Assessing the Effect of Public Social Expenditure and Human Capital Development on Malaysian Economic Growth: A Bound Testing Approach

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ABSTRACT

Government expenditure on social services is essential to the development of the economy. This fact also applies to Malaysia, a developing country that aspires to become a developed nation in few years to come. As Malaysian government plays a dominant role in financing public education and health services, an analysis on its investment in these areas, if made available, would be able to assist policymakers in generating a strategic plan to enhance human capital development and economic growth. Hence, the aims of this study are to investigate the long run and short run relationships between economic growth and public social expenditure with human capital indicators in Malaysia, using annual data from 1975 to 2008. The cointegration technique - bound testing approach developed within the autoregressive distribution lag (ARDL) framework is utilized. The finding shows that there is a cointegration between economic growth and the explanatory variables.

Keywords
Human capital, public social expenditure, economic growth and bound testing approach.

1.0 INTRODUCTION

Public social expenditure on education and health care is prominent to Malaysia economic development especially to achieve knowledge–based economy and to become a developed nation by year 2020 (Ninth Malaysian Plan). The path towards these visions will be full with challenges and difficulties especially to produce first class mentality society and productive human capital that able to generate the economy above the value chain.

In order to meet these challenges, policymakers will have to develop sound strategies for a rapid development of human capital. Greater attention should be given for the development of healthy, educated and well-trained manpower in producing high productivity, hence, a vibrant economy. Therefore, education and health are essential in these processes.

The Malaysian government has taken many initiatives to provide better education to the people whether in primary, secondary or tertiary level. Over the years the school enrollment rate has improved significantly. As highlighted in Ninth Malaysia Plan (2005-2010) report, the enrollment rates for all levels of formal education has increased from year 2000 to 2005 where 4.7 percent in primary school, 5.8 percent in lower secondary, 7.9 percent in upper secondary and more than 100 percent in post secondary level.

The establishment of numerous public training institutions in Malaysia also helped generate more skillful manpower. In 2005, public training institutions have produced 38,765 trained workers and the number is expected to increase to 71,794 by 2010.
Education expenditure had always dominated the social expenditure provisions. For example in year 1970, government had allocated 63 percent of public social expenditure on education and training and this expenditure increased to 65 percent in 2008. This reflects a special focus given to education and training by the Malaysian government in its development plans.

Health care services also receive special attention by the government every year. It is highly subsidized by the government in order to ensure that no one is denied access to healthcare in the government facilities regardless of their nationality or income levels. The government expenditure on health had increased from RM5,403 million to RM13,058 million from year 2000

to 2008. Table 1 shows the trend of public social expenditure from year 1970 to 2009.

Health care indicator also shows an improvement in health services and health status. For example, the ratio between patient and doctor has improved from 1:1,406 in 2002 to 1:1,214 in 2006 and life expectancy at birth increased from 73.1 years in 2002 to 74.1 years in 2006.

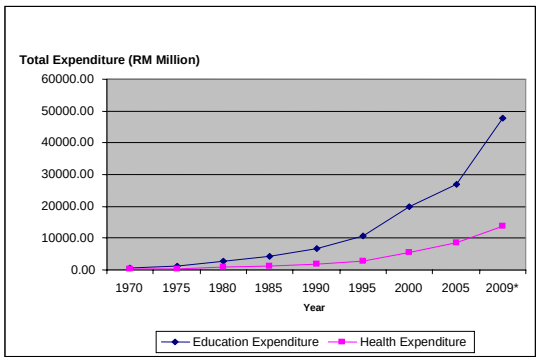

Figure 1: Government Expenditure on Education & Training and Health Care Services, 1970 – 2009 (UPE, Malaysia)

According to Baldacci, Guin-Sui & De Mello (2003); Gupta, Verhoeven & Tiongson (2002), public social expenditure can help to improve education and health capital such as education attainment and health status of the society. Baldacci, Clements, Gupta & Cui (2004) also discovered that social expenditure on education and health has a positive and significant direct impact on the accumulation of education and health capital and significant effect to economic growth. Thus, an increase in government expenditure on health and education is expected to result in better quality human capital and enhance the economic growth of the country.
The objectives of this study are to investigate the long run and short run relationships between economic growth and public social expenditure with human capital indicators in Malaysia.

