The Casual Effect between Public Expenditure on Education and Economic Growth in Sri Lanka from 1980 to 2015

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ABSTRACT

Education is one of the important determinants of economic growth of the country. At the same time, government expenditure policies effect the long run growth of the country. It is high effects government decisions and priority of the government expenditure on different sectors. The main objective of this study to analyze the relationship between public expenditure on education and economic growth in Sri Lanka from 1980 to 2015. An econometric model is applied for this analysis with time series data. The results of the study show that public expenditure on education has a positive and significant impact on economic growth in the long run. By employing co integration technique it is observed that a one per cent increase in public expenditure on education contributes 0.21 percentage increase in GDP per capita in the long run.

Keywords: Education expenditure, Economic growth, Gross Domestic Product (GDP), Long run, Public expenditure

1. Introduction

Education is a primary and more essential input for human resources development of a country. Education is a key factor for boosting country's economy and is considered as one of the necessary conditions to achieve better outcomes on social welfare. The social benefits of education provide a powerful set of arguments in favor of public investment to achieve the social optimum (Harsha, 2004). Education is important for a country's economic growth. And public expenditure on education is very important for rising education. Therefore, the connection between public expenditure on education and economic process has to be mentioned. This research analyzed the relationship between public expenditure on education and economic growth in Sri Lanka.

2. Literature review

Here are some studies discussed the relationship between expenditure on education and economic growth. Ansari and Singh (1997) used annual statistic information from 1951 to 1987 to check the connection between public spending on education and growth in Asian country. They found that there's no long relationship between the education and economic growth. Afzal et al (2010) conducted a study to investigate the short-run and long-run linkage between school education and economic growth in Pakistan and confirmed the existence of a direct relationship between them. In another study, Chandra (2010) made an attempt to explore the causal relationship between government spending on education and economic growth of India using 1950-2009 data. The study shows that the direction of effort is from education expenditure to economic process isn't immediate to require result, rather it is same that investment in education is anticipated to have an effect on economic process of a rustic when some amount. Kesavarajah (2012) has made an econometric analysis based on Wagner's law in Sri Lanka. The research examines the validity of Wagner's law in Sri Lanka by using time series analysis from 1960 – 2010. The analysis model is cointegration and error correction modelling techniques. This research supports the existence of a long run relationship between public expenditure and economic growth. Therefore, the findings of this study pave to a deeper understanding about the relationship between public expenditure and economic growth by considering individual items of public expenditure and by including more macro-economic variables in the econometric model using a different methodology in future. Ganegodage (2011) analyzed the impact of education investment on Sri Lankan economic growth. This study analyzes the contribution of investment on education to Sri Lanka's economic growth during the period 1959–2008. Physical capital, economic policy changes and the ethnic war are also evaluated due to their substantial importance. This study uses a framework encompassing each the classical and endogenous growth model. The impact of education is assessed through a quality-adjusted human capital stock live. The returns to investment in education are positive however considerably below those found for different developing economies. Unlike the case of most developed economies, higher returns from investment in physical capital cannot produce any sizable positive externalities. The war has had the expected negative result on output, and the results on economic policy changes

are inconclusive. The results indicate a desire for associate degree acceptable strategy to portion resources on education to enhance its returns to the economy.

3. Research Methodology

Economic growth is outlined because the increase in a very nation's ability to supply merchandise and services over time as is shown by raised production levels within the economy. There are various measures to depict economic process and also the study used value per capita (US $) as a proxy for economic process. GDP per capita is measured as value divided by the overall population of the country. The experimental variable of the study is public expenditure on education (US $). Public expenditure on education consists of current and capital public expenditure. The studies typically use Ordinary Least square (OLS) to estimate the following growth equation:

$$\mathbf{GDP_t=\beta_0 + \beta_1 EDU_t + \varepsilon_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)}$$

