RELATIONSHIP BETWEEN HUMAN CAPITAL AND ECONOMIC GROWTH IN MALAYSIA

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Abstract

This paper will focus on the long-run relationship and causality between human capital development and economic growth in the Malaysian economy for the last three decades. In order to achieve the objective, an estimation of Vector Auto Regression (VAR) method would be applied on the created research model. The findings from the research showed that economic growth (GDP) positively cointegrated with selected variables namely fixed capital formation (CAP), labor force participation (LAB), government expenditure on education (EDU) and health (HEA). From the aspect of Granger causality relationship, it is found that the economic growth is a short run Granger cause for capital. Furthermore, findings of the research proved that human capital such as health variable played an important role in influencing economic growth in Malaysia but not the education variable.

Keywords *Malaysian, expenditure on education, expenditure on health, economic growth, Vector Error Correction Model*

INTRODUCTION

The contribution of human capital towards economic growth has been acknowledged over a long period of time. Many studies have focused their research in the area of human capital and its impact on the economy throughout the century. There is a need to improve and increase of human capital via government's expenditure due to the fact that educated and healthy human capitals are the main source in developing economic growth and building a successful organization (Zuniga, 2004). According to Lyakurwa (2007), building a human

capital possesses traits that are able to generate various ideas and human choices as well as developing health rate through knowledge and skills. This in turn will improve growth rates through the increase in productivity.

Malaysian government has emphasized greatly in building a quality human capital. The Malaysian government's expenditure in the education and health sector has increased tremendously every year. This can be seen from Malaysia's annual budget allocation. For example, there has been a significant amount of budget for the education sector and the amount is increased for each budget session. Graph 1 shows Malaysia's budget allocation for the educational sector between 1970 and 2010. What can be learnt is that, from 1989 there has been a consistent increase for Malaysia's educational budget allocations. Despite the financial turmoil that badly affected the Malaysian economy and had devaluated Malaysia currency in 1998, the government's allocation for the educational sector has never been reduced.

Graph 2 shows the management and development government expenditure on health from the year 1970 to 2010. The total government expenditure on health has been increased due to the awareness from the government that good quality human capital will contribute to national economic growth. Arthur and Sheffrin (2005), for example, concluded that human capital theory which consisted of education and health elements provided an important role for long run economic growth. Their findings showed that education and training, health and higher levels of health are the catalyst for economic growth.

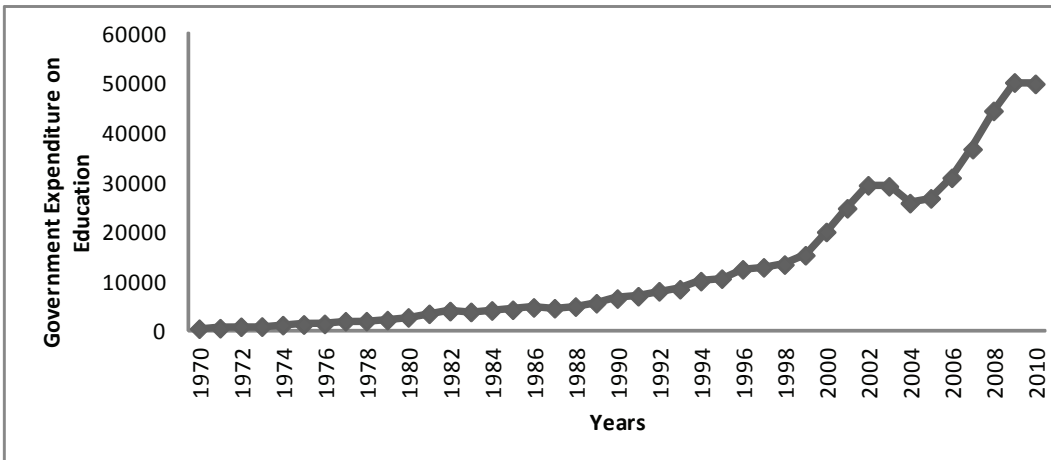

Figure 1 Malaysian Government Expenditure for Educational Sector as Its Total Management and Development Expenses, 1970 – 2010
Source: Malaysian Economic Report, Various years.

Many studies have also been carried out on the relationship between human capital and economic growth. Human capital and its impact on the economy, such as that of Malaysia's, have also been left unexplored due to their small sizes and geographic locations. In this paper, we examined the long run relationship and causality between human capital development and economic growth in the Malaysian economy for the last three decades from 1970 to 2010 using Vector Auto Regression (VAR) model.

