International Journal for Multidisciplinary Research (IJFMR)
E-ISSN: 2582-2160 ● Website: www.ijfmr.com ● Email: editor@ijfmr.com

Higher Education and Economic Growth Nexus: Evidence from India

Sheetal Rawat[1], Prof. J N Sharma[2]

[1]Research Scholar, IIS deemed to be University, Jaipur
[2]Professor, IIS deemed to be University, Jaipur

Abstract:
The study attempts to explore the causal relationship shared between Indian economic growth and higher education sector. Time series data for the period 1980-81 to 2021-22 has been considered for the analysis by making use of Auto Regressive Distributive Lag Model. Gross enrolment ratio at higher education, Pupil Teacher Ratio and expenditure on higher education have been used as the proxy variables for higher education. ARDL Bounds test confirms the presence of the long run relationship between the variables. Expenditure on higher education and gross capital formation are found to have statistically significant association with economic growth in the long run. In the short run, the impact of higher education on GDP is not found to be quite relevance. Granger causality test denies the presence of any sort of causal relationship between the two. The government is expected to increase the share of expenditure on higher education with special focus on raising the quality standard.

Keywords: Higher education, economic growth, Auto-Regressive Distributed Lag (ARDL)

1. Introduction

In today's highly globalised world, economies all around the world are engaged in taking advantage of the numerous economic opportunities by trying to make the best use of its physical and human capital resources. Human capital over the years has formed its mark as a dominating factor influencing the economic growth of nations. The extent of natural and physical resources, a nation is blessed with because of its geographical location on the globe cannot be challenged against but by investing heavily on human capital, nations having lesser or fewer natural resources, can overtake the former nations efficiently in today's globalised world.

Education is unanimously accepted as a significant tool in enhancing the human potential of the people. It not only opens doors for better financial opportunities for an individual but also makes one smarter by enhancing one's decision making and innovative skills. Schultz (1961) and Barro (1991) in their work have found the positive influence human capital has on economic growth of countries and has advocated at increasing the investment in human capital.

Higher education specifically focuses on development of knowledge and skills related to any specific area leading to specialization of certain concerned skills. Higher education overpowers secondary and primary education with respect to its impact on economic growth (Hanif and Arshed 2016).

India being the most populous nation of the world, in its present state, is having the opportunity of taking benefits of the window which is opened to it in form of demographic dividend but for that to happen, having a highly skilled and adequately educated labour force is a prerequisite. Since the resources to be

spent on smooth functioning of such a heavily populated nation are limited, so it becomes rather necessary to first examine the extent to which economic prosperity of the India is being influenced by higher education.

The present study focuses on investigating the actual impact, the higher education sector has if any, on the economic growth of India making use of ARDL modelling technique.

2. Review of Literature

Researchers have used different variables in investigating the relationship shared between education and economic growth. Some relevant studies are mentioned below-

Singh, et al. (2018) based their time series analysis on the Malaysian economy to examine the impact the different three levels of education has on the nation's economic growth using data from the period 1980 to 2015. Higher education is found to be the most impactful among the levels of education in the short run while in long run both primary and higher level of education are found to influence economic growth considerably.

Goel and Walia (2017) evaluated the magnitude of the impact higher education has on economic growth of Haryana using time series data from the period 1990 to 2014 drawn from Statistical Abstract of Haryana. Johansen Cointegration test confirms a long-run relationship existing between HEE (Higher Education Expenditure) and GSDP (Gross State Domestic Product) while presence of bilateral causality between the two is expressed by Granger Causality test. The state government is expected to focus on strengthening the higher education sector of Haryana with special focus on Research and Development.

Sehrawat and Giri (2017) aimed at studying the influence of female and male human capital on Indian economic growth utilizing time series data from the year 1970 to 2014. Human capital is measured as a composite index of education index and health index. The outcomes reflected that while in both short and long run, while female human capital was found to positive and significant association with economic growth of India, in case of male human capital, though the relationship is positive but the influence is not significant which indicates the vitalness of female human capital for the development of the economy of the nation.

Nowak and Dahal (2016) discussed the inter-relationship between education and Nepal's economic growth considering the period 1995-2003 using OLS and Johansen's cointegration approach. The outcomes conclude that all the three levels of education are found to have positive and statistically significant relationship with the economic progress of the nation which highlights the importance of education for the economic and hence socio-economic development of Nepal.

Dastidar and Chatterji (2015) investigated the relationship between the education expenditure at primary, secondary and tertiary levels of education with economic growth of India taking data from the years 1951 to 2011. Johansen Cointegration test revealed absence of any long-run relationship between education expenditure at all three levels and GDP of India. The findings of Granger Causality test stated that causal relationship is running from GDP to primary educational expenditure.

