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Does Public Expenditure on Education Cause Economic growth in Nepal ?

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Abstract

The only way to boost economic growth, every country in the world agreed, was to improve education. The purpose of this study was to investigate the potential relationship between economic growth and public education spending. This was achieved by using time series data from 1988 to 2022 in conjunction with the ARDL model. The study investigated the impact of a variety of factors on GDP growth in order to ascertain the significance of this correlation. The number of secondary schools, the duration of a student's school year, the proportion of students who passed the SEE, government spending on education, and gross fixed capital formation are a few variables that can be altered. Additionally, this investigation investigated several other critical variables that impact economic expansion. The findings support past research and demonstrate a connection between public education spending and economic growth. Study findings indicate that increased funding for education is boosting the national economy. Analysis also highlights the role that gross fixed capital formation plays in the process of economic expansion. The exceptionally strong negative sign of the error correction term suggests a strong long-term correlation between the variables. The heteroscedasticity, normality, and Breusch-Godfrey LM tests generate P-values exceeding 5%, as expected. This model is devoid of heteroscedasticity and autocorrelation. The government should allocate a substantial portion of its budget to the education sector and prioritize funding. The study suggests that additional indicators should be investigated in order to support the idea that education is the foundation of any economy.

Keywords: *ARDL model, school enrollment, spending on education, and economic growth.*

Introduction

Everyone acknowledges that education is the most crucial tool for promoting economic development. It is critical to the growth of human capital and increases productivity, competency, and skill levels, all of which contribute to economic growth. It is well known that one of the main factors influencing the rate of economic growth is education. It is well known that a nation's degree of education has a big impact on its social and economic development (Becker, 2009; Lucas, 1988). Adam Smith, Romer, Lucas, and Solow are just a few of the economists who have developed various theories and models of economic growth and have all suggested that education is an essential element. Romer (1990) and Robert Solow (1957) developed the two main theoretical frameworks that are used to model the relationships between economic performance and education. It is well known that increasing education has a significant impact on both the economy and social welfare. It is vital to both the advancement of humankind and the growth of an economy. The connection between economic growth and education has been hotly contested.

Nations differ significantly in how much money is invested in the education sector, according to Mingat et al. (1998). It is for this reason that funding for education has been suggested. Increases in government spending accelerate growth in the GDP, GDP per capita, and human capital stock. Putting money into education is a more prudent use of it than on individuals. Mallick et al. (2016) found that long-term economic growth is notably impacted by government spending on education in 14 Asian countries. The economy of the country depends on no single factor. The degree to which the government makes investments in various variables and factors influences the rate of economic expansion. These factors can be described by endogenous and exogenous variables. Education is a significant endogenous variable that influences the HDI. The expansion of human resources is one of HDI's main outcomes. Public education is essential for the development of human capital for both political and economic reasons (Bhowmick & Yadav, 2019). Romer (1990), Lucas (1988), and Barro (1991) developed the theory of endogenous economic growth. It makes the claim that investing in education actively supports the economy's endogenous growth. Subsequently, Lucas expressed his disapproval of Backer's human capital theory (1962). Numerous studies have demonstrated that investing in public education promotes economic growth. Government investment in education should be given top priority since it strengthens the social and economic foundation of the nation (Panik & Wahab, 2016; Ghali, 2018). Similarly, among many others, examples are (Sequeira and Martins, 2008), (Bose et al., 2007), and Jeyhoon (2017).

Using a balanced panel dataset, Mallick et al. (2016) investigated the relationship between economic growth and education spending in 14 well-known Asian countries. The dataset included

all of 1973 through 2012. Ordinary least squares (OLS), the vector error correction model, and cointegration were used in the analysis. The results suggested a long-term, stable equilibrium between these two variables by showing a strong and statistically significant correlation between education spending and economic growth.

The relationship between economic growth and education in Nepal from 1995 to 2013 was investigated by Nowak et al. (2016) using the Johansen Cointegration technique and ordinary least squares (OLS). Economic growth and education spending show a strong correlation, indicating a long-standing stability between these two variables. Ziberi et al. (2022) employed comparable instrumental variable techniques to show a clear and positive correlation between North Macedonia's public education budget and GDP growth rate. The dependent variable for the 1917–2020 study period was GDP.