Where GDPt is the GDP per capita (GDPPC) at 2010 constant price, EDU is public expenditure on education in Sri Lanka. β0 and β1 are the parameters known as the intercept and slope coefficient and ε is the classical random disturbance term. The data were highly correlated with each variable. Therefore, data were transformed in logarithms to smoothen the data which displayed a high trend. The variable name is preceded by an L to indicate the inclusion of logs. Thus equation (1) transformed in the following linear logarithmic regression form,

$$\mathbf{LGDP_t=\beta_0 + \beta_1 LEDU_t + \varepsilon_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (2)}$$

In order to avoid a spurious regression scenario, the variables in a very regression model should be stationary or co-integrated. When working with non- stationary time series, there is a need to test the presence of unit roots in order to avoid the problem of spurious regressions. If a variable contains a unit root then it is non-stationary and unless it combines with non-stationary series to form a stationary cointegration relationship, then regressions involving the series can falsely imply the existence of a meaningful economic relationship (Harris, 1995).

It is necessary to check the order of integration of every variable in an exceedingly model, to ascertain whether or not it's non- stationary and the way over and over the variable must be differenced to result in a stationary series. Therefore, in the first step, unit root tests on LGDP and LEDU have been performed to investigate whether they are stationary or not. To check for the non-stationarity property, the data were subjected to Augmented Dickey and Fuller test (ADF test). The null hypothesis of ADF check states that a variable is non-stationary. The null hypothesis of non-stationary is rejected if the calculated ADF statistics is a smaller amount than the vital worth. ADF performed by adding the lagged values of the variable quantity ΔYt. The following regression is for ADF test,

$$\Delta Y = \beta_1 + \beta_2\, t + \delta Y_{t-1} + \alpha\, \Sigma \Delta Y_{t-i} + \varepsilon_\tau$$

As the first difference reflects the rate of change of each variable, the equation (2) can be differenced and written as follows,

$$\Delta LGDP_t = \beta_0 + \beta_1 \Delta LEDU_t + \varepsilon_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (3)$$

Where a variable with Δ indicates the first difference of it. To examine the relationship between GDP and EDU variables equation (3) can be used. The analysis of the relationship between economic growth and expenditure on education in a cointegration test begins with the testing of integration properties of the data. EViews version 8 statistical software was used for this analysis.

4. Result and Discussion

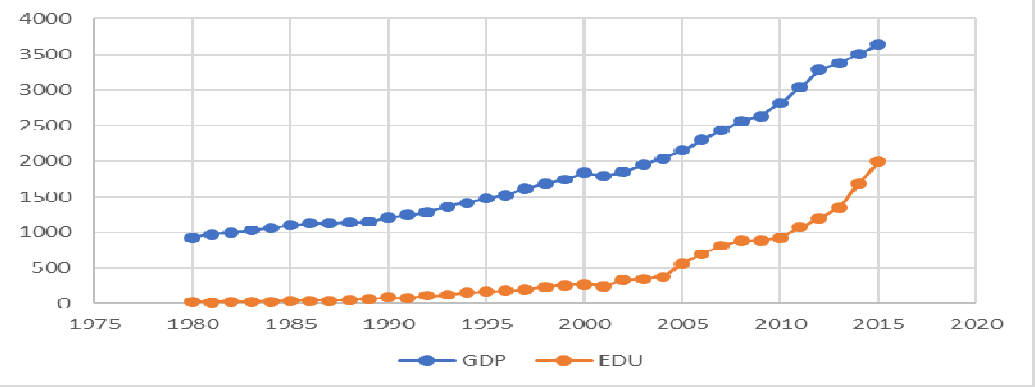
The following descriptive statistics show that the trend of educational expenditure and economic growth in Sri Lanka. The graph shows the increasing trend of both variables. Figure 4.2 shows that the fluctuation trend of both variables.