Khan (2015) evaluated the impact of human capital on economic growth of Pakistan separately for male and female. The time series data related with the period 1972-2012 is taken for the analysis and Vector Error Correction Model (VECM) has been employed for studying the long and short run relationship among the variables. The results show that in the long run, a positive as well as significant relationship between female human capital and economic growth persists while for male human capital, the impact is

found to be positive but statistically insignificant. Unidirectional causality runs from economic growth towards female human capital.

Hussin, et al. (2012) based their work on Malaysian economy. Times series data from reliable and authorized sources from the year 1970 to 2010 have been used and VAR and VECM approaches is applied along with Granger Causality analysis. In the long run, existence of a positive relationship of GDP with each of the following three variables- labour force participation, capital formation, and public expenditure on education is present. Economic growth and education Granger cause each other. Capital also has causal impact on economic growth in short run.

Babalola (2011) considered time series data for the period from the year 1977 to 2008 to analyse the association expenditure on education possesses with GDP of Nigeria. The dependent variable is GDP used as proxy variable for economic growth while investment on education is the only independent variable considered. Johansen cointegration test confirms the long run association between the two concerned variables also unidirectional causality is found to exist running from economic growth towards educational investment. Error correction model ensures achieving long run equilibrium caused by the short run disturbances.

3. Variables and Methodological Framework

The necessary details regarding the variables considered under study as proxies of economic growth and higher education are presented in a systematic form in Table 1.

Table 1: Variables used in the study

Variable	Description	Specification	Data Sources
GDP	Real Gross Domestic Product (in Rupees)	Used as proxy for economic growth of India	National Accounts Statistics
LAB	Total Labour Force (in millions)	Used as a controlled variable and as a proxy for labour	Handbook of statistics on Indian economy and World Development Indicators
GCF	Gross Capital Formation (in Rupees)	Used as a controlled variable and a proxy for capital	National Accounts Statistics
GERHE	Gross Enrollment Ratio at Higher Education	Used as a proxy for higher education	UGC and Ministry of Education Reports
EXPHE	Government Expenditure on Higher Education (in crore Rupees)	Used as a proxy for higher education	Analysis of Budgeted Expenditure on Education Report
PTR	Pupil Teacher Ratio at the level of higher education	Used as a proxy for higher education	UGC and Ministry of Education Reports

To estimate the relationship between the dependent and independent variables of the concerned variables, the following regression model in log linear form has been selected:

$$\ln GDP_t = \beta_0 + \beta_1 \ln LAB_t + \beta_2 \ln GCF_t + \beta_3 \ln GERHE_t + \beta_4 \ln EXPHE_t + \beta_5 \ln PTR_t + \mu_t \quad (1)$$

where the time in years and error term are represented by t and μ respectively. The parameters to be estimated are showcased by β_0, β_1, β_2, β_3, β_4 and β_5.

The use of ADF (Augmented Dickey-Fuller) Test and PP (Phillips-Perron) Test have been made to test the stationary of the variables and to be assured of absence of unit root problem (Phillips and Perron 1988). ARDL model framework has been selected to study the short and long run relationship shared between GDP and the independent variables but it must be ensured that all the variables should be stationary at level or first difference and none at second difference as then ARDL model cannot be estimated (Nkora and Uko 2016).

ARDL bounds test is employed to check for the presence or absence of any long run relationship among the variables (Pesaran and Shin 1999, Pesaran et al. 2001). In condition of the assurance of a long run relationship, long run coefficients are estimated followed by Error Correction Model (ECM) which is used to check for the short run dynamics of the association among the variables. ECM model also tells whether the estimated model is expected to move towards equilibrium state or it can lead to disequilibrium in the long run.

The following equation has been utilized to find the coefficients of the ARDL model:

$$\Delta \ln GDP_t = \alpha_0 + \delta_1 \ln GDP_{t-1} + \delta_2 \ln LAB_{t-1} + \delta_3 \ln GCF_{t-1} + \delta_4 \ln GERHE_{t-1} + \delta_5 \ln EXPHE_{t-1} + \delta_6 \ln PTR_{t-1} + \sum_{i=1}^{p-1} \theta_i \Delta \ln GDPPC_{t-i} + \sum_{j=0}^{q_1-1} \beta_{1j} \Delta \ln LAB_{t-j} + \sum_{j=0}^{q_2-1} \beta_{2j} \Delta \ln GCF_{t-j} + \sum_{j=0}^{q_3-1} \beta_{3j} \Delta \ln GERHE_{t-j} + \sum_{j=0}^{q_4-1} \beta_{4j} \Delta \ln EXPHE_{t-j} + \sum_{j=0}^{q_5-1} \beta_{5j} \Delta \ln PTR_{t-j} + e_t$$

