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# AN EMPIRICAL ANALYSIS OF EDUCATION EXPENDITURE, HEALTHCARE EXPENDITURE AND ECONOMIC GROWTH IN MALAYSIA

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## ABSTRACT

This paper aims to empirically analyze the relationship between the education expenditure, healthcare expenditure and economic growth in Malaysia over the period of 1980 to 2012. The main interest of this study will be to review and address the mixed results presented by past researches regarding the relationship between education and healthcare expenditure towards economic growth. The relationship between the variables will be empirically examined for both the short-run and long-run by employing the Johansen Co-integration Technique and Vector Error Correction Model (VECM). The existence of a long-run relationship between the public education spending, healthcare expenditure and economic growth was well indicated. It was therefore ascertained that the public spending on education and healthcare sectors are very much a long-run phenomenon as it only generates return over an extended period of time.

**Keywords:** education expenditure, healthcare expenditure, economic growth, Johansen Co-integration, Error Correction Model

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## INTRODUCTION

Health and education are important factors that contribute to the development of human capital. A healthy and educated workforce will be able to produce more output. The development of human capital will subsequently help to boost a country's economic growth. Matsushita, Siddique, and Giles (2006) state that there is a general consensus supported empirically and theoretically that improvement in the human capital will contribute to economic growth. Gupta, Clements and Tiongson (1998) state that public spending on education and health produces positive impacts on human capital formation, thus helps to boost a country's economic growth while promoting equity and reducing poverty. This implies that investments in sectors of healthcare and education will contribute to a nation's economic development.

Historical data has shown that the Malaysian Government has funded more than 95 per cent of primary and secondary education levels (Ministry of Higher Education, 2009). Meanwhile, tertiary education has also received attention from the government. Figure 1 shows the public expenditures allocated for the education sectors from the year 1980 to 2012 (Economic Planning Unit, 2013). Historical data shows that the spending on education has been relatively low in the past especially in the year 80's. However, the public expenditure on education increases during the year 1994 until 2002. This could imply the government's increasing concern in this sector. Despite the fluctuation of the expenditures experienced from the year 2003 to 2010, the federal government expenditure was much higher compare to the early 80's.

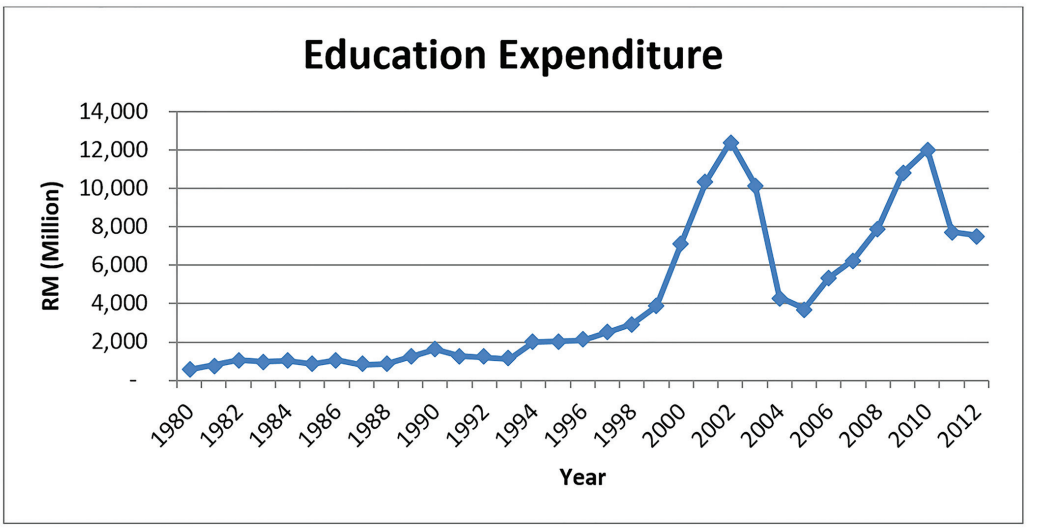


**Figure 1** Public expenditures in the education sector from the year 1980 – 2012

Similarly, the healthcare sector was also funded by the Malaysian Government throughout the years. According to Rajah Rasiah, Nik Rosnah Wan Abdullah, and Makmor Tumin (2011), the