Table 4.1: Descriptive Statistics of Variables

Variables	Minimum	Maximum	Mean	Standard error
GDP	927.1346	3637.539	1844.428	802.2778
EDUE	20.63274	1991.566	433.6186	511.1636

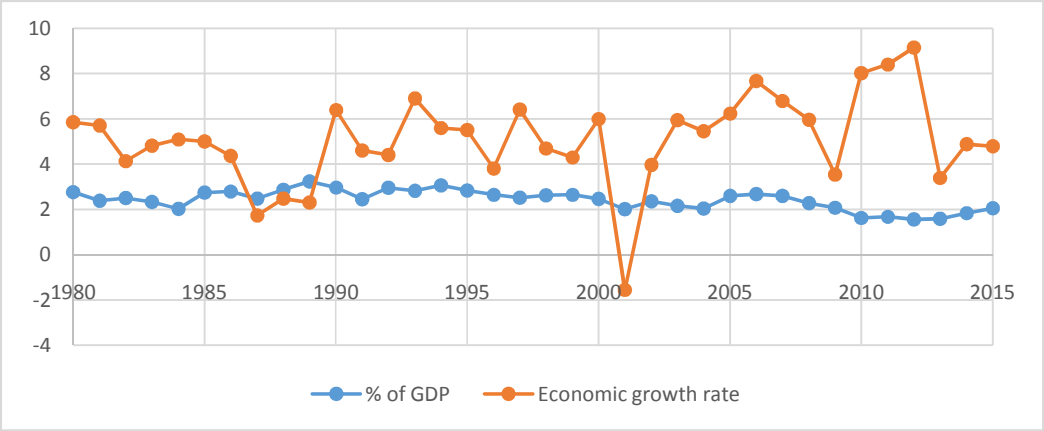
Source: Computed by researcher, 2017

Figure 4.1: Trends of Education expenditure an Economic Growth (1980-2015)



Source: Central bank report of Sri Lanka various reports

Figure 4.2: Trend of economic growth rate and public expenditure on education as % of GDP (1980 – 2015)



Source: Central bank report of Sri Lanka various reports

The first step in our empirical work was to determine the degree of integration of each variables. We need to test whether data were stationary or non-stationary. The method of testing is unit root test. The general type of unit root test is the Augmented Dickey-Fuller test (ADF). The results if the ADF test reported in table 4.14 for the level as well as for the first and second difference of each variable.

Table 4.2: Results of the ADF test of LnGDP

ADF test of lnGDP in level				
		t statistics	P value	Status
Augmented Dickey-Fuller test		7.970512	1.0000	Non-Stationary
Test Critical values	1% level	-3.632900		
	5 % level	-2.948404		
	10% level	-2.612874		
ADF test of lnGDP in 1st Difference				
Augmented Dickey-Fuller test		-0.970726	0.7524	Non-Stationary
Test Critical values	1% level	-3.639407		
	5 % level	-2.951125		
	10% level	-2.614300		
ADF test of lnGDP in 2nd Difference				
Augmented Dickey-Fuller test		-6.964985	0.0000	Stationary
Test Critical values	1% level	-3.646342		
	5 % level	-2.954021		
	10% level	-2.615817		

Source: Computed by researcher, 2017

Table 4.3: Results of ADF test LnEDU

ADF test of lnEDU in level				
		t statistics	P value	
Augmented Dickey Fuller test		7.9750512	1.0000	Non-Stationary
Test Critical values	1% level	-3.632900		
	5 % level	-2.948404		
	10% level	-2.612874		
ADF test of lnEDU in 1st Difference				
Augmented Dickey Fuller test		-0.970726	0.7524	Non-Stationary
Test Critical values	1% level	-3.639407		
	5 % level	-2.951125		
	10% level	-2.614300		
ADF test of lnEDU in 2nd Difference				
Augmented Dickey Fuller test		-6.9646342	0.0000	Stationary
Test Critical values	1% level	-3.3646342		
	5 % level	-2.954021		
	10% level	-2.615817		