The following equation represents to estimate the short-run coefficients of the model:

$$\Delta \ln GDP_t = \alpha_1 + \sum_{i=1}^{p-1} \theta_i \Delta \ln GDP_{t-i} + \sum_{j=0}^{q_1-1} \beta_{1j} \Delta \ln LAB_{t-j} + \sum_{j=0}^{q_2-1} \beta_{2j} \Delta \ln GCF_{t-j} + \sum_{j=0}^{q_3-1} \beta_{3j} \Delta \ln GERHE_{t-j} + \sum_{j=0}^{q_4-1} \beta_{4j} \Delta \ln EXPHE_{t-j} + \sum_{j=0}^{q_5-1} \beta_{5j} \Delta \ln 6PTR_{t-j} + \gamma ECT_{t-1} + \varepsilon_t$$

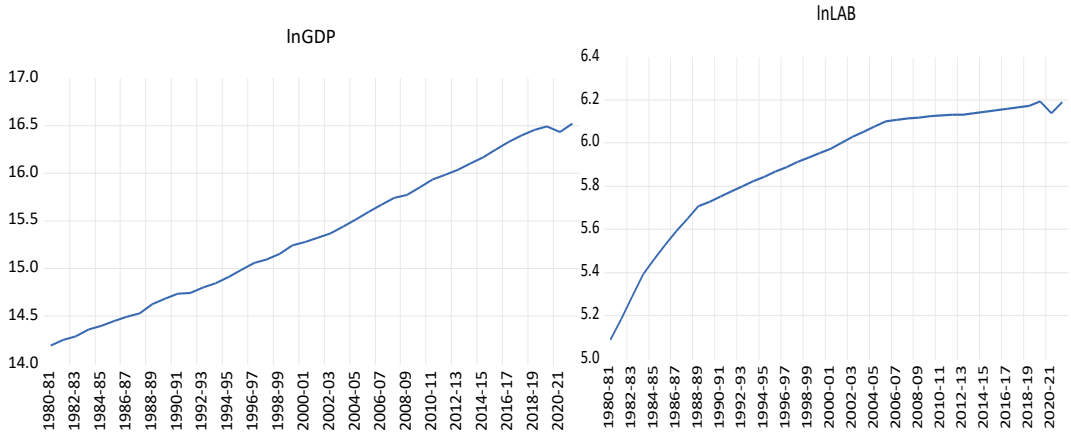
Where ECT indicates the error correction term while the speed of adjustment is shown by γ.

