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Education and Economic Growth: A Comparative Analysis of India and Sri Lanka

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Abstract: *Education is a fundamental foundation in the development of a nation. History reveals that success, honor and dignity become the pride of those nations who lead in education in the world. This study elaborates on the role of education in India and Sri Lanka's economic growth. Growth is 1981-2016. Auto-Regressive Distributed Lag (ARDL) technique is applied in this study. It is pragmatic that India focused more on Tertiary education and Sri Lanka concentrated on Primary education. Tertiary education has a major role in India's GDP growth, whereas, in Sri Lanka, Primary education has a robust role in economic growth. It is evident that India's number of research scholars and highly skilled persons netted good recognition and distinction in the global world. This is due to the focus on tertiary education.*

Key Words: GDP Growth, Primary Education and Tertiary Education

Introduction

Education is critical to the advancement of the world's economy. Many observational studies have also shown that education has a positive and fundamental impact on the Gross Domestic Product (GDP) (Torruam, Chiawa, & Abur 2014; Yardimcioglu, Gürdal, & Altundemir, 2014). Some studies have shown that education affects development through various channels (Lv, Yu, Gong, Wu, & Xu, 2017; Sunde, 2017). Education expenses significantly affect long-term economic gains relative to short-term ones (Mallick & Dash, 2015; Sunde, 2017). Sunde 2017 also finds that skilled workers are better for economic growth (Sunde, 2017). Similarly, (Lv et al., 2017) added a higher impact on development on average primary education. However, similar tests in developing and developed countries have different primary, secondary and tertiary school outcomes. Various researches have demonstrated the importance of primary education for economic development, although others have demonstrated the more significant influence of tertiary education on economic condition. (Glewwe, Maiga & Zheng, 2014; Hannif & Ar Shed, 2016; Hassan & Cooray, 2015). (Barro, 2013; Benos & Zotou, 2014; Dănăcică, Bela Umbert, & Ilie, 2010).

After independence, India's higher education institutions have grown quite rapidly. Universities were 40 times, universities were 82 times higher between 1950-2015, and students were more than 127 times higher in a significant number (Yogesh & Kiran, 2018). Even though India focuses on higher education and highly educated people like to participate in its development activities, increasing economic growth (Layard, 2009; Mishra & Mishra, 2015). (Mishra & Mishra, 2015) found that in India, there is unidirectional causation from education spending to GDP. While the Indian government agreed to raise spending by about 6% of the GDP ratio to the education sector in 1968. (Mishra & Mishra, 2015).

In India, the growth of the education sector is indeed remarkable, particularly in tertiary education. At the end of 2020, India will have the world's highest tertiary students and number two in graduate students. India now has a demand of

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US$100 billion in education. Higher education currently adds 59.7 percent to the market, 38.1 percent to school buildings, 1.6 percent to pre-school education, and 0.6 percent to skills, technology, and multimedia. India's tertiary education structure is now the largest globally, with over 70 million scholars (Kumari and Shrama, 2017). India concentrated a great deal on tertiary education. India has the world's largest tertiary education structure. The universities are six hundred thirty-four, the universities are 33,000, and the universities are 20. However, in terms of enrollment, it grades third about 17 million scholars (UGC, 2012).

However, after the 1980s, funding of the government of India was declining, and therefore the growth of new universities and colleges for higher education decreased (Tilak, 2005). After that, public universities start offering distance learning opportunities to the growing number of students (Agarwal, 2007), and the fee from these distance courses was the key earning source for public universities in India. As a result, in 2005, around 12 new open universities and 106 conventional universities established for a distance learning course; because of lack of resources, the state of India decided to allow the private institution to offer distance learning opportunities to the students in India (Kapur & Mehta, 2004). Similarly, (Castelló-Climent, Chaudhary, & Mukhopadhyay, 2015) stated that positive and unidirectional causality exists in India when they control the rich size of geographical and historical characteristics.

Sri Lanka is consistently focusing on economic development with the fall of the colonial empire. So, for attaining higher economic growth goals, Sir Lanka's national strategy focuses on educated labour by investing in human resources (Ganegodage & Rambaldi, 2011). Therefore, Siri Lanka's Government has agreed to offer free primary education (Ranasinghe & Hartog, 2002; Visaria & Pal, 1981) as primary education contributes much more to economic development than higher education (Ganegodage & Rambaldi, 2011). Several studies have agreed that education expenditure promotes capital and enhances economic activity development (Al-Yousif, 2008; Clements, Gupta & Inchauste, 2004; Maitra & Mukhopadhyay, 2012; Psacharopoulos & Patrinos, 2004). According to Mallick, Das & Pradhan (2016), education is one of the primary ingredients in developed countries like Sri Lanka that boost economic development. Sri Lanka gives primary education particular importance and support to India, while India focuses mainly on tertiary education. Sri Lanka used more money for primary education and in 2016 ranked 98 countries on the list (primary education spending percentage of government educational expenditure). However, India ranked 124 in primary education spending worldwide as one percent of government education expenditure in 2013. However, for tertiary education, India was 36th worldwide in 2013, and in 2016 Sri Lanka was 133th in the world (Territorial education spending percentage of government educational costs), the United Nations Institute for Education, Science and Culture (UNESCO) 1. New research in Sri Lanka finds that high-income returns occur if male schooling increases again for one year (Himaz & Aturupane, 2016). However, it argued that education yields are 4% lower than in other developed countries. Likewise, Sri Lanka's return on investment in the education sector is less than other developed countries but positively. At the global stage, the average education return was at least 10 percent higher than that of Siri Lanka (Fasih, Kingdom, Patrinos, Sakellariou & Soderbom, 2012). However, some reports have indicated that developed countries rely more on primary education, as higher education returns are less in developing economies (Ganegodage & Rambaldi, 2011; Mukherjee, Cabraal, & Terrado, 2005; Todaro & Smith, 2009).

