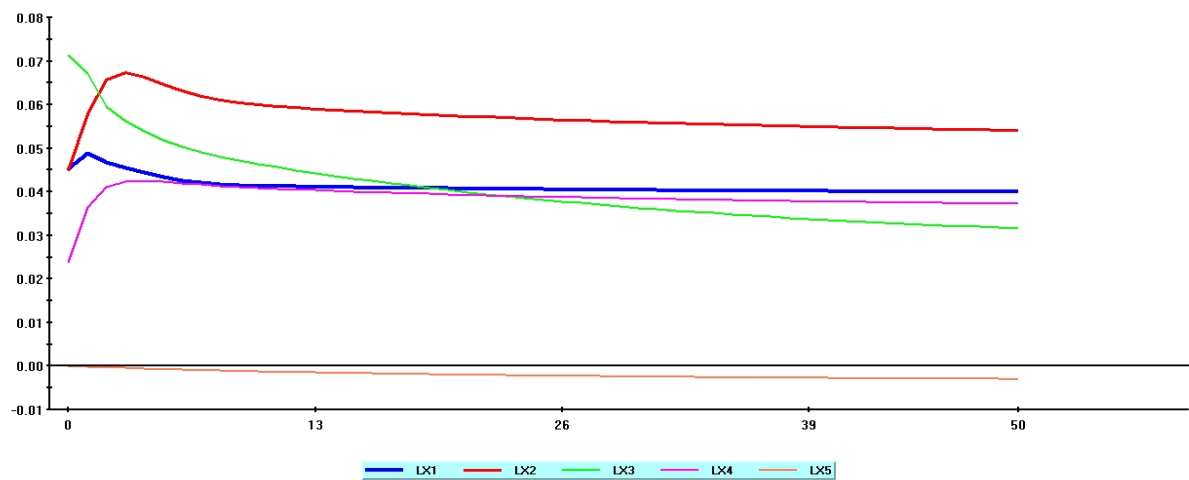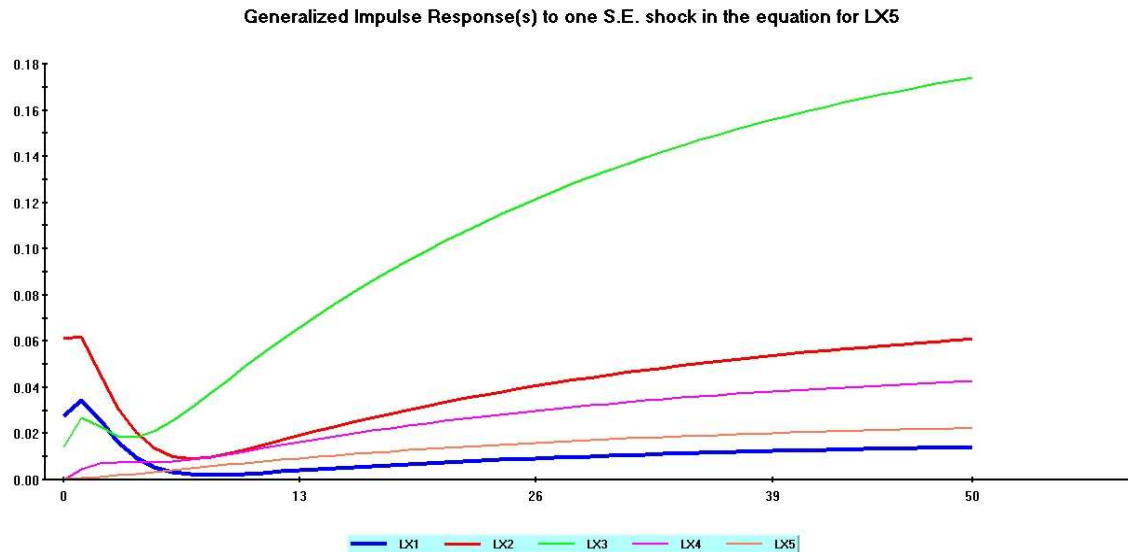
From the graphical presentation above, we can deduce that if any shocks applied to any variable, then the most affected towards the shock is LX3 (export). Anyhow, the graphs above need to be stretched longer (time horizon) so it will noticeably display that the variables returns to equilibrium.

4.8 Persistent Profile (PP)

If IRF focus on variable-specific shocks, Persistent Profile of PP test illustrates the situation when the entire co-integrating equation is shocked (from external factor outside the system) and indicates the time it would take for the relationship to get back to equilibrium and it will trace out the effects of a system-wide shock on the long-run relations.