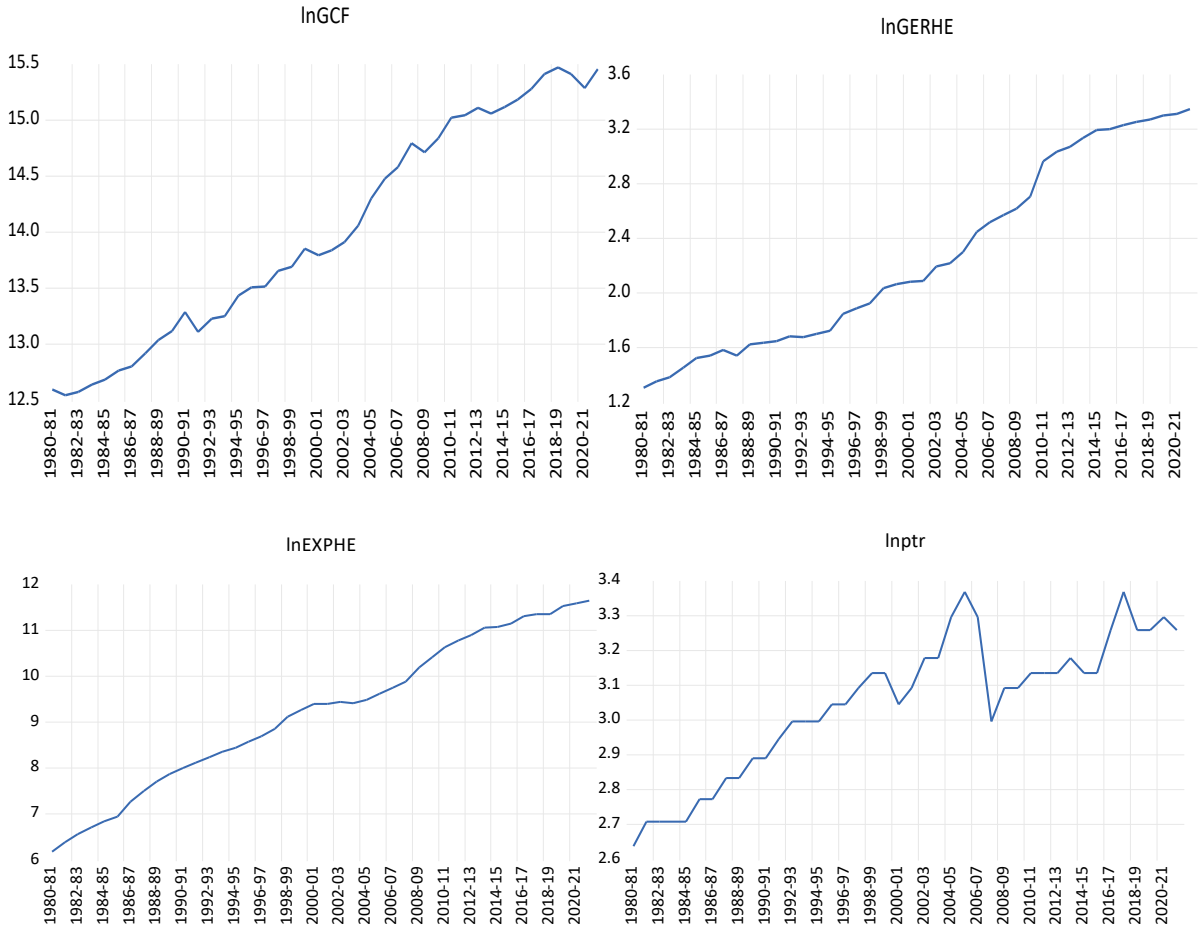
4. Analysis of the results

The results obtained are presented below with detailed analysis and interpretation.

4.1 Graphical Plot of the variables under study

Figure 1: Graphical Representation of the variables





It can be observed from the time series plots given above that despite of having individual time bound fluctuations, all the variables in their log form follow upward trend over the time-period considered for the study.

4.2 Descriptive Statistics

Table 2 displays information about descriptive statistics regarding the variables of the study.

Table 2: Descriptive Statistics

Variable	lnGDP	lnLAB	lnGCF	lnGERHE	lnEXPHE	lnPTR
Mean	15.346	5.898	14.009	2.267	9.213	3.048
Median	15.304	5.988	13.848	2.085	9.399	3.091
Maximum	16.519	6.192	15.469	3.246	11.635	3.367
Minimum	14.197	5.088	12.545	1.311	6.181	2.639
Std. Dev.	0.727	0.293	0.989	0.685	1.633	0.199
Skewness	0.093	-1.159	0.054	0.310	-0.172	-0.434
Kurtosis	1.739	3.505	1.559	1.607	1.914	2.234
Jarque-Bara	2.843	9.852	3.655	4.066	2271	2.346
Probability	0.241	0.007	0.161	0.131	0.321	0.309
Observations	42	42	42	42	42	42

From Table 2, it can be stated that except labour force, all the variables are normally distributed. Other than labour force and expenditure on higher education, all the rest variables are positively skewed. All

variables have positive coefficient of kurtosis, with labour force corresponding to a leptokurtic curve while all the other variables represent platykurtic curve.

4.3 Correlation Matrix

Correlation coefficients existing between different pairs of the variables are displayed in Table 3 in a matrix form which states the degree of association among variables.

Table 3: Correlation Matrix

	lnGDP	lnLAB	lnGCF	lnGERHE	lnEXPHE	lnPTR
lnGDP	1					
lnLAB	0.9031	1				
lnGCF	0.9943	0.8994	1			
lnGERHE	0.9881	0.8532	0.9877	1		
lnEXPHE	0.9913	0.9385	0.9836	0.9726	1	
lnPTR	0.8696	0.9187	0.8572	0.8110	0.8878	1

Presence of a strong positive correlation coefficient can be easily noticed among the variables with the coefficient of correlation ranging approximately to 0.8 and 0.9 specifying high degree of positive association existing among all the variables. It makes the study interesting to carry out the time-series analysis further to check and understand in depth the long run dynamics of the relationship of the variables.