Literature has indicated that both India and Sri Lanka are focusing on education, but their emphasis is different, and India is focused on tertiary education, though studies have shown that tertiary education in India is better for economic development (Layard, 2009; Mishra & Mishra, 2015; Tilak, 2005). Sri Lank, on the other hand, focuses on primary education to encourage development. The Global Index on Competition (2005) shows that Sri Lanka's primary education had increased from 36 in 2005 to 26 in 2015. Primary school enrollment was up from 96.1 in 2005 to 98.5 in 2014. The priority in Sri Lanka was more primary than tertiary. This study sought to examine the relative relevance to both primary and tertiary education countries through its impact on economic development. The researchers set the study's objective to determine

whether primary or secondary education is more beneficial to Sri Lankan and Indian economic growth.

Hypotheses of the Study

Ho = Primary Education does not have a significant role in Sri Lankan economic growth.

Ho = Therapeutic education has no significant role in India's economic growth.

Literature Review

Although a thorough investigation into the relationship between various levels of education and economic progress has been carried out, it has been discovered that education at all levels, including secondary and tertiary education, facilitates global economic growth. Barro, 2013; Benos & Zotu, 2014; Dănăcică et al., 2010; Gyimah-Brempong, Paddison, & Mitiku, 2006; Hanif & Arshed, 2016; Jalil & Idrees, 2013; Gyimah-Brempong, Paddison, & Mitiku, 2006; Hanif & Arshed, 2016; Hanif & Arshed, 2016; Dănăcică, Belaşcu, and colleagues investigate the long-term association between higher education and per capita GDP in Romania (2010).

In addition, a one-way causal link between GDP per capita and tertiary education has been established. Similarly, Hanif and Arshed (2016) found that tertiary education has a greater impact than primary and secondary education on real GDP growth in SAARC countries. However, the lack of experience and knowledge that leads to economic responsibilities not linked to a stable career is the reason for the lower impact on GDP in primary education. In addition, a panel report (Papageorgiou 2003) found that primary and secondary schools have a positive influence on growth. Low revenue countries can focus on policy growth, notably schooling, and policymakers can concentrate on secondary education; in high-income countries where employment is most important, employment policies can be formulated (Ali, Chani & Hussain, 2019). He argues that primary education increases overall efficiency, while tertiary education contributes to the adoption and innovation of new technologies. A study in the developed country of Pakistan also found that increased education financing led to an increase in GDP growth (Jalil & Idrees, 2013).

Fewer recent meta-regression studies show that higher education has an important positive effect on economic growth for males, while higher education for females has no effect (Benos & Zotou, 2014; Hassan & Cooray, 2015). Male primary school, on the other hand, has little impact on economic growth, while the female primary school has an indirect economic impact due to lower fertility rates (Benos & Zotou, 2014). According to Hassan and Cooray (2015), education at every level has a positive effect on Asian countries' development: primary, secondary, and tertiary. (Oketch, McCowan, & Schendel 2014) went on to point out that tertiary learning has a greater impact on economic growth and graduate income in low- and lower-middle-income countries. Some figures show that low education levels in Sub-Saharan Africa have a lower effect on the economic development of the region than in other countries (Glewwe et al., 2014). The relationship between secondary and third-school education and economic development was discovered in another longitudinal study (Pegkas 2014), but there was no such connection between primary and secondary education or economic growth in Greece.

Sources of Data Collection and Econometric Methodology

This research compares and contrasts India and Sri Lanka's educational success in terms of economic development. Primary and tertiary education was used in the evaluation, while World Development Indicators and the United Nations Educational, Scientific, and Cultural Organization (UNESCO) provided services from 1981 to 2016 considered as the data source.

Econometric Methodology

When we use time-series results, we display the cointegration between or inside the series. However, they must be coupled in the same order in order to study the long-term relationship between time series variables. The root test of the Dicky- or Fuller Augmented Dicky-unit Fuller was widely used to determine if a part was fixed or not. In consequence, we start by evaluating the unit root test results before deciding on the appropriate analytical techniques. If variables are stationary in the order I(0), we can use a basic low-

carrying (OLS) regression technique; if variables are combined in the order I(1), we can use the joint integration process of Johansen to find the long-term relationship between them (Dickey & Fuller, 1979). Furthermore, the autoregressive distributed lag process (ARDL) can be used if the series are combined in mixed order I(0) and I(1) but not I(2) according to Pesaran, Shin and Smith (2001).