launching of New Economic Policy (NEP) in 1971 has witness an immense public expenditure on expanding the healthcare services to rural locations and poor states. Figure 2 displayed the historical data of government expenditure in the healthcare sector from the year 1980 to 2012 (Economic Planning Unit, 2013). Beginning in the early 80's, the federal government spending in the health sector was relatively low. However, it can be seen clearly from Figure 2 that the expenditure on healthcare sector has increased to a level much higher compared to the early 80's.

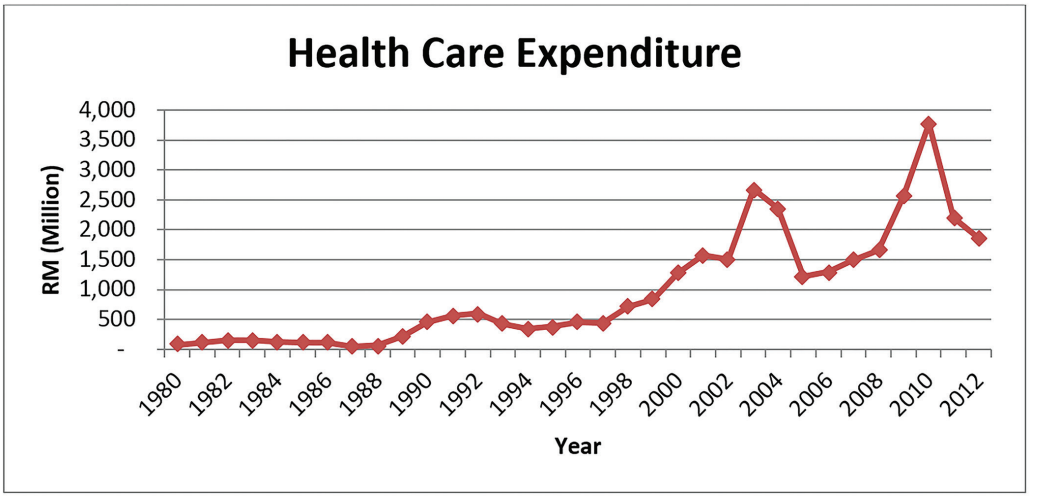


**Figure 2** Public expenditures in healthcare sector from the year 1980 – 2012

There had been many researches that were conducted in the past to investigate the role of education and health in a country's production level. However, the empirical results from the past researches were found to be distinct from one another and of a mixed interpretation. In Malaysia, some past studies have been conducted concerning education expenditure and healthcare expenditure. According to Noraina and Nur Azura (2010), public social expenditure on education and healthcare is essential to the development of Malaysia's economics. However, Abdul Jabbar Abdullah (2013) disputed that education is not generating a higher economic growth but instead is negatively affecting the economy. Chor (2010) supported the conventional rationale that health expenditure will lead to the increase of productivity and subsequently to the economic growth. Djafar (2009), Gounden (1967), and Asghar, Hussain, and Rehman, (2012) concluded that there is no significant relationship between the education expenditure, healthcare expenditure or both expenditures on economic growth. This study will be interested in investigating the mixed findings provided by past studies concerning the relationship between the education expenditure, healthcare expenditure and economic growth. An empirical analysis will be performed on the time series data in Malaysia by applying the Johansen Co-integration test and Vector Error Correction Model (VECM) technique.

This paper will be organized in the following: Section 1 begins with a brief introduction to the study. Section 2 describes the literature review on the previous researches that were related to this study. Apart from that, Section 3 will discuss the data that will be analyzed in the study. Next, Section 4 explains the theoretical model that is being employed in the study. Section 5 provides description and discussion on the methodology of the study. Meanwhile, Section 6 reveals the result on the empirical study conducted. Finally, Section 7 will provide a conclusion on the study conducted.