Ghimire (2010) looked at problems in education from a historical point of view. The study's data show that spending on public education has an impact on GDP and is linked to economic growth. The results show that education has a big effect on the socioeconomic progress of the country. Politicians and economists are very interested in the money the government spends on schools. In 2019, Dangal and Gajurel studied the connection between Nepal's GDP growth and government spending on education. The study, which looked at data from 1982 to 2018, came to the conclusion that funding for public education eventually impedes Nepal's progress toward economic development. This was made possible in large part by the ARDL error correction model. Additionally, the number of technical students at various Tribhuvan University schools is currently growing slower than the GDP of Nepal. During the fiscal year 2022–2023, NPR 197.29 billion was spent on education, which is more than 12.4% of the total budget. The largest portion of the budget was allocated to this sector (MOF, 2023). The education sector contributed 6.26 percent to Nepal's gross domestic product in FY 2013–14, 7.53 percent in FY 2018–19, and 8.02 percent in FY 2021/22. Additionally, the government projects that it will contribute 8.22 percent, with 4.07 percent going toward production costs. Economic Survey, 2023. The graph shows that the GDP share of the education sector has increased over the last ten years. Nepal has achieved great strides in the field of education over the last thirty years, and the government has consistently raised education spending in each budget. However, the outcomes of the plan did not demonstrate a noticeable rise in the quality of education or a narrowing of the achievement gaps amongst the different regions of Nepal. The majority of the currently published research concurs that government investment in education is crucial and actually enhances economic performance in many countries via a number of different mechanisms. The study's primary objective is to determine the relationship between government spending on education and Nepal's economic expansion. It demonstrates how crucial it is to prioritize developing human capital development

in the growth agenda. The report emphasizes the need for robust government intervention to ensure that investments in higher education lead to significant discoveries and socioeconomic development.

Methodology

The investigation investigates the correlation between Nepal's economic expansion and government expenditures on education. The paper accomplishes its goals by examining a time series data set that spans the years 1988–2022. For economic growth, the GDP constant is used as a stand-in, and for an independent variable, public education spending is used as a stand-in. The study also analyzes the mean duration of schooling, gross fixed capital formation, the proportion of students who pass the SLC and SEE exams, and enrollment in secondary schools as control variables. The research used data from the World Bank's World Development Indicator (WDI), the Ministry of Finance (MoF), and the Nepal Rastra Bank (NRB). The relationship between government spending on education and variables associated with both economic growth and education is examined in this study using quantitative methods. The economic growth of a nation is not contingent upon a solitary variable or factor. Government spending on different goods and components facilitates economic growth. The study makes a distinction between exogenous and endogenous factors. One of the most important endogenous variables and a critical component of the Human Development Index is education. The Human Development Index (HDI) is a crucial statistic for monitoring the growth of human capital.

Model specification

The relationship between public education spending, the total number of schools, and the number of colleges is investigated in this study. The researchers have examined a number of economic variables, including the NSHCH, GEE, and RGDP. The primary econometric model employed in this study to examine the connection between capital expenditures and Nepal's economic growth is presented. The basis of the function model is Keynes' idea of appropriate public spending.

GDP _C =F (GEXPEDU GFCF, NSSCH, SEDUR, SEE) ……..(1)

where GDP_C represents the GDP at constant prices. The terms "GEXPEDU" and "GFCF" refer to government spending on education, "NSSCH" and "number of secondary schools," "SEDUR" and "year" and "SEE" and "number of students passing secondary school exams," respectively.

Result and Discussion

Unit root test

Time series data are essential for the study. The majority of time series data fluctuate and are

unpredictable because they are non-stationary. Non-stationary data may produce inaccurate results. Put differently, it is necessary to convert non-stationary data into stationary data. The Augmented Dickey-Fuller (ADF) unit root test was used to confirm the stationary state. The most typical ADF evaluation format is

$$\Delta y_t = \alpha + \beta_t + \gamma y_{t-1} + \sum^{i=1}_{p} \delta_i \Delta y_{t-i+t} \quad \ldots\ldots\ldots\ldots\ldots (i)$$