Persistence Profile of the effect of a system-wide shock to CV(s)

Legend: CV1
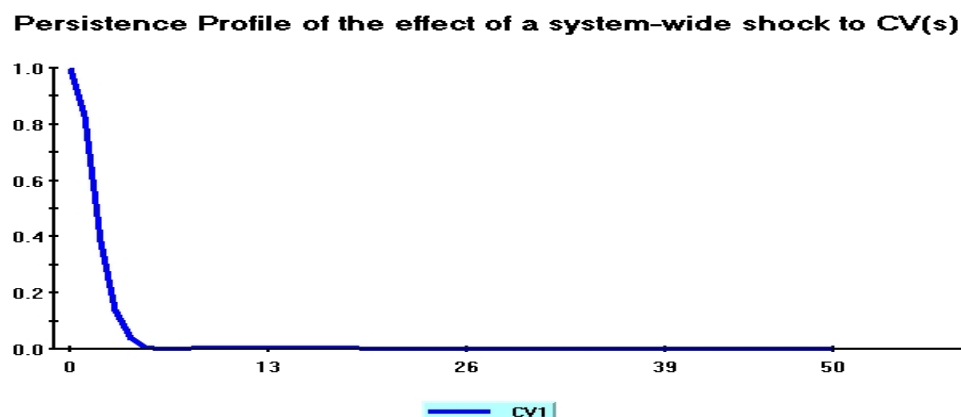
Based on the PP test, it suggested that it will take between 5-6 years before the co-integrating relationship to return to equilibrium following a system-wide shock. Initially, the variables temporarily moved in different path since the variables are not co-integrate in the short run. Anyhow, in long run, the variables are moving together.

5.0 CONCLUSION & POLICY IMPLICATION

Given the rapid progress of the development of the education sector in Malaysia, it is curious to figure out if the results of the government efforts and initiatives are fruitful, in terms of economy growth or indirectly towards the social well-being of Malaysians which the main objective of this study. Taking data spanning 42 years starting from 1970 and analyzed using time series techniques which began with stationary test, cointegration test, long run coefficient test, error correction model, variance decomposition, shock effect by impulse response and persistent profile respectively.

The relationship between economic growths (indicated by GDP), education expenditures, exports, inflations rate and national populations are theoretically valid and moving together in the long run. In contrast, if adjustment is made to particular variable, it will implicate others due to cointegration effect in short run. Granger Causality showed that GDP, exports and inflation rate are exogenous variables and among these three variables, GDP is the leading variable. Thus, concluded that GDP is independent variable, but does not have causality relationship between exports and inflation rate. But it not our main focus in this study, although it seems to conflict. Our main aim is to understand the education relationship which is indicated by expenditure on economy.

GDP is the contributing factor towards the development of the education sector and not the other way around since expenditure in education is the dependent variable. Therefore, we have found out that the foundation of development and progress of education in Malaysia are contributed by the economic growth. The amount of expenditure will be affected by the performance of Malaysia economy which we can assume that government and public expenditure and savings pattern changes and reflected in accordance with their interpretation of current economy situation and their expectation of the future economic performance.

Therefore, government budget and policies on education shall be driven by economic performance. Malaysian government need to consider the benefit and cost of education investment before

considering and concluding the investment. Since, expenditure on education is not instantaneously effective and profitable in terms of monitories. It might be translated to increase in students' well-fare due to better infrastructure and better performance of personnel which directly involve in education sector. Macro-economically, a nation founded with many semi-skilled and skilled workers (contributed by good education sector) have better chances to attract more foreign direct investment into the country and eventually benefiting the countries in terms of employment, exports and government income through taxes.

Thus, we can assure that it is indeed a correct judgment by the government of Malaysia to focus and transform the education sector which is beneficial for the citizens and Malaysia economy in the long run. In addition, the efforts should elevate the status of Malaysia as the leader in education sector among OIC nations and championing other nations in the Islamicity index in the future which would profoundly prove the wisdom of *Maqasid* of Shariah in Islam.

Last but not the least, this study is tentative and not final. It is open for further investigation, research, and improvement.

6.0 LIMITATION AND RECOMMENDATION

Given the invalidity of structure and exact component of human capital from previous research, this study tries to figure out the impact of expenditure for education on the economic growth. Therefore, we do recommend other country to be chosen as the subject of the study. Anyhow, further improvement towards the subject can be done by concentrating straight onto the components of the human capital itself by constructing a theoretical model of human capital. Only then, after the model has been proven, we relate towards the other economy indicators. Eventually, the policy maker can identify proportionately and plan their policies based on the model.

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