## LITERATURE REVIEW

Many past studies had been performed on determining the relationship between education expenditure, healthcare expenditure and economic growth. Most of the past researches supported the theoretical thinking that the increase of expenditure in education and healthcare sectors will boost the nation's economic growth. However, some studies argued by revealing a negative relationship between the variables. In another case, some studies depicted an insignificant relationship between the variables.

Mohd Yahya, Fidlizan, Mohd Fauzi and Azila (2012) discovered a long-run relationship between government education expenditure and economic growth in Malaysia. Musila and Belassi (2004) revealed that education expenditure has a significant positive impact on economic growth both in the long run and short run. In another study by Omojimite (2010), the co-integration relationship was found between public education expenditures and economic growth. However, some studies discovered an insignificant relationship between the variables in the short-run. Tilak (1989) revealed that the GNP per capita and public education expenditure are not significantly related in Latin America and Caribbean.

Akram, Ihtsham and Khan (2008) established a significant relationship between health variables and economic growth in the long run but not in the short run. Elmi and Sadeghi (2012) found out that the health spending and economic growth of developing countries studied hava a co-integrated relationship in the long run. Meanwhile, a study by Bukenya (2009) did not reveal the long run relationship between healthcare expenditure and economic growth (as measured by the gross state product) in the US states except for the state of Georgia. Odubunmi, Saka, and Oke (2012) proved the existence of long run relationship between healthcare expenditure and economic growth in Nigeria. Nevertheless, the findings by Apergis and Padhi (2013) did not revealed a clear indication of the relationship between public spending on healthcare sector and economic growth for 26 Indian States. Another study by Reeves, Basu, McKee, Meissner, and Stuckler (2013) exhibited that the investment in health contributes to economic growth of 25 EU countries both in the long run and short-run. Faraq et al. (2012) found out that the health spending was not very responsive and sensitive to the income growth.

Rahmah and Selvaratnam (1999) showed the presence of a strong significant relationship between the human capital variables of education and health with economic growth. Muhammad and Rukhsana (2012) empirically investigated the presence of a long-run relationship and triangular causality between the real GDP per capita, per capita education expenditures and per capita health expenditures in Pakistan over the period of 1972 to 2009. The result of their study signified the existence of a long-run relationship between the variables of real GDP per capita, per capita health expenditures and per capita education expenditures. On the other hand, a study by Rahman (2011) indicated a significant positive relationship between health expenditure, education expenditure and economic growth in Bangladesh. Another study by Noraina and Nur Azura (2013) revealed the co-integrating relationship between economic growth and public social services expenditure (which include education expenditure and healthcare expenditure) with human capital indicators in Malaysia. This implied that the increase of public expenditures in education and healthcare will in turn generate higher growth of the economy.

## METHODOLOGY

In this study, the data for the variables of gross domestic product (GDP), education expenditure (EDU), healthcare expenditure (HEA), labour force participation rate (LBR) and gross fixed capital formation (GFC) will be used. The data for the respective variables was obtained from the world development indicators (World Bank, 2014) and Economic Planning Unit (EPU, 2013) over the period of 1980 until 2012.

## THEORETICAL MODEL

The model of this study will be based on the following production function:

$$Y_t = f(A_t, L_t, K_t) \tag{1}$$

Whereby; $Y_t$ = total output, $A_t$ = total factor productivity, $L_t$ = labour and $K_t$ = capital stock

The Log-Linear regression model developed based on the production function is as follow:

$$In\ GDP = \beta_0 + \beta_1\ In\ EDU + \beta_2\ In\ HEA + \beta_3\ In\ LBR + \beta_4\ In\ GFC + \varepsilon_t \tag{2}$$

Whereby; *GDP* = Real Gross Domestic Product, *EDU* = Public Expenditure on Education, *HEA* = Public Expenditure on Healthcare, *LBR* = Labour Force Participation Rate, *GFC* = Gross Fixed Capital Formation and $\varepsilon_t$ = Error Correction Term.