Source: Computed by researcher, 2017

The results of the ADF test shows that the null hypothesis that the series contain unit root cannot be rejected in both cases at the level and first difference levels. But the hypothesis of unit root is strongly rejected for the differenced series of both variables. Given the consistency and ambiguity of the result from this testing approach, we conclude that the series under investigation are 1(I). the reveals both the GDP and expenditure on education are non-stationary in its levels and stationary in the second difference**.**

4.1 Regression Model

The log-transformed GDP and Public expenditure on education have been used to develop the OLS regression model. The estimated equation shows as following:

$$\begin{aligned} LGDP &= 52.98 + 0.43LEDU \\ &\quad (10.080) \quad (0.0997) \\ t= &\quad (5.25) \quad (4.35) \end{aligned}$$

The slope coefficient is statistically significant at 1 % level and the relationship between the variables is positive. It is implying that in Sri Lanka, a one per cent increase in public expenditure on education contributes 0.43% increase in GDP per capita. Moreover, F = 18.99 and P = 0.001 imply that the regression model significantly fits the data. Finally, R^2 indicates that about 65 per cent variation of GDP per capita can be explained by total variations in the independent variable.

4.2 Cointegration Test

The next step in our empirical analysis is to test for cointegration. Since the variables are unit thought of to be I (1), the co-integration method is appropriate to estimate the long-run relationship between variables. To explore the number of cointegrating vectors Maximal Eigenvalue and Trace statistics is used. The results of Trace statistics and Maximum Eigenvalue are shown as following:

Table: 4.4: Results of Unrestricted Cointegration Rank Test (Trace) between variables included in the study through the Johansons Cointegration test.

Hypothesized No of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical value	Prob**
None*	0.442812	22.00820	15.49471	0.0045
At most 1*	0.097786	3.292897	3.841468	0.0696

Trace test indicates 1 cointegratingeqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Table: 4.4: Results of Unrestricted Cointegration Rank Test (Maximum Eigenvalue) between variables included in the study through the JohansonsCointegration Test.

Hypothesized No of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical value	Prob**
None*	0.442812	18.71530	15.49471	0.0093
At most 1*	0.097786	3.292897	3.841468	0.0696

Max-eigenvalue test indicates 1 cointegratingeqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

we can see that the null hypothesis of no cointegrating relationship can be rejected at the five percent level employing Trace statistic (trace statistic = 22.00 > critical value = 15.49 and p-value: 0.0045), thereby suggesting that there is one linear combination of these non-stationary variables in the level form that is stationary. The Trace statistic recognized one cointegrating vector, while the Maximal Eigen statistic identified one cointegrating vector. Therefore, the study used one cointegrating vector in order to establish the long-run relationships among the variables. After normalization the cointegrating vector on LGDP, normalized cointegrating coefficients were estimated as follows:

LGDP	LEDU	Log-likelihood
1	-0.211118	
Standard error	0.193562	
t-value	-2.692256	160.3690
P value	0.0125	

Table 4.5: Normalized cointegrating coefficients

Source: Computed by researcher, 2017

The sign of a coefficient in the above table is reversed because of the normalization process. The estimation of the equation by cointegration gives the following one

$$LGDP = 0.21LEDU$$

This clearly shows that within the long-standing time, public expenditure on education encompasses a positive impact on gross domestic product. The slope coefficient of LEDU states that one percent increases in public expenditure on education contribute 0.21% increase in GDP per capita in the long run.

5. Conclusion

In this study, data were analysed and its results were presented in different subheadings. The sub-analysis was totally interrelated with the main objective of this study. To the understanding of trend and the pattern of education expenditure regression analysis was done. It shows how the components of the dependent variable are related to each other and how the components of the independent variable are related to each other and how the total expenditure on education relate to the other important variables in Sri Lanka. This analysis was done by several methods and concepts. The conceptual framework shows that the clear linkage between all topics. When we consider economic development, we must focus on education. This study proved the linkages between all relevant contributions on educational expenditure in Sri Lanka. This analysis outcome will explain by another topic. The next chapter explains the conclusion and recommendation.

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