Table 1: The Augmented Dickey Fuller (ADF) Test's results

Variables	LevelForm		FirstDifference		Remarks
	Intercept	Trend and Intercept	Intercept	Trend and Intercept	
GDF_C	0.7124 (***0.9907***)	-1.4701 (***0.8203***)	-5.4603 (***0.0001***)*	-5.7868 (***0.0002***)*	**I(1)**
GEXPEDU	-3.4117 (0.0166)*	-4.5162 (0.0067)*	-3.3363 (***0.0238***)*	-2.0301 (***0.5585***)	**I(0)**
GFCF	- 0.0129 (0.9496)	-5.1266 (***0.0017***)*	-2.4994 (***0.1275***)	-0.3457 (***0.9846***)	**I(0)**
NSSCH	0.9932 (0.9956)	-2.1427 (0.98)	-4.4837 (***0.0011***)*	-4.5662 (***0.0048***)*	**I(1)**
SEDUR	-1.4713 (0.5358)	-1.5740 (***0.7823***)	-5.7446 (***0.0000***)*	-5.7501 (***0.0002***)*	**I(1)**
SEE	0.2028 (09688)	-1.8248 (***0.6704***)	-5.0930 (***0.0002***)*	-5.1926 (***0.0010***)*	**I(1)**

Note: Author's own calculation form E-views 10

Table 1 shows that the null hypothesis of the variable, such as GEXPEDU and GFCF, is stationary at level I(O), even though GDP_C, NSSCH, SEDUR, and SEE are stationary at first difference I(1). Based on the outcomes of the ADF test, the ARDL model is thus employed for the study's econometric analysis.

Long Run Equilibrium Model

Table 5 displays the model's estimated long-run coefficients, while the equation represents the long-run equilibrium relationship

GDP_C = C(1)*GDP_C(-1) + C(2)*GEXPEDU + C(3)*GFCF + C(4)*NSSCH + C(5)*NSSCH(-1)

+ C(6)*NSSCH(-2) + C(7)*SEDUR + C(8)*SEE + C(9)*SEE(-1) + C(10)*SEE(-2) + C(11) …….(iii)

Table 2: ***Long Run Form and Bounds Test for ARDL***

Selected Model: ARDL(1, 0, 0, 2, 0, 2)

Levels Equation

Case 2: No Trend and Restricted Constant

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GEXPEDU	11.98397	2.755158	4.349648	0.0003
GFCF	2.221873	0.332631	6.679695	0.0000
NSSCH	-6.490839	7.182130	-0.903749	0.3759
SEDUR	3547.792	6113.154	0.580354	0.5676
SEE	-0.136667	0.087191	-1.567442	0.1313
C	10636.19	22672.51	0.469123	0.6436

Note: Author's own calculation form E-views 10

Table 2 provides compelling evidence that government expenditure on education over an extended period of time (GEXPEDU) significantly affects outcomes at the 1% level. This suggests that there is a corresponding increase of 11.98 units in GDP_C for every unit increase in GEXPEDU. This study shows that government spending on education and GDP are positively correlated. The findings of this investigation are consistent with earlier studies by Okerekeoti (2016), Alper and Demiral (2016), and Nowak and Dahal (2016). At a significance level of one percent, GFCF is statistically significant. The results demonstrate a robust and positive relationship between GDP and fixed capital formation. This result is in line with what Ali et al. (2009) found. To every unit change in the GFCF, the GDP_C changes by 2.221 units. It is indicated that the variables SEDUR, SEE, and NSSCH are not statistically significant when the coefficient of NSSCH is negative.

Short Run Model (Error Correction Estimation)

The error correction model determines the reason behind the variables chosen as well as the rate at which the long-term equilibrium is adjusted. In Table 3, you can see the predicted result of the ECM. The error correction model provides a thorough method for testing causation when variables are cointegrated, as stated by Toda and Phillips (1993) and Engle and Granger (1987).