## RESEARCH METHODS

In this study, unit root test such as the Augmented Dickey-Fuller (ADF) test and Philip-Perron (PP) test will be conducted to investigate whether the data is stationary or not. The integration test is conducted to avoid spurious regression. It is important that the data is found to be stationary so that the Johansen Co-integration test can be carried out. Next, the lag length selection test is conducted to find out the appropriate lag length that can be used in Johansen Co-integration test. It is fundamental to choose the suitable lag length so that the analysis will be consistent with the real economy. Having established that the variables are stationary, the Johansen Co-integration test can then be conducted to find out the long run relationship between the variables. Provided the variables are co-integrated, the Vector Error Correction Model (VECM) is applied to examine the short-run relationship between the variables.

## RESULTS

### Estimation Results Based on Johansen Co-Integration Test

The unit root test is used to examine the time series data on both at level and first differences by carrying out the Augmented Dickey Fuller (ADF) and Phillips Perron (PP) test. The Augmented Dickey Fuller (ADF) and Philip-Perron (PP) test result showed that all the variables were stationary after the first difference. This implied that the variables are integrated of order I (1). Table 1 illustrates the Augmented Dickey Fuller (ADF) result. Meanwhile, Table 2 shows the Philip-Perron (PP) result.

**Table 1** Augmented Dickey Fuller (ADF) test result

| Augmented Dickey Fuller (ADF) Test | | | | |
|---|---|---|---|---|
| Variable | Level | | First Difference | |
| | Intercept | Trend and Intercept | Intercept | Trend and Intercept |
| LNGDP | −1.013113 | −1.172681 | −4.559265* | −4.564542* |
| LNEDU | −0.775484 | −3.328250*** | −4.248613* | −4.169137** |
| LNHEA | −0.884554 | −3.718921** | −4.272216* | −4.188076** |
| LNLBR | −3.345650** | −4.952245* | −8.280137* | −8.187709* |
| LNGFC | −0.988856 | −1.682581 | −3.973163* | −3.877977** |

*Significant at 1% significance level, **Significant at 5% significance level, *** Significant at 10% significance level

**Table 2** Philip-Perron (PP) test result

| Phillips Perron (PP) Test | | | | |
|---|---|---|---|---|
| Variable | Level | | First Difference | |
| | Intercept | Trend and intercept | Intercept | Trend and intercept |
| LNGDP | −0.971279 | −1.364033 | −4.567684* | −4.573509* |
| LNEDU | −1.246583 | −2.205881 | −4.185404* | −4.047444** |
| LNHEA | −1.331825 | −2.518709 | −3.949278* | −3.858175** |
| LNLBR | −4.569539* | −4.952245* | −8.497616* | −8.187709* |
| LNGFC | −0.988856 | −1.915017 | −3.911085* | −3.809640** |

*Significant at 1% significance level, **Significant at 5% significance level, *** Significant at 10% significance level

Next, the lag length selection estimated based on the unrestricted Vector Autoregressive (VAR) model is carried out. It is crucial to be carried out to determine the optimal lag length that should be used in the Co-integration test. Table 3 shows the VAR lag order selection criteria.

**Table 3** VAR lag order selection criteria

| VAR Lag Order Selection Criteria | | | | | | |
|---|---|---|---|---|---|---|
| Lag | LogL | LR | FPE | AIC | SC | HQ |
| 0 | 167.3422 | NA | 1.95e-11 | −10.47369 | −10.24240 | −10.39830 |
| 1 | 312.1644 | 233.5842* | 8.76e-15* | −18.20416 | −16.81643* | −17.75179* |
| 2 | 337.5192 | 32.71583 | 9.81e-15 | −18.22704* | −15.68287 | −17.39771 |

* indicates lag order selected by the criterion
LR: sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion

From the result computed, it is revealed that Akaike's Information Criterion (AIC) value suggested the lowest value compared to the other criterions. Hence, the lag order 2 is selected as suggested by Akaike's Information Criterion (AIC). Johansen Co-integration test is then conducted using lag order 2 to investigate the long-run relationship between the variables. Table 4 and Table 5 depict the result of the Johansen Co-integration test which proved the existence of long-run relationship between the education expenditure, healthcare expenditure and economic growth. Both of the Johansen Co-integration test (Trace) and Johansen Co-integration test (Max Eigenvalue) results rejected the null hypothesis of no co-integration at 5 per cent level of significance. Thus, implying the existence of long-

run relationship between the variables real Gross Domestic Product (GDP), education expenditure (EDU), healthcare expenditure (HEA), labour force participation rate (LBR) and gross fixed capital formation (GFC).