Model 1& 2: Models of Primary and Tertiary education of Sri Lanka

Our hypothesis is that the primary and tertiary education of Sri Lanka does not affect to GDP growth rate. This section discovers the association between primary, tertiary education and GDP growth rate. This is accomplished by using the following two models.

$$LogGDP_t = \alpha_0 + \alpha_1 LogPNRN_t + \alpha_2 LogCAP_t + \alpha_3 LogDCPP + \alpha_4 LogFDI_t + \alpha_5 LogINF_t + \varepsilon_t \quad \text{(Eq. 1)}$$

$$LogGDP_t = \beta_0 + \beta_1 LogNTRN_t + \beta_2 LogFDI_t + \beta_3 LogINF + \beta_4 LogCAPM_t + \beta_5 LogDCPP_t + \varepsilon_t \quad \text{(Eq. 2)}$$

Where GDP = Gross Domestic Product, PNRN = Primary Enrolment, CAP = Gross Fixed Capital Formation, FDI = Foreign Direct Investment, DCPP = Domestic Credit to Private Partners, NTRN = Tertiary Enrolment, INF= Inflation, and εt= Error term

We select the ARDL model to see the long-run and short-run impact of primary and tertiary education on GDP with a set of control variables.

Model 3& 4: Models of Primary and Tertiary Education of India

Our hypothesis is that the primary and tertiary education of India does not affect GDP growth. This section discovers the association between primary, tertiary education and GDP growth. This is accomplished by using the following two models.

$$LogGDP_t = \gamma_0 + \gamma_1 LogPRNM_t + \gamma_2 LogPOPM_t + \gamma_3 LogINF + \gamma_4 LogGCEM_t + \gamma_5 LogEXRM_t + \varepsilon_t \quad \text{(Eq. 3)}$$

$$LogGDP_t = \lambda_0 + \lambda_1 LogTNRN_t + \lambda_2 LogFDI_t + \lambda_3 LogINF + \lambda_4 LogTOP_t + \varepsilon_t \quad \text{(Eq. 4)}$$

Where PRNM = Primary enrolment, POPM = Population, GCEM= Government Consumption expenditure, EXRM = Export, TNRN= Tertiary Education, TOP= Trade Openness

We use the conventional ARDL model to examine the impact of primary and tertiary education on GDP in Siri lank and India

$$\Delta y_t = \sum_{z=1}^{q} \alpha_z \, y_{t-z} + \sum_{z=0}^{p} \beta'_{lz} \, X^r_{l,t-z} + \varepsilon_t \dots\dots\dots\dots (5)$$

The dependent variable y_t is GDP growth, $X_{l,t}$ is a vector of regressor variables that similarly contains selected control variables, and ε_t Is a stochastic error term. Here t shows the time phases from 1, 2,3...to T. The symbol r states that which country gives more importance to primary education or tertiary education. The estimations from r equations will be differentiated to realize the effect of primary education or tertiary education on GDP growth (Frank, 2009). We also present the ARDL estimates in error correction form (Frank, 2009). To indicate the ARDL estimations in error adjustment form, on both sides of the equation, we add y_{t-1} Eq. 5.

$$y_t = \sum_{z=1}^{q} k_z \, y_{t-z} + \sum_{z=0}^{p} \beta'_{lz} \, X_{l,t-z} + \varepsilon_t \dots\dots\dots\dots (6)$$

Where $k_z = \alpha_z \; \forall \; z \neq 1 \; \& \; k_z = \alpha_1 + 1$
After some modification, we get:

$$\Delta y_t = \theta_l [y_{t-1} - \emptyset'_l X_{l,t}] + \sum_{z=1}^{q-1} k_z \, \Delta y_{t-z} + \sum_{z=0}^{p-1} \beta'_{lz} \, \Delta X_{l,t-z} + \varepsilon_t \dots\dots\dots\dots (7)$$

Where

$$\theta_l = -\left(1 - \sum_{z=1}^{q} \delta_l\right),$$
$$\emptyset_l = \sum_{z=0}^{p} \frac{\beta_{lz}}{1 - \sum_r k_{lr}},$$
$$k_z = -\sum_{n=z+1}^{q} k_m,$$
$$\beta_{lz} = -\sum_{m=z+1}^{p} \beta_{ln}.$$

Empirical Findings

Empirical results are presented in this part of the study. Analysis and comparison between India and Sri Lanka's primary and secondary education are presented in the viewpoint of economic growth.

Descriptive Statistics

These statistics commonly elaborate on the nature and structure of the data. The mean and median values of variables are very adjacent, which directs symmetry. The variables are closely spread from their mean as indicated by their small standard deviations. Primary enrolment and population are least volatile in Sri Lanka and India, respectively. However, Tertiary education and FDI are highly volatile in Sri Lanka and India correspondingly. The variables are not highly skewed since their skewness values are close to zero. The kurtosis values are not far from three. Jarque- Bera values show the normal distribution of all variables of interest. These statistics are presented in the following (see Table 1 & 2) for both Sri Lanka and India.