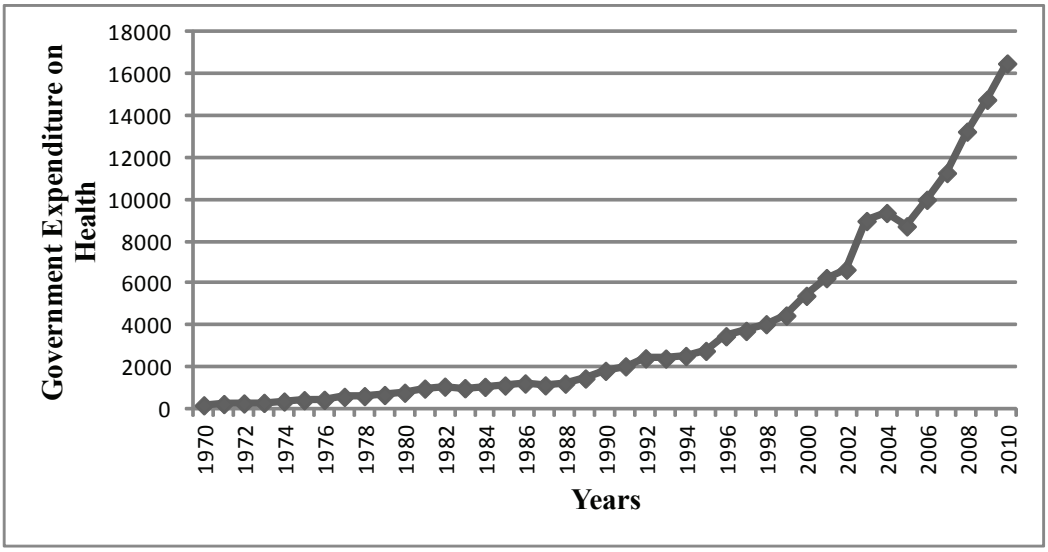

Figure 2 Malaysian Government Expenditure for Health Sector as Its Total Management and Development Expenses, 1970 – 2011

Source: Malaysian Economic Report, Various years.

LITERATURE REVIEW

There have been numerous cross-country studies which extensively explored the relationship between the attainment of education and the overall output in the economy. However, these macro studies continued to produce inconsistent and controversial results (Pritchett 1996). For example, Permani (2009) in his study on development strategy in East Asia, concluded that this region gave greater emphasis to education. His study found that there is positive relationship between education and economic growth in East Asia. In the meantime, there is bidirectional causality between education and economic growth. Pradhan (2009) supported this finding and proved that education has high economic value and must be regarded as a national capital. In the context of India, he suggested that this capital must be invested and capitalized besides the physical capital which in turn will contribute to the country's economic growth.

Afzal et al. (2010) acknowledged that education has positive long-run and short-run relationships on economic growth in Pakistan. This is in line with findings from Lin (2003), and Tamang (2011) on their studies in Taiwan and India respectively. In addition Baldacci et al., (2004)'s documentation on 120 developing countries from 1975 – 2000 found that there are positive relationships in the long-run between educational expenses and economic growth.

In the meantime, Becker (1964) argued that a man would definitely invest in education as it will give him a promising return in the future. He assumed that, this rational decision will lead the individual to assure that the investment in education is efficient in terms of the cost, profits and opportunities cost that the person incurred while pursuing his education. A study by Lin (2004) on Taiwanese economy concluded that higher education

has positive and significant impact on the country's economic growth. The author than compared the finding between disciplines and found that engineering and natural science played a vital role.

Empirical studies on Uganda economy by Musila and Belassi (2004) showed that an increase of 1% average in educational expenses for each labour will lead into 0.04% rise in national short-run production and 0.6% rise in long run production. Nevertheless, finding by Kakar et al., (2011) on their study in Pakistan concluded that there is no significant relationship between education and short-run economic growth but the educational development has impact in the country's long run economic growth. These findings demonstrated that government expenditure on education sectors does not only have a positive impact on a country's economic growth in a short run but in long run as well.

By using the same approach in evaluating the impact of education on economic growth, a study on 55 developing countries carried out by Otani and Villanueva (1993) from 1970 to 1985 found that educational program and human capital investment such as vocational training and health training would increase a country's output and per capita income. Consequently, the countries would achieve high level of economic performances. The research demonstrated that human capital development contributes an annual average of 1% increase in developing countries' growth rate. This finding was supported by Trostel et. al., (2002) which found that achievement in human capital development that comprises two important elements, namely education and training, positively correlated with national income and productivity. According to the author, the finding is consistent in all countries regardless of their stages in development.

Beside the contribution of education on national economic growth, it also plays significant in reducing income inequality, research done by Phillipe et. al., (2011), Kakar et. al., (2011) concluded that educational achievement and successfulness as well as human capital development would positively reduce income inequality. In general, there is a consensus among the researchers that education influenced economic growth by reducing poverty incidence, social imbalances as well as income equality. Moreover, it gives a positive impact to the poor and needy to improve their live. In this regards, Jung and Thorbecke (2003) suggested that education is a main instrument to alleviating poverty. It is argued that poverty alleviation can be achieved by giving education to the poor so that more job opportunities will be created, thus more income to the individual and a country. Yogish (2006) has also found that education is a promising investment to a country by producing skilled and high skilled labour force. This skilled and high skilled labour would definitely accelerate country's economic development and in consequence improve quality of life.