**Table 4** Johansen Co-integration test (Max Eigenvalue)

| Johansen Co-integration Test (Max Eigenvalue) | | | | |
|---|---|---|---|---|
| **Hypothesized No. of CE(s)** | **Eigenvalue** | **Max Eigen statistic** | **0.05 Critical value** | **Prob.**** |
| None* | 0.783855 | 45.95417 | 33.87687 | 0.0012 |
| At most 1* | 0.632714 | 30.04844 | 27.58434 | 0.0236 |
| At most 2 | 0.362418 | 13.50219 | 21.13162 | 0.4072 |
| At most 3 | 0.247444 | 8.528389 | 14.26460 | 0.3275 |
| At most 4* | 0.124329 | 3.982953 | 3.841466 | 0.0460 |

Max-eigenvalue test indicates 2 co-integrating eqn(s) at the 0.05 level
* Denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) *p*-values

**Table 5** Johansen Co-integration test (Trace)

| Johansen Co-integration Test (Trace) | | | | |
|---|---|---|---|---|
| **Hypothesized No. of CE(s)** | **Eigenvalue** | **Trace statistic** | **0.05 Critical value** | **Prob.**** |
| None* | 0.783855 | 102.0161 | 69.81889 | 0.0000 |
| At most 1* | 0.632714 | 56.06198 | 47.85613 | 0.0070 |
| At most 2 | 0.362418 | 26.01353 | 29.79707 | 0.1283 |
| At most 3 | 0.247444 | 12.51134 | 15.49471 | 0.1340 |
| At most 4* | 0.124329 | 3.982953 | 3.841466 | 0.0460 |

Trace test indicates 2 co-integrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) *p*-values

**Table 6** Normalized cointegrating coefficients

| Normalized Cointegrating Coefficients | | | | |
|---|---|---|---|---|
| **Dependent Variable** | **Independent variables** | | | |
| **LNGDP** | **LNEDU** | **LNHEA** | **LNLBR** | **LNGFC** |
| Coefficient | 0.666897 | −0.563013 | −10.97664 | −0.899941 |
| Standard Error | (0.14210) | (0.14923) | (3.25619) | (0.20288) |
| t-statistic value | [4.69315]* | [−3.77279]* | [−3.37101]* | [−4.43583]* |

*Significant at 5% significance level

The normalized cointegrating coefficients as illustrated by Table 6 revealed the presence of significant positive relationship between LNEDU and LNGDP. This means that the education expenditures had a positive effect on economic growth in the long run. Such finding was consistent with the past researches of Mohd Yahya et al. (2012), Govindaraju, Rao, and Anwar (2011). However, a negative sign is found for the LNHEA cointegrating coefficient. Such a negative coefficient indicates that healthcare expenditure has a significant but negative relationship with economic growth. This negative finding could suggest a poor utilization of the public expenditure on healthcare sector.

## Estimation Results Based on Vector Error Correction Model (VECM)

The Vector Error Correction Model (VECM) was employed to find out the short-run relationship between the variables. Table 7 illustrates the result of the Vector Error Correction Model (VECM). The findings revealed that the coefficients of the lagged independent variables are insignificant (since the result showed all the coefficients of the lagged variables are insignificant). Therefore, this means that all of the independent variables do not have any significant impacts on the economic growth in the short run. As such, it can be concluded that there is no short run relationship between the variables of education expenditure, healthcare expenditure, labour force participation rate, gross fixed capital formation and the real gross domestic product.