Sri Lanka

Table 1. Descriptive Statistics

	LOGGDP	LOGPNRN	LOGCAP	LOGDCPP	LOGINF	LOGFDI	LOGTOP	LOG GDPPG	LOG NTRN
Mean	24.19	-1.03	22.67	3.20	2.11	-0.01	4.19	1.26	11.11
Median	24.15	-1.04	22.59	3.36	2.24	0.11	4.22	1.39	11.07
Maximum	25.10	-0.88	23.78	3.83	3.12	1.05	4.48	2.12	12.84
Minimum	23.39	-1.19	21.84	2.17	-0.08	-1.26	3.83	-2.03	9.58
Std. Dev.	0.52	0.11	0.62	0.42	0.68	0.49	0.18	0.76	0.91
Skewness	0.20	0.07	0.41	-1.09	-1.28	-0.45	-0.53	-2.67	0.37
Kurtosis	1.81	1.50	1.78	3.59	5.06	3.02	2.08	11.65	2.51
Jarque-Bera	2.31	3.29	3.12	7.45	15.85	1.22	2.87	150.91	1.15
Probability	0.31	0.19	0.21	0.024	0.0003	0.54	0.23	0	0.56
Sum	846.64	-35.90	793.62	111.95	73.69	-0.51	146.76	44.01	388.94
Sum Dev.	9.37	0.34	13.01	5.89	15.87	8.37	1.11	19.48	28.09
Observations	35	35	35	35	35	35	35	35	35

India

Table 1. Descriptive Statistics

	LGDP	LGDPPG	LPRNM	LPOPM	LINF	LGCE	LEXRM	LTOP	LTNRN	LFDI	LOGIMP
Mean	27.35	1.41	2.83	6.91	1.87	25.21	11.40	3.26	2.13	-1.07	25.36
Median	27.33	1.55	2.87	6.93	2.05	25.29	11.27	3.19	1.77	-0.46	25.37
Maximum	28.46	2.17	3.21	7.17	2.62	26.14	13.13	4.02	3.35	1.29	27.08
Minimum	26.38	0.09	2.27	6.57	0.57	24.18	9.84	2.51	1.22	-5.94	23.74
Std. Dev.	0.63	0.54	0.29	0.18	0.45	0.57	1.16	0.51	0.71	1.83	1.14
Skewness	0.14	-0.59	-0.30	-0.28	-0.99	-0.02	0.12	0.07	0.48	-0.83	0.11
Kurtosis	1.82	2.37	1.93	1.86	3.48	1.89	1.56	1.57	1.78	2.78	1.60
Jarque-Bera	2.11	2.58	2.12	2.33	5.96	1.72	2.97	2.90	3.43	4.02	2.83
Probability	0.35	0.27	0.34	0.31	0.05	0.42	0.22	0.23	0.18	0.13	0.24
Sum	930.1	47.88	96.34	234.9	63.57	857.15	387.70	110.9	72.56	-36.66	862.49
Sum Dev.	13.27	9.85	2.90	1.14	6.62	11.09	44.72	8.89	16.82	110.85	43.51
Observations	34	34	34	34	34	34	34	34	34	34	34

Unit Root Test

Time series findings from 1981 to 2016 used to evaluate the economic growth impact of primary and tertiary education in Sri Lanka and India. The problem of static data in time series arises sometimes. This analysis uses the Augmented Dickey-Fuller (ADF) test and all variables articulated in logarithm form to calculate the static properties of the variables. Many of the control and main variables are executed through the root device. The following is a list of the findings (see Table 3).

Table 2. Sri Lanka - Unit Root Stationarity Test

	Level		1st Difference	
Variables	**Intercept**	**Trend and Intercept**	**Level**	**Trend and Intercept**
LnGDP	0.9994	0.8795	0.0011	0.003
LnPNRN	0.7826	0.8187	0.000	0.000
LnCAP	0.9919	0.4919	0.0036	0.0033
LnDCPP	0.5306	0.3898	0.0001	0.0006
LnINF	0.0029	0.0044	0.000	0.0006
LnFDI	0.0025	0.0002	0.000	0.0649
LnTOP	0.8014	0.9029	0.0002	0.0013
LnNTRN	0.9756	0.6530	0.0001	0.0007

The Augmented Dicky Fuller (ADF) test is applied to verify the stationarity, while all study variables are found to be stationarity except for Inflation and FDI. The two variables at the level are stationary. The method implies that the ARDL method should extend since the mixture of I (0) and I (1) sequence suited for the ARDL solution sets the compound nature of vivid components of variables.

Table 3. India - Unit Root Stationarity Test

	Level		1st Difference	
Variables	**Intercept**	**Trend and Intercept**	**Level**	**Trend and Intercept**
LnGDP	1	0.8811	0.0003	0.0003
LnPRNM	0.4229	0.1729	0.000	0.0002
LnPOPM	0.0016	0.000	0.000	0.000
LnINF	0.000	0.0259	0.000	0.000

LnGCE	0.9998	1	0.0032	0.0593
LnEXRM	0.9665	0.5144	0.0007	0.0048
LnTOP	0.814	0.9432	0.2035	0.0039
LnTNRN	0.9756	0.6997	0.0001	0.0007
LnFDI	0.1997	0.1497	0.000	0.0176

These values of the ADF test elaborates that LnPOPM and LnINF are stationary at a level whereas all other
variables are stationary at 1st difference.