The paper is organized as follows: Section 2, reviews previous empirical literature, section 3 discusses on model specification and estimation techniques. Section 4, presents the empirical results and, section 5 contains concluding remarks.

2.0 PREVIOUS STUDIES

Early research on human capital had concentrated essentially on education capital, and had often focused on the impact of the initial stock of education capital on growth. Among these studies, Levine & Renelt (1992), Mankiw, Romer & Weil (1992) (1992), Barro & Sala-i-Martin (1995) and Barro (1996a & 1996b) found a positive relationship between enrollment, schooling and growth. Meanwhile, Coulombe, Tremblay & Marchand (2004) state that a country with literacy scores of 1 percent higher than the average will experience an increase in per capita GDP growth of 1.5 percent. Many other studies also focus on education as the main form of human capital (e.g. Romer, 1990; Barro, 1991). However, studies by Schultz (1961), Arrow (1962), Mushkin (1962) and Romer (1986) found health as another important aspect of human capital.

Nevertheless, the empirical literature on the effects of health capital on growth is fairly rare. Basically, a healthy person will work more effectively and efficiently and also allocate more time to productive activities.

According to Strauss & Thomas (1998), health explains the disparity in wages at least as much as education. Meanwhile, studies by Gyimah-Brempong & Wilson (2004) found that health capital indicators positively influence aggregate output. Their findings show that about 22 to 30 percent of the growth rates are attributed to health capital, and improvements in health conditions equivalent to one more year of life expectancy which is associated with higher GDP growth up to 4 percent per year.

Mayer (2003) discovered how investment in health can benefit economic growth. It is shown that health plays a significant role in economic growth and contributes more to growth compared to education. Health increases growth through improvement in education enrollment, productivity level and participation of women in economic activities. Knowles & Owen (1995, 1997) established a significant statistical relationship between health and growth with education having a modest role. However, Webber (2002) reached a different conclusion. He suggested that growth oriented policies should prefer investments in education over health. It is clear that the empirical results of the effect of education and health on economic growth are quite mixed.

3.0 MODEL SPECIFICATION AND ESTIMATION TECHNIQUES

The model of this study is based on Baldacci et al. (2004) framework. The production function is in the following form:

$$\mathbf{Y= f(S_k, H_E, E_D)}$$

Where Y is real GDP; S_k is investment ratio, H_E represents health capital and E_D denotes education capital. Referring to the above model, this study tries to look at the government expenditure on health and education as one of the factors that influence the economic growth. Two models will be tested to determine factors that contribute to growth as shown below:

$$\mathbf{lnGDP_t = \beta_0 + \beta_1 ln\, INV_t + \beta_5 lnSSP_t + \varepsilon_t} \qquad \mathbf{(1)}$$

$$\mathbf{lnGDP_t = \beta_0 + \beta_1 ln\, INV_t + \beta_2 lnEDU_t + \beta_3 lnLIFE_t + \beta_4 lnSSP_t + \varepsilon_t} \qquad \mathbf{(2)}$$

Whereby β_0 is the intercept, β_i is the coefficient of independent variables and ε is the error term. GDP is real GDP and a proxy of economic growth, INV is gross capital formation as a proxy of investment, SSP is public social expenditure that consists of government expenditure in education, health and other services, EDU is tertiary enrollment as a proxy of education capital and LIFE is life expectancy at birth as a proxy of health indicator.