Table 3: Error correction model estimation

Dependent Variable: D(GDP_C)
Selected Model: ARDL(1, 0, 0, 2, 0, 2)
ECM Regression
Case 2: Restricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(NSSCH)	11.89030	6.456491	1.841604	0.0791
D(NSSCH(-1))	30.12846	6.986807	4.312193	0.0003
D(SEE)	-0.196739	0.041409	-4.751060	0.0001
D(SEE(-1))	-0.200776	0.050395	-3.984016	0.0006
CointEq(-1)*	-0.813350	0.125334	-7.287345	0.0000
R-squared	0.714234	Mean dependent var		6949.285
Adjusted R-squared	0.673410	S.D. dependent var		17362.48
S.E. of regression	9922.317	Akaike info criterion		21.38169
Sum squared resid	2.76E+09	Schwarz criterion		21.60843
Log likelihood	-347.7978	Hannan-Quinn criter.		21.45798
Durbin-Watson stat	2.327770			

* P-value not consistent with the t-Bounds distribution.

Note: Author's own calculation form E-views 10

Table 3 displays the results of the error correction estimation for the ARDL model. -0.196739, the negative correlation between the SEE coefficient (D) and the results and the dependent variable GDP_C. Additionally, the relationship is statistically significant, as shown by a p-value of 0.0001 at the 5% level. As a result, the GDP increases by 19.17% for every unit increase in SEE. This demonstrates the inverse relationship between GDP (Gross Domestic Product) and SEE (Socioeconomic Environment). At the 1% level, the error correction term's coefficient, -0.813350, is statistically significant. The presence of a strongly negative error correction term indicates a strong and enduring relationship between the variables. However, the GDP C balances out this year at a rate of 81.13 percent, after being unbalanced last year.

Bound testing

The mixed-order data used in the study first differentiated before becoming stationary.The bound test model is used in the study. The bound test result can be used to verify that the variables under investigation co-integrate. The Pesaran et al. (2001) proposed criteria for decision making.

Table 4: ***The F-Bound Test's result***

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
F-statistic	**5.960810**	10%	2.08	3
k	5	5%	2.39	3.38
		2.5%	2.7	3.73
		1%	3.06	4.15

The bound test's estimated output is shown in Table 4. The bound test may be used to show that the study's variables are cointegrated. 5.96081 is the computed bound test F-statistic at the 1% level, which is higher than the critical values of the associated upper and lower bounds. The null hypothesis can be rejected, as this serves as evidence of the variables' cointegration. Consequently, the selected variables become interdependent over time.

Table:5 Residuals Diagnostic Test of Estimated Equation

LM Test for Breusch-Godfrey Serial Correlation:			
F-statistic	3.197702	Prob. F(2,20)	0.0624
Obs*R-squared	7.995647	Prob. Chi-Square(2)	0.0584

Heteroskedasticity Test: Breusch-Pagan-Godfrey			
F-statistic	8.089701	Prob. F(10,22)	0.64100
Obs*R-squared	25.94440	Prob. Chi-Square(10)	0.2338
Scaled explained SS	21.92176	Prob. Chi-Square(10)	0.0155

Table 5 displays LM test results. Test F-statistic for Breusch-Godfrey Serial Correlation The null hypothesis – no serial correlation – cannot be rejected by the LM test. Consequently, the estimated model residuals are serially uncorrelated. Probability value and Jarque-Bera statistic show that the data are insufficient to reject the null hypothesis that the distribution is normal. Neither model is heteroscedastic.

Conclusion

Education is an essential tool for accomplishing this objective, which should worry every nation. The purpose of this study was to look into how consumer spending and GDP growth are related. When the study acquired data on the chosen variable in the field of education from a reliable source, it took the significance of this correlation into consideration. This analysis also considered other important variables that influence economic growth. This study confirms previous research findings by demonstrating a robust correlation between public education spending and economic growth.

Higher GDP and more investment in higher education are positively correlated, as the results unequivocally show. In addition, the study shows that gross fixed capital formation stimulates GDP growth. At a significance level of 1%, the coefficient of the error correction term (-0.813350) exhibits statistical significance. If the highly significant negative sign in the error correction term is observed, it indicates the possibility of strong long-term correlations between the variables. As anticipated, the heteroscedasticity, normality, and Breusch-Godfrey LM tests have P-values greater than 5%. There is no heteroscedasticity or autocorrelation in this model. Priority should be given to the education sector, and a sizeable portion of government spending should go toward it. The country must prioritize increasing school enrollment, higher education, and technical education in order to allocate resources towards education and create a skilled workforce that will support long-term economic growth.

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