Wheeler (1980) agreed that apart from education and food, the elements of health is also becoming a contributing factor to economic growth. Recent study by Stephen and Olurani (2011) in Nigeria shows that there is a positive relationship between economic growth and education and health elements. According to Bakare and Olubokun (2011), maintaining a good health has become one's needs. The different between developed countries and less developed countries growth rate is partly explained by the health factor (WHO, 2005). Schultz (2005), for instance, argued that a lower source of health investment in less developed countries contributed to a slower economic growth relatively. On the other hand, a higher portion of expenditure on health sector in developed countries is due to their believed that this sector has importance role in development and economic activities.

There is a complex relationship between health and economic growth. Many studies show a positive relationship between a level of health and income, occupation and social class at a micro level. A higher level of health will increase economics growth in long run. Duggal (2007) agreed with the need of health expenditure to develop a higher quality of human capital. In a long-run, it will contribute a positive impact on economics. This idea was supported by the work of Arthur and Sheffrin (2005). The result revealed that apart from education health is one of the important factor contribute to economic development.

A good standard of health among the society at large will create a healthy nation worldwide. It promotes healthy lifestyle and increase in work productivity (Baldacci, 2004). Individual with a good health has the capacity to absorb knowledge faster, efficient, and become more productive due to excessive of energy released physically and mentally (Bloom & Canning, 2000). These evidence supported by Eberstadt and Groth (2007), in their study. Their findings implicated that an additional year of life will contribute to GDP per capita by 4% to 7%.

Furthermore, long life expectancy will create an incentive for a longer investment and saving (Weil, 2007). Empirical evidence provided by Jamison (2003) shows that 11% of economic growth of certain countries is predicted by a good health. This study also revealed that investment in physical capital, education and health is a major factor to generate economic growth.

In spite of the positive finding on the effect of education and economic performances, several studies conversely demonstrated a different finding. De Meulmeester and Rochet (1995), for example concluded that the relationship between education and economics growth are not always positive. Some has also argued that education is simply an application and it is not meant to improve economy.

According to Blaug (1970) and Sheehan (1971), investment in education is just merely consumption. This is due to the fact that investment in acquiring knowledge or skills is for the individual interests only and does not contribute into the economic growth. To support this argument, empirical study by Devarajan et. al., (1996) on 43 developing countries showed that excessive government expenditure in education negatively correlated with the countries' economic growth. Moreover, Blis and Klenow (2000) argued that it was too weak to conclude that the education or school achievement significantly contributed the economic growth. This finding is based on their study among the 52 countries between 1960 and 1990.

In conclusion, based on the previous discussion, the affect of education and health on economic growth are arguable. Some might said it has positive effect and vice versa, despite the general believe that individual educational achievement will lead to job opportunities and job creations and at the same time improve people's life. Therefore, in this study, we seek to investigate long run relationship and causal relations between expenditure in education and health (human capital) with Malaysian economic growth.

Variable Descriptions

A total of five variables had been used in the analysis. The definitions of each variable and time-series transformation are described in Table 1 and Table 2.

Table 1 Definitions of Variables

No	Variable	Description	Duration	Source
1	Real Gross Domestic Product (GDP)	GDP used as the proxy for economic growth in Malaysia	Annually data from year 1970 to 2010.	Department of Statistics, Malaysia
2	Government Expenditure on Education (EDU)	EDU used as the proxy for human capital in Malaysia	Annually data from year 1970 to 2010.	Department of Statistics, Malaysia
3	Government Expenditure on Health (HEA)	HEA used as the proxy for human capital in Malaysia	Annually data from year 1970 to 2010.	Department of Statistics, Malaysia
4	Gross Fixed Capital Formation (CAP)	CAP used as the proxy for the net investment in an economy.	Annually data from year 1970 to 2010.	Department of Statistics, Malaysia
5	Labour (LAB)	LAB used as the proxy for the labour participation in Malaysia	Annually data from year 1970 to 2010.	Department of Statistics, Malaysia

Table 2 Time-Series Transformations

No	Time Series Data Transformation Variable	Description
1	$\Delta LNGDP = Log\left[\frac{GDP_{(t)}}{GDP_{(t-1)}}\right]$	Growth of Real GDP
2	$\Delta LNEDU = Log\left[\frac{EDU_{(t)}}{EDU_{(t-1)}}\right]$	Growth of Government Expenditure on Education.
3	$\Delta LNHEA = Log\left[\frac{HEA_{(t)}}{HEA_{(t-1)}}\right]$	Growth of Government Expenditure on Education.
4	$\Delta LNCAP = Log\left[\frac{CAP_{(t)}}{CAP_{(t-1)}}\right]$	Growth of Fixed Capital Asset.
5	$\Delta LNLAB = Log\left[\frac{LAB_{(t)}}{LAB_{(t-1)}}\right]$	Growth of Labour Participation.