In this study, annual data are used and collected from year 1975 to 2008. Data were collected from Department of Statistics and World Development Indicators, 2009. The Autoregressive Distributed Lag (ARDL) bounds testing approach originally initiated by Pesaran & Shin (1995) and further extended by Pesaran, Shin & Smith (2001) will be used to examine the economic growth function as stated in the above models.
The Unrestricted Error Correction Model (UECM) of the bounds test used in the present study has the following form as expressed in the equation below:

$$\Delta \ln GDP_t = \alpha_i + \sum_{j=1}^{k1} \gamma_i \Delta \ln GDP_{t-j} + \sum_{k=1}^{k2} \delta_i \Delta \ln INV_{t-j} + \sum_{l=1}^{k3} \varphi_i \Delta \ln SSP_{t-j} + \beta_1 \ln GDP_{t-1} + \beta_2 \ln I_{t-1} + \beta_3 \ln SSP_{t-1} + \varepsilon_t \quad (3)$$

H_o: $\beta_1 = \beta_2 = \beta_3 = 0$ (No long run relationship)
H_1: at least one $\beta_i \neq 0$ (A long run relationship)

This equation can be denotes as F_{GDP}(GDP | INV, SSP)

$$\Delta \ln GDP_t = \alpha_i + \sum_{j=1}^{k1} \gamma_i \Delta \ln GDP_{t-j} + \sum_{k=1}^{k2} \delta_i \Delta \ln INV_{t-j} + \sum_{l=1}^{k3} \varphi_i \Delta \ln EDU_{t-j} + \sum_{m=1}^{k4} \sigma_i \Delta \ln LIFE_{t-j} + \sum_{p=1}^{k5} \psi_i \Delta \ln SSP_{t-j} + \beta_1 \ln GDP_{t-1} + \beta_2 \ln INV_{t-1} + \beta_3 \ln EDU_{t-1} + \beta_4 \ln LIFE_{t-1} + \beta_5 \ln SSP_{t-1} + \varepsilon_t \quad (4)$$

H_o: $\beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = 0$ (No long run relationship)
H_1: at least one $\beta_i \neq 0$ (A long run relationship)

This equation can be shown as F_{GDP} (GDP | INV, SSP, EDU, HEL)

The above equations with the summation signs represent the error correction dynamics, while β_t corresponds to the long run relationship and ε_t is white noise error term. The F test or Wald test is used to test on the existence of long run relationship. If the estimated test lies outside the critical bounds, a conclusive decision can be made regarding cointegration without knowing the order of integration of the regressors (Narayan, 2005). If the computed F-test is higher than the upper bound, the null hypothesis of no cointegration is rejected. If F-test is lower than the lower bound then the null hypothesis cannot be rejected. Meanwhile, if the F-test lies between the lower and the upper bounds, conclusive inference cannot be made. Once the cointegration is confirmed, the further two steps procedure in ARDL will be taken to estimate the models. The first step is to estimate the long run relationship between growths as the dependant variables with the independent variables in both models. Second and also the final step is to estimate the association of ARDL error correction models.

4.0 ESTIMATION RESULTS

The result from bounds test is shown in table 1. The computed F tests in Model 1 and Model 2 are above the critical value proposed by Narayan (2005) at 1 percent and 5 percent significant level, respectively. Hence, it can be concluded that the null hypothesis of no cointegration is rejected showing that there is a long run relationship between economic growth and the explanatory variables.

Table 1: Bounds Test Results Based on Eq. (3) and (4)

Critical value of the F-statistics with intercept and no trend			
F- statistics		Model 1[a]	Model 2[b]
		9.080*	4.406***
1%	I(0)	6.183	4.768
	I(1)	7.873	6.670
5%	I(0)	4.267	3.354
	I(1)	5.473	4.774
10%	I(0)	4.470	2.752
	I(1)	3.008	3.994

Source: Critical value bounds are taken from Narayan (2005), case III: unrestricted intercept and no trend.
a and b refer to the number of parameters (variables); a=2 and b=4.
*and *** denote significant at 1% and 10% level of significant.

Results in table 2 show long run relationship for growth determinants. Based on the findings for model 1, public social expenditure and investment significantly have a long run relationship with real GDP at 1 percent and 10 percent significant level, respectively. It explains that an increase in 1 percent of public social expenditure will lead to 0.5 percent increase in real GDP. Meanwhile, 1 percent increase in investment will lead to 0.4 percent increase in real GDP.