4.4 Unit Root Test

Table 4: ADF Test and PP Test Results for stationarity check

Variable	Augmented Dickey-Fuller Test				Phillips-Perron Test			
	With Intercept		With Intercept and Trend		With Intercept		With Intercept and Trend	
	Level	First Difference	Level	First Difference	Level	First Difference	Level	First Difference
lnGDP	-0.128	-6.159*	-2.33	-6.082*	0.172	-6.162*	-2.356	-6.079*
lnLAB	-2.409	-2.905	-5.687*	-2.542	-11.161*	-3.089*	-6.676*	-3.606*
lnGCF	-0.215	-6.955*	-2.453	-6.877*	-0.161	-7.043*	-2.453	-6.964*
lnGERHE	0.370	-5.276*	-1.577	-5.255*	0.262	-5.267*	-1.709	-5.244
lnEXPHE	-1.529	-3.774*	-2.856	-4.083*	-1.939	-3.829*	-1.935	-4.038*
lnPTR	-1.906	-6.476*	-2.672	-6.449*	-2.006	-7.695	-2.571	-10.734

Note: * indicates the rejection of null hypothesis of unit root at 5% level of significance

The results of ADF and PP test as mentioned in Table 4 state that all the variables are found to be non-stationary at level except labour force which is stationary at level. All the rest variables are found to be stationary at first difference i.e. no problem of unit root exist at first difference for these variables.
As the order of integration of all the variables is a mix of I(0) and I(1), hence it is feasible to make use of ARDL approach for the time-series analysis.

4.5 Optimal Lag Length

The decision regarding the appropriate number of lags to be consider must be taken before ARDL model estimation. The outcomes of the different criteria are displayed in Table 5.

Table 5: Lag Length Selection Criterion

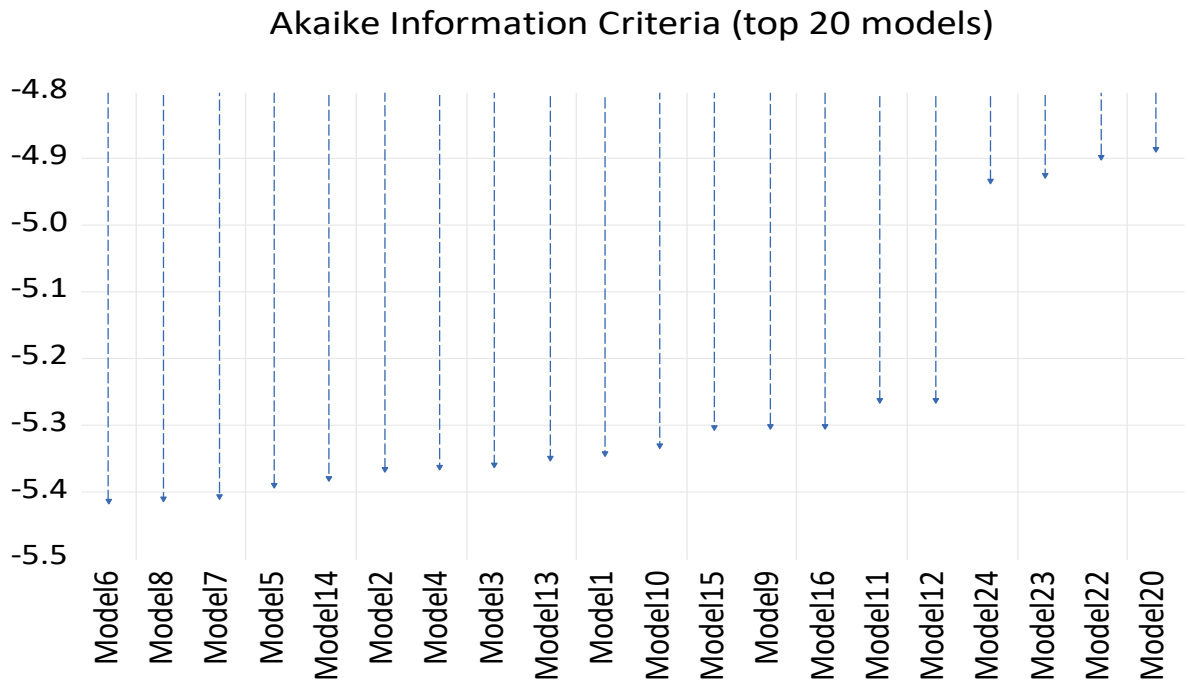
Lag	LogL	LR	FPE	AIC	SC	HQ
0	171.3437	NA	8.37e-12	-8.4792	-8.2232	-8.3873
1	466.9818	485.1498*	1.41e-17*	-21.7939	-20.0024*	-21.1512*
2	505.0390	50.7429	1.46e-17	-21.8994	-18.5723	-20.7057
3	545.0744	41.0619	1.74e-17	-22.1064*	-17.2437	-20.3617

Note: * indicates lag order selected by the respective criterions
Since four of the six given criteria results namely LR test statistic, Final Prediction Error (FPE), Schwarz Criterion (SC) and Hannan-Quin (HQ) information criterion, consider 1 as the suitable lag length, hence for the current analysis, optimal lag length of 1 is finalised.