Estimation Results: Sri Lanka

Analysis of Effect of Primary education on Economic Development

ARDL Bounds Test

The ARDL technique originates with conducting the bound test. Therefore, The null hypothesis is that there is no cointegration.

Ho: $\alpha 1 \neq \alpha 2 \neq \alpha 3 \neq \alpha 4 \neq \alpha 5 \neq \alpha 6 \neq 0$

H1: $\alpha 1 = \alpha 2 = \alpha 3 = \alpha 4 = \alpha 5 = \alpha 6 = 0$

The computed F-statistics alongside critical values calculated by Pesaran et al. (2001) are exposed in the following (See Table 5).

Table 4. Bound Test for Long-Run Relationship

Computed F. Statistic	Level of Significance	Critical Values	
		I(0)	I(1)
7.0311	10%	2.26	3.35
	5%	2.62	3.79
	3%	2.96	4.18
	1%	3.41	4.68

The computed F. statistics show that the value is great than I(0) and I(1). It infers that the null hypothesis can be rejected.

ARDL Long Run Analysis

As a result, there is a long-term relationship between the dependent and independent variables. After determining the long-term relationship, the model one coefficients examined; the long-term model's results are further explored

Table 5. Long-Run Model (LogGDP)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOGPNRN	0.669318	0.105507	6.343844	0.0014*
LOGCAP	1.074629	0.045192	23.778962	0.0000*
LOGDCPP	0.040662	0.072076	0.564152	0.5970
LOGFDI	-0.119361	0.080105	-1.490064	0.1964
LOGINF	0.249601	0.082369	3.030262	0.0291**
C	-9.07332	2.411413	-3.762657	0.0131
R-Squared	0.984	S.E. REG	0.006	
Adjusted R-Squared	0.900	Observations	35	

Notice that the symbols *, **, and *** denote a 1%, 5%, and 10% degree of importance, respectively. The variables logPNRN, LogCAP, and LogINF are significant and have positive coefficient signs. 1% increase in primary education will enlarge 66 % of GDP. The variable LogDCPP and Log FDI are insignificant and have no significant role in the model.

ARDL Short-Run Analysis

The symbol for error correction incorporates short and long-term analyzes in one symbol. The

coefficients of the various variables in the short-term error correction model are seen by the short-term economic growth responses. Below are the results of the error correction model for the ARDL key model

Table 6. Short-Run Model (LogGDP)

Variables	Coefficient	Std. Error	t-Statistic	Prob.
LOGPNRN	0.14785	0.06289	2.350912	0.0655
LOGCAP	0.331723	0.046409	7.147803	0.0008
LOGDCPP	0.043024	0.016599	2.591944	0.0487
LOGFDI	-0.011227	0.006182	-1.816157	0.129
LOGINF	0.011841	0.002831	4.181832	0.0086
CointEq(-1)	-0.345162	0.081704	-4.224533	0.0083
R-Squared	0.997	S.E. REG	0.006	
Adjusted R-Squared	0.986	Observations	35	

The ECTt-1 coefficient is statistically crucial at 1% and has the proper signal (negative). The short-term cointegration of LogPNRN, LogCAP, LogDCPP, and LogINF also supports this importance. The ECTt-1 coefficient is -0.345162 and indicates the long-term equilibrium adjustment after a short-term shock of approximately 30.45%.

Analysis of Effect of Tertiary education on Economic Development

ARDL Bounds Test

The ARDL Bound Test is important in estimating the long-term relationship between dependent and independent variables. The above was found in accordance with vital Pesaran et al. principles (2001).

Table 7. Bound Test for Long-Run Relationship

Computed F. Statistic	Level of Significance	Critical Values	
		I(0)	I(1)
7.0786	10%	2.75	3.79
	5%	3.12	4.25
	3%	3.49	4.67
	1%	3.93	5.23

The computed F.statistics show that the value is great than I(0) and I(1). It infers that the null hypothesis can be rejected.

ARDL Long Run Analysis

It is, therefore, understood that there is a long-term connotation between the dependent and the independent variables. After establishing a long-term relationship, the model evaluates two coefficients. The effect of the long-term model is seen below.

Table 8. Result of Long-Run Model (LogGDP)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOGNTRN	0.022121	0.039577	0.558934	0.5850
LOGFDI	0.055367	0.116931	0.473502	0.6432
LOGINF	0.291359	0.114754	2.538996	0.0236
LOGCAPM	0.990938	0.107232	9.241085	0.0000
LOGDCPP	-0.061530	0.104890	-0.586621	0.5668
C	15.428828	0.920604	16.759463	0.0000

R-Squared	0.9941	S.E. REG	0.006
Adjusted R-Squared	0.9088	Observations	35

*Notice that the symbols *, **, and *** denote a 1%, 5%, and 10% degree of importance, respectively*

The variable Log NTRN has no significant role in GDP. However, this core variable has a positive coefficient sign. In the same way, Log FDI and Log DCPP have no robust role in this model. However, LogInf and Log CAPM have a significant role. With a one percent increase in LogCAPM, 0.99 percent GDP increase.