Model 2 shows that investment, education and health capital have a positive relationship with real GDP at 10 percent, 5 percent and 1 percent significant level, respectively. Life expectancy as a proxy of health capital showing a bigger effect to real GDP compared to

education capital as 1 percent increase in life expectancy will increase 10 percent of real GDP.

The results are consistent with the findings documented by Bloom & Canning (2003); Bloom, Canning & Sevilla (2004); Gyimah-Brempong & Wilson (2004) where health capital shows a bigger impact on aggregate output compared to education capital.

Table 2: Long run Relationship of Growth Determinants

Regressor	Model 1 (1,3,2)	Model 2 (1,1,1,4,1)
lnINV	0.3720***	1.2189*
lnSSP	0.5465*	-0.2738
lnSEC		0.7107**
lnLIFE		10.1566***
Constant	1.7575**	-45.559

Note: *, ** and *** denotes significant at 1%, 5% and 10% level of significant, respectively.

The generated long run coefficients are used to estimate the error correction terms for the two models.

The results for short run relationship and error correction model are shown in Table 3. Based on model 1, investment has a positive relationship with economic growth in short run at 1 percent significant level but public social expenditure has negative relationship with growth.

Meanwhile, in model 2, investment, public social expenditure and health capital have positive relationship with economic growth.

Table 3: Error Correction Representation of ARDL Model

Dependent variable is ΔlnGDP		
Regressor	**Model 1**	**Model 2**
ΔlnINV	0.4462*	0.3043**
$\Delta lnINV_{t-1}$	0.2063	
$\Delta lnINV_{t-2}$	0.1702	
ΔlnSSP	0.2223	0.3208***
$\Delta lnSSP_{t-1}$	-0.5733**	
ΔlnEDU		0.1242
ΔlnLIFE		29.1353**
$\Delta lnLIFE_{t-1}$		-1.5117
$\Delta lnLIFE_{t-2}$		29.2262*
$\Delta lnLIFE_{t-3}$		37.6556*
ΔConstant	0.87000***	-23.1390**
Ecm_{t-1}	-0.4950*	-0.5079*
Diagnostic tests:		
Breusch-Godfrey LM Test	1.6499	1.1689
ARCH Test	0.0489	0.7139
Jacqua-Bera	1.6322	0.0323
CUSUM and CUSUMSQ	No structural break	

Note: *, ** and *** denotes significant at 1%, 5% and 10% level of significant, respectively.

The error correction model (ecm_{t-1}) measures the speed of adjustment to restore equilibrium in the dynamic model. The negative sign in both models are statistically significant at 1 percent level, thus confirmed a long run relationship existence among the variables. The error correction in model 1 is -0.4950 and -0.5079 in model 2, it implies that a deviation from long run growth in this period is corrected by about 50 percent in model 1 and 51 percent in model 2. This means the speed of adjustment for both models are quite fast. The models also passed all diagnostic tests such as the test for autocorrelation ($LM_{(SC)}$), normality ($LM_{(N)}$) and heteroskedasticity (ARCH test).

5.0 CONCLUSIONS

Developing human capital through education, training and health care is seen as a key driver to improve the quality of human resource. As government plays an important role in financing public education and health services in Malaysia, it is important to measure the effectiveness of public social expenditure towards the development of human capital and economic growth.

The objectives of this paper are to examine the long run and short run relationships between economic growth and public social expenditure with human capital variables. This study employs Autoregressive Distributed Lag (ARDL) bound testing approach that covers a sample period of annual data from 1975 to 2008.

The empirical results show that there is a cointegration between economic growth and the explanatory variables i.e. investment, public social expenditure and human capital indicators. In model 1, investment and public social expenditure show a positive impact to economic growth in long run and short run. Meanwhile, results in model 2 proved that life expectancy at birth as a proxy of health indicator and tertiary enrollment as a proxy of education indicator have a long run relationship with economic growth. However education indicator is not significant in the short run.

The results revealed two major conclusions; first, government expenditure in social services is important to human capital development and economic growth, and second, an increase in life expectancy and enrollment in tertiary level can help generate better human capital and contribute to economic development in the country.

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