Theoretical Model

The model used in this paper is based on the aggregate production function.

$$Y = A.K^{\alpha}. L^{\beta}. HC^{\gamma} \ldots (1)$$

Y is output "A" is technological progress, "K" is capital stock, "L" is labour force, and "HC" is used for Human capital. Human capital can be replaced with "E and H" where "E" is government expenditure on education and "H" is government expenditure on health . We can replace "HC" with "E" and "H", and rewrite the equation as,

$$Y = A.K^{\alpha}. L^{\beta}. E^{\gamma}. H^{\delta} \ldots (2)$$

Equation (2) given above, is used to develop the econometric model to determine the impact of education expenditure on economic growth. In accordance to statistical economics and economics characteristics, an appropriate model to explain equation (2) is through following non-linear model:

$$Y_t = A\, CAP^{\alpha}_t\, LAB^{\beta}_t\, EDU^{\gamma}_t\, HEA^{\delta}_t \quad (3)$$

Where:
Y= Output (Real Gross Domestic Product)
CAP = Fixed Capital Formation
LAB = Labour Force Participation
EDU= Government Expenditure on Education
HEA= Government Expenditure on Health
t = Times

Since this equation is a non linear model, parameter values for A, α, β and γ are not be able to be directly estimated. Therefore, it is suggested to amend the production function into log-linear model as follows:

$$\text{Ln } GDP_t = \ln A + \alpha \ln CAP_t + \beta \ln LAB_t + \gamma \ln EDU_t + \delta \ln HEA + e_t \quad (4)$$

Based on the VAR regression method, the above-mentioned model has four variables and can be written as:

$$\begin{bmatrix} GDP_t \\ EDU_t \\ CAP_t \\ LAB_t \\ HEA_t \end{bmatrix} = \begin{bmatrix} A_1 \\ A_2 \\ A_3 \\ A_4 \\ A_5 \end{bmatrix} + R(L) \begin{bmatrix} GDP_{t-1} \\ EDU_{t-1} \\ CAP_{t-1} \\ LAB_{t-1} \\ HEA_{t-1} \end{bmatrix} + \begin{bmatrix} et_1 \\ et_2 \\ et_3 \\ et_4 \\ et_5 \end{bmatrix} \quad (5)$$

Where R is 5 x 5 matrix polynomial parameter estimators, (L) is lag length operators, A is an intercept and etc is Gaussian error vector with mean zero and Ω is a Varian matrix.

METHODOLOGY

To properly specify the VAR model, we followed the standard procedure of time series analyses. First, we applied the commonly used augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) unit root tests to determine the variables' stationarity properties or integration order. Briefly stated, a variable is said to be integrated of order d, written 1(d), if it requires differencing d times to achieve stationarity. Thus, the variable is non-stationary if it is integrated of order 1 or higher. Classification of the variables into stationary and non-stationary variables is crucial since standard statistical procedures can handle only stationary series. Moreover, there also exists a possible long-run co-movement, termed cointegration, among non-stationary variables having the same integration order. Accordingly, in the second step, we implemented a VAR-based approach of cointegration test suggested by Johansen (1988) and Johansen and Juselius (1990). Appropriately, the test provides us with information on whether the variables, particularly measures of economic growth, education and health variables are tied together in the long run. Then the study proceeded with a Granger causality test in the form of vector error correction model (VECM). Granger causality test is performed to identify the existence and nature of the causality relationship between the variables. This is appropriate to identify relationships between variables because multiple causes simultaneously, especially if the variables involved in the created model more than two variables.

RESULTS

Research findings from the aforementioned tests was analysed accordingly which began with unit root test, co integration test and finally with the Vector Error Correction Model.

Integration Test

Integration analysis is carried out to evaluate the degree of stationary for each variable. This analysis is important to avoid spurious regression problem. This study requires the same order of stationary for the time series data because it is a pre-requisite in co-integration analysis and Granger causality version VECM.

Table 3(a) and 3(b) present the results for the unit-root tests using Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests for the order of integration for each variable. For the level of the series, the null hypothesis of the series having unit roots cannot be rejected at even 5% level. However, it is soundly rejected for each differenced series. This implies that the variables are integrated of order I(1).