**Table 7** Vector Error Correction Model (VECM)

| Vector Error Correction Model | | | | |
|---|---|---|---|---|
| **Dependent Variable: D (LNGDP)**<br>**D (LNGDP) = f(D (LNEDU), D (LNHEA), D (LNLBR), D(LNGFC))** | | | | |
| **Variable** | **Coefficient** | **Standard Error** | **t-statistic** | **P-Value** |
| Error Correction Term (−1) | 0.112034 | 0.10405 | 1.07669 | 0.2967 |
| Error Correction Term (−2) | −0.066910 | 0.03360 | −1.99115 | 0.0628 |
| D(LNGDP(−1)) | −0.186000 | 0.61411 | −0.30288 | 0.7657 |
| D(LNGDP(−2)) | −1.019038 | 0.57785 | −1.76350 | 0.0958 |
| D(LNEDU(−1)) | −0.003859 | 0.03642 | −0.10595 | 0.9169 |
| D(LNEDU(−2)) | 0.046686 | 0.03979 | 1.17344 | 0.2568 |
| D(LNHEA(−1)) | 0.013950 | 0.02739 | 0.50937 | 0.6170 |
| D(LNHEA(−2)) | −0.038310 | 0.03199 | −1.19770 | 0.2475 |
| D(LNLBR(−1)) | −0.737796 | 0.53219 | −1.38633 | 0.1836 |
| D(LNLBR(−2)) | −0.212835 | 0.44057 | −0.48309 | 0.6352 |
| D(LNGFC(−1)) | 0.123101 | 0.15395 | 0.79963 | 0.4350 |
| D(LNGFC(−2)) | 0.200688 | 0.12843 | 1.56267 | 0.1366 |
| C | 0.046928 | 0.02160 | 2.17302 | 0.0442 |

## CONCLUSION

In conclusion, this study proved the existence of long-run relationship between gross domestic product (GDP), education expenditure and healthcare expenditure. However, a significant relationship between the variables was not found in the short run. The Johansen Co-integration test also revealed that the education expenditure has a positive impact on the economic growth in the long run. Therefore, one can conclude that the public expenditure on education is only effective in generating economic growth in the long run but not in the short run. Meanwhile, co-integrating equation indicated that the healthcare expenditure has a negative impact on GDP in the long run. This implied that the government healthcare spending is not very effective and efficient in enhancing the economic growth of the country. Such negative effects may be due to poor allocation and utilization of the public healthcare expenditure which ended up producing a negative impact on economic development. Thus, one can summarize that the government expenditure on the education and healthcare sectors will only generate effects towards the economic growth in the long run. Therefore, policy makers would need to revise and introduce policies that can provide better education and healthcare facilities to the public in the long term. A better education and healthcare facilities will help the development of human capital and enhancing the economic growth.

## REFERENCES

Abdul Jabbar Abdullah. (2013). Education and economic growth in Malaysia: The issues of education data. *Procedia Economics and Finance*, *7* (2013), 65 – 72.

Akram, N., Ihtsham Ul Haq Padda, & Khan, M. (2008). The long term impact of health on economic growth in Pakistan. *The Pakistan Development Review*, *47* (4), 487 – 500.

Apergis, N., & Padhi, P. (2013). Health expenses and economic growth: Convergence dynamics across the Indian States. *International Journal of Health Care Finance and Economics*, *13* (34), 261 – 277.

Asghar, N., Hussain, Z., & Rehman, H. U. (2012). The impact of government spending on poverty reduction: evidence from Pakistan 1972 to 2008. *African Journal of Business Management. 6* (3), 845 – 853.

Bukenya, J. (2009). Do fluctuations in health expenditure affect economic growth? *The Open Economics Journal*, *2*, 31 – 38.

Chor, F. T. (2010). The determinants of health expenditure in Malaysia: A time series analysis. *MRPA Paper No. 24356*. Economic Programme, School of Sciences, Universiti Sains Malaysia.

Djafar, F. 2009. Economic growth, public expenditure and human development in Asia. *Prosiding PERKEM IV*, *1*, 77 – 88.

Economic Planning Unit. (2013). Retrieved from http://www.epu.gov.my/public-sector.

Elmi, Z. M., & Sadeghi, S. (2012). Healthcare expenditures and economic growth in developing countries: Panel co-integration and causality. *Middle-East Journal of Scientific Research*, *12* (1), 88 – 91.