4.6 Model Selection

Figure-2 displays the graph showcasing top 20 models having lesser magnitude of AIC among all the possible models. Based on the model presenting the least AIC, the order of the ARDL model selected for model estimation is (1,1,1,0,1,0).

Figure 2: ARDL Model Selection Graph



Model6: ARDL(1, 1, 1, 0, 1, 0)
Model8: ARDL(1, 1, 1, 0, 0, 0)
Model7: ARDL(1, 1, 1, 0, 0, 1)
Model5: ARDL(1, 1, 1, 0, 1, 1)
Model14: ARDL(1, 1, 0, 0, 1, 0)
Model2: ARDL(1, 1, 1, 1, 1, 0)
Model4: ARDL(1, 1, 1, 1, 0, 0)
Model3: ARDL(1, 1, 1, 1, 0, 1)
Model13: ARDL(1, 1, 0, 0, 1, 1)
Model1: ARDL(1, 1, 1, 1, 1, 1)
Model10: ARDL(1, 1, 0, 1, 1, 0)
Model15: ARDL(1, 1, 0, 0, 0, 1)
Model9: ARDL(1, 1, 0, 1, 1, 1)
Model16: ARDL(1, 1, 0, 0, 0, 0)
Model11: ARDL(1, 1, 0, 1, 0, 1)
Model12: ARDL(1, 1, 0, 1, 0, 0)
Model24: ARDL(1, 0, 1, 0, 0, 0)
Model23: ARDL(1, 0, 1, 0, 0, 1)
Model22: ARDL(1, 0, 1, 0, 1, 0)
Model20: ARDL(1, 0, 1, 1, 0, 0)

4.7 ARDL Bounds Test

ARDL Bounds test is performed next to check if any sort of long-run association exists between GDP of India and the undertaken independent variables. Table 6 presents the outcome of the test conducted.

Table 6: Results of Bounds Test

Test Statistic	Value	K
F-Statistic	6.3892	5
Critical Value Bound		
Significance	I(0)	I(1)
10%	2.26	3.35
5%	2.62	3.79
2.5%	2.96	4.18
1%	3.41	4.68

Presence of long-run relationship among the concerned variables is assured as the value of F statistic (6.3892) surpasses the upper bound values at 1%, 2.5%, 5% and 10% level of significance leading to rejection of null hypothesis of no long-run relationship. It confirms that the concerned independent variables are cointegrated with real GDP of India in the long run.

4.8 ARDL Long run form Estimation

Having confirmed of the presence of a long-run relationship existing between Real GDP of India and the independent variables, estimation of long and short run coefficients of the variables is carried out which provides details about the direction as well as the degree of association present between GDP and each of the independent variables. The result of long-run coefficient estimation is shown under Table 7.

Table 7: Long Run Coefficient

Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
lnLAB	0.1331	0.2197	0.6061	0.5488
lnGCF	0.3942	0.1099	3.5875	0.0011
lnGERHE	0.0742	0.1554	0.4774	0.6364
lnEXPHE	0.1913	0.0639	2.9943	0.0054
lnPTR	0.1074	0.1314	0.8177	0.4198

All the five independent variables are found to have positive relationship with economic growth of the Indian economy. Gross capital formation and expenditure on higher education possess statistically significant association with economic growth at 5% level of significance showcasing the evident importance of higher education for the economic growth and how essential is the process of capital formation with the continuous pace of development of the economy. Labour, PTR and gross enrollment ratio at higher education are also found to influence real GDP positively but their impact is statistically insignificant.

The following equation displays the long-run relationship between Real GDP and the independent variables:

lnGDP = 0.1331lnLAB + 0.3942lnGCF + 0.0742lnGERHE + 0.1913lnEXPHE + 0.1074lnPTR

The equation shows the expected change in economic growth due to one unit change in respective independent variables.

4.9 Error Correction Model Estimation

ECM has been utilised to check the short run dynamics of the estimated model and the results of the same are given in Table 8.