Table 3(a) Augmented Dickey Fuller (ADF) Unit Root Test

Test Variable	Augmented Dickey Fuller (ADF)							
	Level				First Difference			
	Lag	Intercept	Lag	Trend & Intercept	Lag	Intercept	lag	Trend & Intercept
LNGDP	0	-1.967	0	-2.109	0	-5.807*	0	-6.256*
LNCAP	0	-1.482	0	-1.731	0	-5.588*	0	-5.679*
LNLAB	2	-2.411	2	-2.163	1	-5.138*	1	-5.761*
LNEDU	3	-1.508	8	-3.435	2	-3.969*	2	-4.165**
LNHEA	2	-0.364	0	-4.069	1	-6.512*	1	-6.418*

* Significant at 1% level of confidence.
** Significant at 5% level of confidence

Table 3(b) Phillip Perron (PP) Unit Root Test

Test Variable	Phillip Perron (PP)							
	Level				First Difference			
	Lag	Intercept	Lag	Trend & Intercept	Lag	Intercept	lag	Trend & Intercept
LNGDP	1	-2.005	1	-2.114	2	-5.795*	1	-6.256*
LNCAP	1	-1.489	1	-1.770	1	-5.588*	0	-5.679*
LNLAB	0	-1.095	2	-1.803	1	-6.677*	5	-7.895*
LNEDU	6	-2.155	6	-3.385	6	-5.335*	7	-5.579*
LNHEA	2	-0.774	1	-4.050	3	-11.847*	2	-11.565*

* Significant at 1% level of confidence.

Based on the Vector Auto-regression, appropriate lag length selection is important in order to assure the research findings reflect real economic situation and importantly the findings are consistent with economic as well as econometric theories (Ibrahim, 2007).

Table 4 Lag Length Test

Lag Length Test	Final Prediction Error (FPE)	Akaike Information Criterion (AIC)	Schwarz Information Criterion (SIC)	Hannan-Quinn Information Criterion (HQ)
0	3.46E-08	-2.990	-2.772	-2.913
1	1.13E-11	-11.030	-9.724*	-10.569*
2	1.82E-11	-10.633	-8.238	-9.789
3	8.09E-12*	-11.655*	-8.172	-10.427

Note: * is a minimum selected lag.

As shown in Table 4, Final Prediction Error (FPE) criterion and Akaike Information Criterion (AIC) suggested that the selected lag length must be lag 3. Meanwhile Schwarz Infromation Criterion (SIC) and Hannan-Quinn Information Criterion (HQ) suggested lag length 1 and must be comply with smallest value for each criterion. Therefore, this research using lag 3 as suggested in Akaike Information Criteria (AIC) and in line with Adam and George (2008) and Yusoff et al (2006). Lag length 3 will be used for cointegration test and vector error correction model (VECM).

Cointegration Analysis

Having established that the variables are stationary and have the same order of integration, we proceeded to test whether they are cointegrated. To achieve this, Johansen Multivariate Cointegration test is employed. The results of the Johansen's Trace and Max Eigenvalue tests are shown in Table 5. At the 5% significance level the Trace test and the Max Eigenvalue test suggested that the variables are cointegrated with r = 4. Therefore, Cheung and Lai (1993) suggested the rank will be dependent on the Trace test results because Trace test showed more robustness to both skewness and excess kurtosis in the residual, which implied that there are at least 4 cointegration vectors ($r \leq 3$) found in this model.

Table 5 Cointegration Test

Model	Null Hypothesis	Statistical Trace	Critical Value (5%)	Max. Eigen	Critical Value (5%)	Variable	Long-term Coefficient Elasticity	Results
Lag Lengt: 3#	$r \leq 0$	150.348*	69.818	68.178*	33.876	LNGDP	1.000	Statistical Trace and Maximum Eigen values showed a four cointegration vectors.
	$r \leq 1$	82.170*	47.856	42.403*	27.584	LNCAP	-0.129	
	$r \leq 2$	39.766*	29.797	21.194*	21.131	LNLAB	-1.677	
	$r \leq 3$	18.572*	15.494	18.153*	14.264	LNEDU	0.006	
	$r \leq 4$	0.418	3.8414	0.418	3.841	LNHEA	-0.345	
						C	6.924	

* Significant at 5% level of confidence
: Critical level obtained from Osterwald-Lenum (1992)
#: Lag length based on AIC value

These values represent long-term elasticity measures, due to logarithmic transformation of GDP, CAP, LAB and EDU in table 5. Thus the cointegration relationship can be re-expressed as Table 6,

Table 6 Cointegration Relationship

Dependent Variable (LNGDP)	Independent Variables				
	LNCAP	LNLAB	LNEDU	LNHEA	C
Coefficient	0.129*	1.677*	-0.006	0.345*	6.924
t-value	7.433	11.346	-0.081	6.555	

* Significant at 1% level of confidence

The long-term equation shows that the GDP values are positively correlated and significant with the CAP variable. This finding is consistent with Ali et. al., (2009) which found that capital has postive relationship with GDP variable in Malaysia. This is due to the readiness of big capital amount that would lead into positive injection in economic growth (Solow, 1957).