Faraq, M., Nandakumar, A. K., Wallack, S., Hodgkin, D., Gaumer, G., & Erbil, C. (2012). The income elasticity of health care spending in developing and developed countries. *International Journal of Health Care Finance and Economics*, *12* (2), 145 – 162.

Gounden, A. M. N. (1967). Investment in education in India. *The Journal of Human Resources, 2* (3), 347 – 358.

Govindaraju, V. C., Rao, R., & Anwar, S. (2011). Economic growth and government spending in Malaysia: A re-examination of Wagner and Keynesian views. *Economic Change and Restructuring*, *44* (3), 203 – 219.

Gupta, S., Clements, B., & Tiongsan, E. (1998). Public spending on human development. *Finance and Development*, *35* (3), 1 – 9.

Magazzino, C. (2011). GSP and health expenditure in Italian regions. *International Journal of Business and Management*, *6* (12), 28 – 35.

Matsushita, S., Siddique, A., & Giles, M. (2006). Education and economic growth: A case study of Australia. *Economic Discussion/ Working Paper*. The University of Western Australia, Department of Economics.

Ministry of Higher Education. (2009). *Education system of Malaysia*. Retrieved from http://www.mohe.gov.my/educationmsia/education.php?article=system.

Mohd Yahya Mohd Hussin, Fidlizan Muhammad, Mohd Fauzi Abu @ Hussin & Azila Abdul Razak. (2012). Education expenditure and economic growth: A causal analysis for Malaysia. *Journal of Economics and Sustainable Development*, *3* (7), 71 – 81.

Muhammad, S. H., & Rukhsana, K. (2012). The triangular causality among education, health and economic growth: A time series analysis of Pakistan. *World Applied Sciences Journal*, *18* (2), 196 – 207.

Musila, J. W., & Belassi, W. (2004). The impact of education expenditures on economic growth in Uganda: Evidence from time series data. *The Journal of Developing Areas*, *38* (1), 123 – 133.

Noraina Mazuan Sapuan & Nur Azura Sanusi. (2010). Assessing the effect of public social expenditure and human capital development on malaysian economic growth: A bound testing approach, knowledge management. *International Conference 2010*. Universiti Utara Malaysia, May 25 – 27 2010.

Noraina Mazuan Sapuan & Nur Azura Sanusi. (2013). Cointegration analysis of social services expenditure and human capital development in Malaysia: A bound testing approach. *Journal of Economic Cooperation and Development*, *34* (1), 1 – 18.

Odubunmi, A. S., Saka, J. O., & Oke, D. M. (2012). Testing the cointegrating relationship between healthcare expenditure and economic growth in Nigeria. *International Journal of Economics and Finance*, *4* (11), 99 – 107.

Omojimite, B.U. (2010). Education and economic growth in Nigeria: A Granger causality analysis. *African Research Review*, *4* (3a), 90 – 108.

Rahmah, I., & Selvaratnam, D. P. (1999). Health, education and economic growth in Malaysia. *IIUM Journal of Economics & Management*, *7* (2), 1 – 15.

Rahman, M. M. (2011). Causal relationship among education expenditure, health expenditure and GDP: A case study for Bangladesh. *International Journal of Economics and Finance*, *3* (3), 149 – 159.

Rajah Rasiah, Nik Rosnah Wan Abdullah, & Makmor Tumin. (2011). Markets and healthcare services in Malaysia: Critical issues. *International Journal of Institutions and Economies*, *3* (3), 467 – 486.

Reeves, A., Basu, S., McKee,M., Meissner, C., & Stuckler, D. (2013). Does investment in the health sector promote or inhibit economic growth? *Globalization and Health*, *9* (1), 43. https://doi.org/10.1186/1744-8603-9-43

Tilak, J. B. G. (1989). The recession and public investment in education in Latin America. *Journal of Interamerican Studies and World Affairs*, *31* (1/2), 125 – 146.

World Bank. (2014). Retrieved from http://data.worldbank.org/country/malaysia.