ARDL Short-Run Analysis

The formula for error correction incorporates the short-term analysis and the long-term analysis. The short-term economic growth reactions are the coefficients of the various short-term variables in the model. The effect of the tertiary model error correction model is seen in the following.

Table 9. Short-Run Model (LogGDP)

Variables	Coefficient	Std. Error	t-Statistic	Prob.
LOGNTRN	0.008339	0.004701	1.773675	0.0979
LOGFDI	0.003308	0.005197	0.636399	0.5348
LOGCAPM	0.231308	0.029754	7.773989	0.0000
LOGDCPP	0.022866	0.009536	2.397929	0.0310
LOGINF	-0.007400	0.003991	-1.854295	0.0849
CointEq(-1)	-0.075487	0.029786	-2.534307	0.0238
R-Squared	0.999	S.E. REG	0.006	
Adjusted R-Squared	0.999	Observations	35	

The ECTt-1 coefficient is statistically meaningful and has a fitting negative symbol. This importance also confirms the short-term cointegration between LogNTRN, LogCAP, LogDCPP, LogFDI, and LogINF. The coefficient of ECTt-1 is -0.075487, which indicates the speed of adaptation to the long-term balance at around 7.5 percent after a short-term shock.

Estimation Results: India

Analysis of Effect of Primary education on Economic Growth

ARDL Bounds Test

ARDL Bound test is indispensable for assessing the long run connotation between dependent and independent variables. The computed F-statistics alongside critical values calculated by Pesaran et.al (2001) are exposed in the following (See Table 11)

Table 10. Bound Test for the Presence of Long-Run Relationship

Computed F. Statistic	Level of Significance	Critical Values	
		I(0)	I(1)
5.8036	10%	2.26	3.35
	5%	2.62	3.79
	3%	2.96	4.18
	1%	3.41	4.68

The computed F.statistics show that the value is great than I(0) and I(1). It infers that the null hypothesis can be rejected

ARDL Long Run Analysis

Thus, there is a long-term relationship between the dependent and independent variables. Once the long-term relationship has been established and three coefficients of the model assessed. The consequence of the long-term model is seen in the following (see Table 12).

Table 112. Result of Long-Run Model (Dependent Variable LogGDP)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOGPRNM	0.010061	0.041710	0.241201	0.8127
LOGPOPM	0.136613	0.200039	0.682933	0.5051
LOGINF	-0.130688	0.054185	-2.411859	0.0291
LOGGCEM	0.258843	0.070696	3.661375	0.0023
LOGEXRM	0.114891	0.024349	4.718567	0.0003
C	21.231447	1.496947	14.183167	0.0000
R-Squared	0.8357	S.E. REG	0.0121	
Adjusted R-Squared	0.6605	Observations	35	

*Note: * , **, *** represent 1%, 5% and 10% level of significance respectively*

The variables logPRNM, and LogPOPM are insignificant, whereas LogINF, logGCEM and LogEXRM are significant and have positive coefficient signs except for LogINF. It elaborated that primary education has no significant role in GDP growth.

ARDL Short Run Analysis

The error correction model integrates the short-run exploration with the long-run analysis. The coefficients of dissimilar variables in the short run model represent the short-run replies of economic progress. The result of the error correction model for the primary model is presented in the following (See Table 13).

Table 12. Result of Short-Run Model (Dependent Variable LogGDP)

Variables	Coefficient	Std. Error	t-Statistic	Prob.
LOGPRNM	-0.096672	0.047542	-2.033423	0.0601
LOGPOPM	223.776135	237.127627	0.943695	0.3603
LOGGCEM	0.284211	0.096042	2.959226	0.0097
LOGEXRM	-0.004042	0.039421	-0.102533	0.9197
LOGINF	-0.185292	0.066797	-2.773934	0.0142
CointEq(-1)	-1.417824	0.266435	-5.321466	0.0001
R-Squared	0.999	S.E. REG	0.009	
Adjusted R-Squared	0.999	Observations	35	

At the 1% stage, the ECTt-1 coefficient is statistically significant and has a right negative mark. PRNM, LogGCE, and LogINF are all convergent in the short term, which emphasizes their significance. The ECTt-1 coefficient is -1.41782, indicating that the transition rate after a short-term shock is around 141.78 percent.

Analysis of Effect of Tertiary education on Economic Growth

ARDL Bounds Test

ARDL Bound test is essential for assessing the long run association between dependent and independent variables. The computed F-statistics alongside critical values calculated by Pesaran *et.al* (2001) are exposed in the following (See Table 14).

Table 13. Bound Test For Long-Run Relationship

Computed F. Statistic	Level of Significance	Critical Values	
		I(0)	I(1)
6.448768	10%	2.45	3.52
	5%	2.86	4.01
	2.5%	3.25	4.49

	1%	3.74	5.06

The computed F.statistics display that the value is great than I(0) and I(1). It infers that the null hypothesis can be rejected.