In addition, above mentioned long term equation showed that there is a significant and positive relationship between long term labour force and GDP. Findings by Tamang (2011) and Kakar et. al., (2011) also concluded the same trend and acknowledged that labour force is highly affected a country's economic growth. It is also suggested that, the increasing number of labour force would improve efficiency and productivity of an economy. The directional relation between GDP and employment is consistent with other studies such as (Debendictis, 1997) which show similar result in British Columbia and Canada. Indeed, economic situation significantly affect the direction of labour demand.

It is interesting to note that, this research proved that there is negative and not significant relationship between educational expenditure and GDP. This finding is in line with De Meulmester and Rochet (1995)'s study which concluded that the relationship between education and economic growth is not always positive. Moreover, according to Blaug (1970) and Sheehan (1971), investment in education is just merely consumption. This is due to the fact that investment in acquiring knowledge or skills is for the individual interests only and does not contribute to the economic growth. To support this argument, empirical study by Devarajan et. al., (1996) on 43 developing countries showed that excessive government expenditure in education negatively correlated with the countries' economic growth. Some have also argued that education is simply an application and it is not meant to improve economy. Moreover, Blis and Klenow (2000) argued that it was too weak to conclude that education or school achievement significantly contributed to economic growth. This finding is based on their study among the 52 countries between 1960 and 1990.

However, the health variables were found to have a positive relationship with GDP and it is significant. It is consistent with the findings of a study conducted by Pradan (2010) which stated that the health of the population has long-term positive relationship with GDP. This is because healthy individuals are more efficient in the application of knowledge and will produce higher levels of productivity because of the advantages of physical and mental energy (Bloom & Canning, 2000). This finding is also supported by the U.S. and Bakare and Olubokun (2011), Haldar (2008), Brempong and Wilson (2004), and Getzen (2004). Overall, this study proves that spending on health, labor force participation and capital affect economic growth in the long run in Malaysia.

Vector Error Correction Model (VECM) Analysis

With examination of cointegration test, it is found that there is existence of long-term relationship between the variables in the same order of homogeneity. Therefore, error correction term (ECT) was included in order to run vector error correction model. Engle and Granger (1987) and Toda and Phillips (1993) proposed that the error-correction model is a comprehensive method to use in the test of causality when variables are cointegrated. Failure to do this would lead to model misspecification. Therefore, it is suggested to estimate Granger causality test in vector error correction model (VECM). The result is presented in table 7.

Table 7 Vector Error Correction Model (VECM)

Dependent Variables	Independent Variables Chi-Square statistic(Wald Test)					t statistic
	Δ LNGDP	Δ LNCAP	Δ LNLAB	Δ LNEDU	Δ LNHEA	Ect-1
Δ LNGDP		4.947	2.865	2.490	18.808*	-0.646*
		(0.175)	(0.412)	(0.477)	(0.000)	[-2.107]
Δ LNCAP	11.401*		4.711	2.635	13.343*	-2.343*
	(0.009)		(0.194)	(0.451)	(0.003)	[-3.347]
Δ LNLAB	5.538	6.450***		2.632	1.891	0.329
	(0.136)	(0.091)		(0.451)	(0.595)	[1.605]
Δ LNEDU	5.189	2.534	4.710		4.997	0.889
	(0.158)	(0.469)	(0.194)		(0.172)	[1.922]
Δ LNHEA	4.878	2.639	3.360	1.683		0.843
	(0.180)	(0.450)	(0.339)	(0.640)		[0.750]

* 1% significant level
** 5% significant level
*** 10% significant level
( ) probability
[ ] t value

Long run Granger causality relationship is identified in ECT-1 value for each variable. Having VECM tested, the result indicates that ECT-1 for the GDP variable is significant and have negative signs implying that the series cannot drift too far apart and convergence is achieved in the long run. This indicates that CAP, LAB and EDU are long run granger causality for the GDP. In other words, GDP variable in the equation is able to correct any deviations in the relationship between GDP growth rate and the explanatory variables. The speed of adjustment of the error-correction term of -0.646 implies that the system corrects its previous level of disequilibrium by 64.6% within one period. Equally, 64.6% of previous year's GDP disequilibrium from the long run will be corrected each year. In addition, ECT-1 value for CAP variable is significant while for LAB, EDU and HEA variables are not significant.

We then conducted a Wald test to investigate short run causal relationship. The result in the Table 7 suggests that health variable (HEA) is the Granger cause for the GDP in the short run. This says that, in the short run GDP will be only affected by health expenditure. While, insignificant coefficient of capital (CAP) labour (LAB) and education (EDU) indicates that these variables are not important for the GDP in the short run. In addition, no variables are the Granger causality for educational expenditure (EDU) and health (HEA) that represent human capital in the short run. For further details, these finding are summarised in Figure 1.