Table 8: Results of ECM

Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
C	1.6929	0.2481	6.8234	0.0000
D(lnLAB)	0.8267	0.1278	6.4669	0.0000
D(lnGCF)	0.1596	0.0238	6.7089	0.0000
D(lnEXPHE)	-0.0028	0.0294	-0.0946	0.9252
CointEq(-1)*	-0.2464	0.0369	-6.6722	0.0000
R-squared	0.7592	Mean dependent var		0.0566
Adjusted R-squared	0.7324	S.D. dependent var		0.0261
		Akaike info criterion		-5.6584
F-statistic	28.3760	Schwarz criterion		-5.4495
Prob (F-statistics)	0.0000	Hannan-Quinn criter.		-5.5823
		Durbin-Watson stat		1.8198

It is observed that out of the five independent variables, in the short run, only labour, capital formation and higher education expenditure is found to influence economic growth. While labour and GCF are associated with economic growth of India positively in the short run, expenditure on higher education is having negative association with economic growth but the impact is highly insignificant. The reason for such a negative relationship can be attributed to the fact that investment on education is a long process, the actual benefits of which can be realized only in the long run. Labour and GCF are found to have highly significant impact on GDP growth at 5% level of significance. The error correction term is found to be negative and statistically significant which ensures that in the long-run, equilibrium will be restored with a decent speed of adjustment being 24.64%.

4.10 Diagnostic Tests

Few diagnostic tests have been applied to examine the strength of the estimated model and to further be ensured regarding the stability quotient of the model, CUSUM and CUSUMSQ tests have also been

applied.

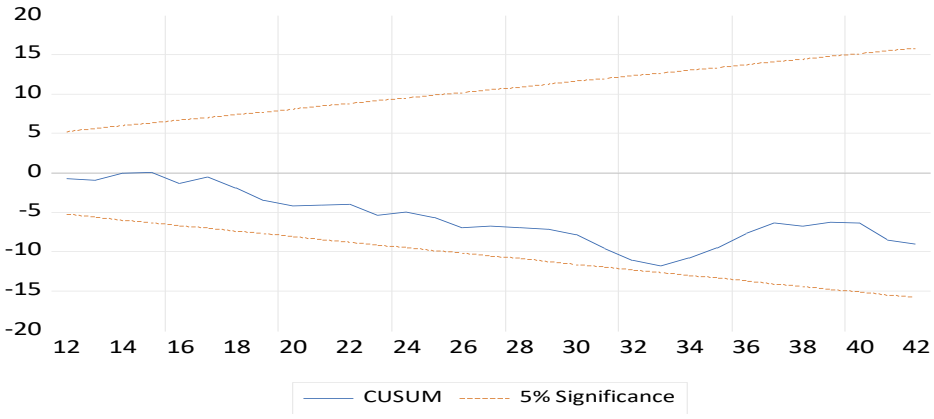
Table 9: Summarized results of Diagnostic Tests

Test	Test Statistic Value	Probability	Results
Jarque- Bera test (normality test)	JB = 0.5105	0.7747	Residuals are normally distributed
Breusch-Godfrey Serial Correlation LM test	F = 0.2415	0.6267	No serial correlation exists
Breusch-Pagan-Godfrey (Heteroskedasticity)	F = 0.1912	0.9935	No presence of Heteroskedasticity
Ramsey RESET Test	F = 0.2031	0.2031	No specification error

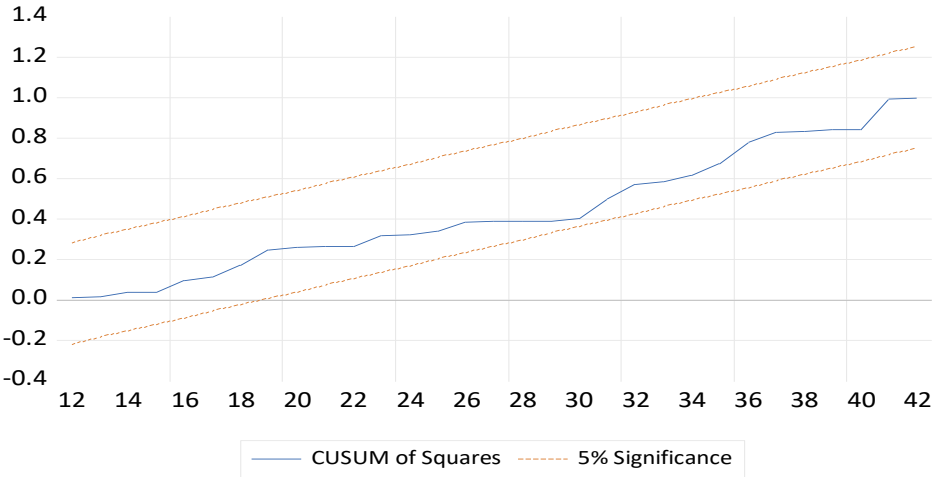
The outcomes of the diagnostic tests confirm that the estimated ARDL model is free from the presence of autocorrelation in the residuals and there no problem of hetreoskedasticity. JB Normality test indicates that the residuals are normally distributed at 5% level of significance. No problem of presence of specification errors is found as per the Ransey RESET test which states that the model is free from any kind of specification bias.