ARDL Long Run Analysis

Therefore, the dependent and independent variables having a long-term relationship is a well established phenomenon. The coefficients of the model are assessed after establishing a long-term relationship. The above is the product of the long-term model (See Table 15).

Table 14. Long-Run Model (LogGDP)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOGTNRN	0.523229	0.075902	6.893435	0.0000
LOGFDI	0.148409	0.037926	3.913070	0.0008
LOGINF	-0.046122	0.050578	-0.911894	0.3722
LOGTOP	0.186546	0.174762	1.067431	0.2979
C	12.549436	0.424519	29.561541	0.0000
R-Squared	0.6697	S.E. REG	0.0206	
Adjusted R-Squared	0.4966	Observations	33	

*Note: * , **, *** represent 1%, 5% and 10% level of significance respectively*

The variables LogTNRN and LogFDI are significant and have positive coefficient signs. 1% increase in LogTNRN (tertiary education) will increase GDP 52 % of India. Thus it is evident that tertiary education has robust role in GDP. The variables LogINF and LogTOP are insignificant.

ARDL Short Run Analysis

Short-term and long-term analysis was combined in the error-correcting model. The coefficients of various variables in the short-term model reflect the short-term responses to economic development. The primary test error correction model's effect is seen in the graph below (See Table 16).

Table 15. Short-Run Model (LogGDP)

Variables	Coefficient	Std. Error	t-Statistic	Prob.
LOGTNRN	0.114267	0.032813	3.482307	0.0022
LOGFDI	0.011106	0.005630	1.972592	0.0619
LOGINF	-0.007733	0.008176	-0.945817	0.3550
LOGTOP	0.031279	0.027189	1.150401	0.2629
CointEq(-1)	-0.167673	0.051965	-3.226654	0.0040
R-Squared	0.999	S.E. REG	0.0148	
Adjusted R-Squared	0.999	Observations	33	

The ECTt-1 is statistically significant at the 1 per cent level and has the right negative coefficient sign. This value also reinforces the assumption that cointegration is short-term. The ECTt-1 coefficient is -0.1676, which means that the transfer speed to the long-term balance is -0.1676 after a brief shock of 16.76%.

Conclusion

The study concluded the economic relationship of growth in primary and tertiary education between India and Sri Lanka; primary and tertiary education in both countries was calculated. In achieving the research objective, the study proposed that India focused on higher education for industrial development while Sri Lanka concentrated on basic education. Both countries' positions in primary and secondary education measured using the econometric ARDL approach. Primary education found to be critical to Sri Lanka's economic development in the report. Primary education in Sri Lanka will boost the country's GDP by 66.93 per cent. Similarly, tertiary

education contributes significantly to India's GDP growth. The GDP of tertiary education will increase by 1% or 52.31 per cent.

Education is vital for the economic prosperity of every nation on the planet. Both countries should also focus on all levels of education, according to experts. Sri Lanka should prioritize tertiary education in addition to primary education. India also places a strong emphasis on elementary and secondary education, as well as higher education. Indeed, India has achieved ambitious development goals and attracted international services by focusing on tertiary education and developing highly qualified research academics, teachers, and qualified staff.

References

Agarwal, P. (2007). Higher education in India: Growth, concerns and change agenda. *Higher Education Quarterly, 61*(2), 197-207.

Ali, M. Q., Chani, M. I., and Hussain, T. (2019). Impact of education and growth on propagating peace and harmony: A cross culture analysis of advance and underdeveloped nations. *Al-Qalam, 24* (2), pp. 12-23.

Al-Yousif, Y. K. (2008). Education expenditure and economic growth: Some empirical evidence from the GCC countries. *The Journal of Developing Areas*, 69-80.

Barro, R. J. (2013). Education and economic growth. *Annals of economics and finance, 14*(2), 301-328.

Benos, N., & Zotou, S. (2014). Education and economic growth: A meta-regression analysis. *World Development, 64*, 669-689.

Castelló-Climent, A., Chaudhary, L., & Mukhopadhyay, A. (2015). Tertiary education and prosperity: Catholic missionaries to luminosity in India.

Clements, M. B. J., Gupta, M. S., & Inchauste, M. G. (2004). Helping countries develop: the role of fiscal policy: International Monetary Fund.

Dănăcică, D.-E., Belaşcu, L., & Ilie, L. (2010). The interactive causality between higher education and economic growth in Romania. *International Review of Business Research Papers, 6*(4), 491-500.

Dickey, D. A., & Fuller, W. A. (1979). Distribution of the estimators for autoregressive time series with a unit root. *Journal of the American statistical association, 74*(366a), 427-431.

Fasih, T., Kingdon, G., Patrinos, H. A., Sakellariou, C., & Soderbom, M. (2012). Heterogeneous returns to education in the labor market: *The World Bank*.

Frank, M. W. (2009). Inequality and growth in the United States: Evidence from a new state-level panel of income inequality measures. *Economic Inquiry, 47*(1), 55-68.