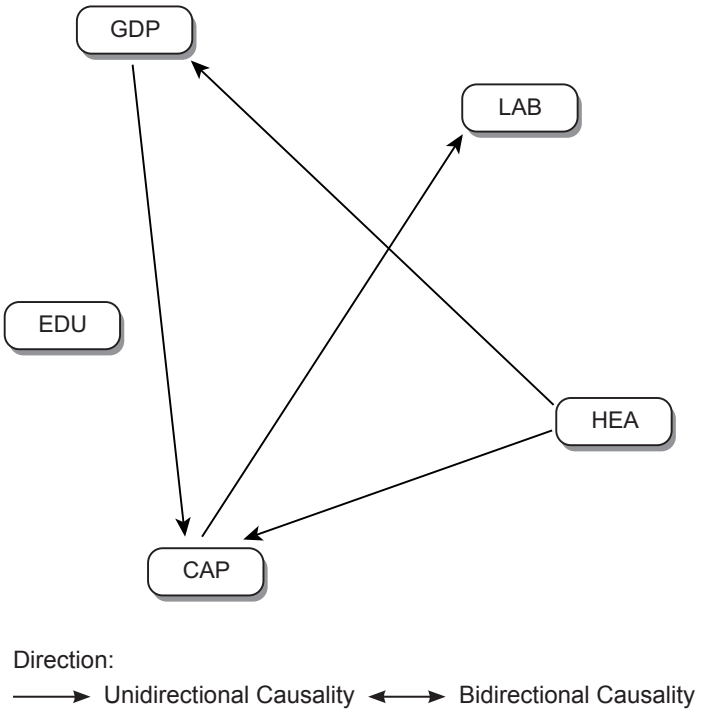

Figure 1 Granger Causality Relationship

CONCLUSION

This paper investigates the impact of government expenditure on education on economic growth on Malaysia for the period 1970-2010 by using vector auto regression (VAR) method. From the analysis above, it can be concluded that the GDP has a positive long run relationship with the fixed capital formation (CAP), labour force participation (LAB) and government expenditure on health (HEA). All these showed a significant relationship. The results confirmed that capital, labour and health have a long run relationship of economic growth. Better standards of health improve the efficiency and productivity of labour force and affect the economic development in the long run. Furthermore, in the short-run, health variable granger caused economic growth but not vice verse. This implies that investment in education is just a consumption rather than to enhance the national economy. Therefore, the government should increase the expenditure on health sector in order to improve the economy's growth performance.

REFERENCES

Afzal, M., Farook, M.S., Ahmed, H.K., Begum, I. & Quddus, M.A. (2010). 'Relationship between school education and economic growth in Pakistan: ARDL Bounds Testing Approach to Cointegration', *Pakistan Economic and Social Review*, 48(1), 39–60.

Bakare A.S & Olubokun, S. (2011). Health care expenditure and economic growth in nigeria: an empirical study. Department of Economics, Adekunle Ajasin University. J*ournal of Emerging Trends in Economics and Management Sciences* (JETEMS), 2 (2), 83–87.

Baldacci, E.B. (2004). The impact of poor health on total factor productivity. *The Journal of Development Studies*, 42 (6), 918–938.

Baldacci, E., Clements, B., Gupta, S., & Cui, Q. (2008). Social spending, human capital, and growth in developing countries. *World Development*, 36(8), 1317–1341.

Becker, G.S. (1964). *Human capital. A theoretical and empirical analysis, with special reference to education*. New York: National Bureau of Economic Research. Columbia University Press.

Bils, M. & Klenow (2000). 'Does Schooling Cause Growth?', *American Economic Review*, 90, 1160–1183.

Blaug, M. (1970). *An introduction to the economics of education*. London: Allen Lane The Penguin Books.

Bloom, D. E. & Canning, D. (2000). *The health and wealth of nations*. Science, 287, 1207–8.

Debenedicts, L.F. (1997). A vector autoregressive model of the British Columbia. *Applied Economics*, 29(7), 877–888.

De Meulmeester, J.C. & Rochet, D (1995). A causality analysis of the link between higher education and economic development. *Economics of Education Review*, 144(4), 351–361.

Devarajan, S. Swaroop V., & Zou H. (1996). The composition of public expenditure and economic growth. *Journal of Monetary Economics*, 37, 313–344.

Duggal, R. (2007). *Healthcare in India : changing the financing strategy, social policy and administration*, 41, 386-94.

Eberstadt, N. & Groth, H. (2007). Healthy old Europe. International Herald Tribune. Retrieved March 2, 2012 from http://www.iht.com/bin/print.php?id=5356041.

Engle, R. F. & C. Granger, W.J. (1987). Cointegration and error correction: representation, estimation and testing. *Econometrica*, 55, 251–276.

Gyimah-Brempong, K., & Wilson, M. (2004). Health human capital and economic growth in Sub-Saharan African and OECD countries. *The Quarterly Review of Economics and Finance*, 296–320.