Ganegodage, K. R., & Rambaldi, A. N. (2011). The impact of education investment on Sri Lankan economic growth. *Economics of Education Review, 30*(6), 1491-1502.

Glewwe, P., Maiga, E., & Zheng, H. (2014). The contribution of education to economic growth: A review of the evidence, with special attention and an application to Sub-Saharan Africa. *World Development, 59*, 379-393.

Gyimah-Brempong, K., Paddison, O., & Mitiku, W. (2006). Higher education and economic growth in Africa. *The Journal of Development Studies, 42*(3), 509-529.

Hanif, N., & Arshed, N. (2016). Relationship between school education and economic growth: SAARC countries. *International Journal of Economics and Financial Issues, 6*(1), 294-300.

Hassan, G., & Cooray, A. (2015). Effects of male and female education on economic growth: Some evidence from Asia. *Journal of Asian Economics, 36*, 97-109.

Himaz, R., & Aturupane, H. (2016). Returns to education in Sri Lanka: a pseudo-panel approach. *Education economics, 24*(3), 300-311.

Jalil, A., & Idrees, M. (2013). Modeling the impact of education on the economic growth: Evidence from aggregated and disaggregated time series data of Pakistan. *Economic Modelling, 31*, 383-388.

Jangraiz, K., & Malik, Z. K. (2015). Education-Economic Growth Nexus: A Review. *Journal of Economic and Social Thought, 2*(2), 121-126.

Kapur, D., & Mehta, P. B. (2004). Indian higher education reform: From half-baked socialism to half-baked capitalism. Center for international development working paper, 103.

Layard, R. (2009). The 3rd OECD World Forum on "Statistics, Knowledge and Policy" Charting Progress, Building Visions, Improving Life.

Lv, K., Yu, A., Gong, S., Wu, M., & Xu, X. (2017). Impacts of educational factors on economic growth in regions of China: a spatial econometric approach. *Technological and Economic Development of Economy, 23*(6), 827-847.

Maitra, B., & Mukhopadhyay, C. K. (2012). Public spending on education, health care and economic growth in selected countries of Asia and the Pacific.

Mallick, L., & Dash, D. P. (2015). Does Expenditure on Education Affect Economic Growth in India? Evidence from

Cointegration and Granger Causality Analysis. *Theoretical & Applied Economics, 22*(4).

Mallick, L., Das, P. K., & Pradhan, K. C. (2016). Impact of educational expenditure on economic growth in major Asian countries: Evidence from econometric analysis. *Theoretical & Applied Economics, 23*(2).

Mishra, P., & Mishra, S. (2015). The Triangulation Dynamics between Education, Health and Economic Growth in India. *The Journal of Commerce, 7*(2), 69.

Mukherjee, I., Cabraal, A., & Terrado, E. (2005). Treasures of the education system in Sri Lanka: restoring performance, expanding opportunities and enhancing prospects.

Oketch, M., McCowan, T., & Schendel, R. (2014). The impact of tertiary education on development. A Rigorous Literature Review. *Department for International Development*.

Papageorgiou, C. (2003). Distinguishing between the effects of primary and post-primary education on economic growth. *Review of Development Economics, 7*(4), 622-635.

Pegkas, P. (2014). The link between educational levels and economic growth: A neoclassical approach for the case of Greece. *International Journal of Applied Economics, 11*(2), 38-54.

Pesaran, M. H., Shin, Y., & Smith, R. J. (2001). Bounds testing approaches to the analysis of level relationships. *Journal of applied econometrics, 16*(3), 289-326.

Psacharopoulos, G., & Patrinos*, H. A. (2004). Returns to investment in education: a further update. *Education economics, 12*(2), 111-134.

Ranasinghe, A., & Hartog, J. (2002). Free-education in Sri Lanka. Does it eliminate the family effect? *Economics of Education Review, 21*(6), 623-633.

Sunde, T. (2017). Education Expenditure and Economic Growth in Mauritius: An Application of the Bounds Testing Approach.

Tilak, J. B. (2005). Higher Education in'Trishanku': Hanging between State and Market. Economic and political weekly, 4029-4037.

Todaro, M., & Smith, S. (2009). Urbanization and Rural-Urban Migration: Theory and Policy (Eds.), Economic Development: New York: Addison-Wesley Series.

Torruam, J. T., Chiawa, M. A., & Abur, C. C. (2014). Cointegration Analysis of Public Expenditure on Tertiary Education and Economic Growth in Nigeria. *CBN Journal of Applied Statistics, 5*(2), 137-146.

Visaria, P. M., & Pal, S. (1981). Some aspects of relative poverty in Sri Lanka 1969-70.

Yardimcioglu, F., Gürdal, T., & Altundemir, M. E. (2014). Education and Economic Growth: A Panel Cointegration Approach in OECD Countries (1980-2008). *Egitim ve Bilim, 39*(173).

Yogesh, H., & Kiran, S. (2018). AN ANALYSIS OF THE GROWTH OF ENROLMENT IN HIGHER EDUCATION IN INDIA. *GLOBAL JOURNAL FOR RESEARCH ANALYSIS, 7*(1).