Haldar S.K & Mallik G. (2010). Does Human Capital Cause Economic Growth? A Case Study of India. *International Journal of Economic Sciences and Applied Research*, 3(1), 7–25.

Ibrahim, M. (2007). The Role of Financial Sector in Economic Development: The Malaysian Case. *International Review of Economics*, 5(4), 463–483.

Jamison, D. T., Lau, L. J., & Wang, J. (2003). Health's contribution to economic growth in an environment of partially endogenous technical progress. *Disease Control Priorities Project Working Paper No. 10*.

Johansen, S. (1988). Statistical Analysis of Co-Integration Vectors. *Journal of Economic Dynamics and Control*, 12, 231–254.

Johansen, S & K. Juselius (1990). Maximum Likelihood Estimation and Inferences on Cointegration With Application to The Demand For Money. *Oxford Bulletin of Economics and Statistics*, 52, 169–210.

Jung, H.S. & Thorbecke, E. (2003). The Impact of Public Education Expenditure on Human Capital, Growth, and Poverty in Tanzania and Zambia: A General Equilibrium Approach, *Journal of Policy Modeling*, 25(8), 701–725.

Kakar, Z. K, Khilji, B. A & Khan, M. J. (2011). Relationship Between Education And Economic Growth In Pakistan: A Time Series Analysis. *Journal of International Academic Research*, 11(1), 27–32.

Lin, T.C.(2003). Education, Technical Progress, And Economic Growth: The Case Of Taiwan.

Economic of Education Review, 22, 213–220.
Lin, T.C. (2004). The Role of higher education in economic development: an empirical study of Taiwan case. *Journal of Asian Economics*, 15(2), 355–371.
Lyakurwa, W. M. (2007). *Human Capital and Technology for Development: Lessons for Africa*. AfDB.
Musila, J.W. & Belassi, W. (2004). The impact of education expenditure on economic growth in Uganda: Evidence from time series data. *The Journal of Developing Areas*, 38(1), 123–133.
Otani, I. & Villanueva, D. (1993). Long term growth in developing countries and its determinants an empirical analysis. *World Development*, 18(6), 769–783.
O'Sullivan, A. & Sheffrin, S.M. (2005). *Survey of economics, principles and tools*. 2nd Edition. New Jersey : Pearson Education, Inc.
Oluwatobi, S.O. & Ogunrinola, I.O. (2011). Government expenditure on human capital development: implications for economic growth in Nigeria. *Journal of Sustainable Development*, 4(3).
Permani, R. (2009). The Role of Education in Economic Growth in East Asia: a survey, *Asian-Pacific Economic Literature*, 23(1), 1–20.
Philippe A., Peter H. & Fabrice M. (2011). The relationship between health and growth: when Lucas meets Nelson-Phelps. *Review of Economics and Institutions*, 2(1), 1–24.
Pradhan, R.P. (2009). Education and economic growth in India: Using Error-Correction Modelling. *International Research Journal of Finance and Economics*, 25, 139–147.
Pradhan, R.P. (2010). The long run relation between health spending and economic growth in 11 oecd countries: evidence from panel cointegration. *International Journal of Economic Perspective, International Economic Society*. Retrieved March 4, 2012 from HighBeam Research:http://www.highbeam.com/doc/1P3-2168331111.html
Pritchett, L. (1996). Where has all the education gone?. World Bank Working Paper No. 1581, The World Bank, Washington D.C.
Sheehan (1971). *Economics of Education*. London : Penguin Books.
Schultz, T.W. (2005). Productive benefits of health: evidence from low income Countries. I*n Health and Economic Growth: Findings and Policy Implications*, ed. G. Lopez-Casasnovas, B. Riveras, and L. Currais. Cambridge, MA: MIT Press.
Solow, R.M. (1957). Technical Change and the Aggregate Production Function. *Review of Economics and Statistics*, 39(3), 312–320.
Tamang, P. (2011). The Impact of Education Expenditure on India's Economic Growth. *Journal of International Academic Research*, 11(3), 14–20.
Toda, H. Y. & Phillips, C. B. (1993). Vector Autoregressions and Causality. *Econometrica*, 61, 1367-1393.
Trostel, P., Walker, I. & Woolley, P. (2002). Estimates of the economic return to schooling for 28 countries, *Labour Economics*, 9(1), 1–16.
Weil, D.N. (2007). Accounting for the effect of health on economic growth. *The Quarterly Journal of Economics*, 122 (3), 1265–1306.
Wheeler, D. (1980). Human resourse development and economic growth in developing countries: a simultaneous model. *World Bank Staff Working Paper* No.407. Washington, D.C: World Bank
World Health Organization (2005). World Health Report: WHO.
Yogish, S. N. (2006). Education and economic development. *Indian Journal of Social Development*, 6(2), 255–270.
Zuniga, F. V. (2004). *Why labour competencies? Key elements to be considered*. Geneva: Cinterfor, Ilo.