Figure 3: CUSUM and CUSUMSQ Tests

1. CUSUM test



2 CUSUMSQ test



Based on the displayed curves of CUSUM and CUSUMSQ tests, the stability of the model is ensured as both the curves are found to be lying within the critical bound of 5% significance level. Hence, we can say that the model is perfectly stable.

Table 10: Granger Causality Test

Null Hypothesis:	F-statistic	Probability
lnLAB does not Granger Cause lnGDP	1.2365	0.2731
lnGDP does not Granger Cause lnLAB	2.6173	0.1140
lnGCF does not Granger Cause lnGDP	0.6506	0.4249
lnGDP does not Granger Cause lnGCF	2.1912	0.1470
lnGERHE does not Granger Cause lnGDP	0.0525	0.8200
lnGDP does not Granger Cause lnGERHE	2.5343	0.1197
lnEXPHE does not Granger Cause lnGDP	1.5889	0.1316
lnGDP does not Granger Cause lnEXPHE	2.1813	0.6647
lnPTR does not Granger Cause lnGDP	2.6819	0.1098
lnGDP does not Granger Cause lnPTR	3.1713	0.0829

The results presented in the Table 10, confirms that there is no causal association existing between the dependent and independent variables under study which means no unidirectional or bidirectional causal relationship is in existence for the concerned set of variables.

4.11 Conclusion

The time series analysis carried out focusses on examining the influence higher education has on the economic growth of India considering time series data for the period 1980-81 to 2021-22. ARDL model approach has been utilized for the purpose of analysis. Real GDP of India has been selected as the representative of economic growth of the nation as being the dependent variable while the five independent variables being- labour, capital formation, GER at higher education, higher education expenditure and PTR at higher education level. Labour and GCF has been taken as the controlled variables in the analysis. The long run relationship is found to exist between economic growth and higher education in India as per the ARDL Bounds test. In the long run, it is GCF and expenditure on higher education is found to have statistically significant association with the growth of Indian economy at 5% significance level while the rest three variables though have positive relationship with economic growth individually but their impact is not that significant. Labour and GCF are the major factors having highly significant impact on economic growth.

The government is advised to invest heavily on capital formation and higher education as both the factors are of vital importance for the long run pathway of economic prosperity of the nation. The focus should be on developing efficient higher educational institutes where practical and analytical knowledge of the students is improvised. To be a technologically updated nation having a skilled lot of highly efficient labour force is a basic requirement which can only be achieved if the labour force is well educated and trained. The government is suggested specifically aim at raising the level of capital formation which leads to faster implementation of latest technologies along with promoting higher education by providing it at affordable cost without compromising with the quality standards and should look out for ways to create dynamic and diverse job opportunities for the youth which work as a motivation of them to go for higher education. Students should be taught and trained in such a manner that they undergo skill development

which is in accordance to the requirement of the job opportunities available in the national and global marketplace.

References

1. Babalola, S.J. (2011). Long-Run Relationship between Education and Economic Growth: Evidence from Nigeria. *International Journal of Humanities and Social Science,* Vol. 1(14), pp.123-128.
2. Barro, R.J. (1991). Economic Growth in a Cross Section of Countries. *The Quarterly Journal of Economics ,106*(2), 407-443.
3. Dastidar, S. H. and Chatterji, M. (2015). Public Expenditure in Different Education Sectors and Economic Growth: The Indian Experience. *Munich Personal RePEc Archive,* Paper No 66903.
4. Goel, M.M. and Walia, S. (2017). Access to Higher Education for Economic Growth in Haryana (India): An Empirical Investigation. *The Indian Economic Journal, Journal of The Indian Economic Association*, pp. 115-125.
5. Hanif, N. and Arshed, N. (2016). Relationship between School Education and Economic Growth: SAARC Countries. *International Journal of Economics and Financial Issues*, 6(1), pp. 294-300.
6. Hussin, M.Y., Hussin, F. M. and Razak, A.A. (2017). Education Expenditure and Economic Growth: A Causal Analysis for Malaysia. *Journal of Economics and Sustainable Development,* Vol 3(7), pp. 71-81.
7. Khan, M.K. (2015). Contribution of female human capital in economic growth: an empirical analysis of Pakistan (1972–2012). *Quality and Quantity, Springer SBM*.
8. Nkora, E. and Uko, A.K. (2016): Autoregressive Distributed Lag (ARDL) cointegration technique: application and interpretation, *Journal of Statistical and Econometric Methods,* Vol. 5(4), pp. 63-91.
9. Nowak, A.Z. and Dahal, G. (2016). The contribution of education to economic growth: evidence from Nepal. *International Journal of Economic Sciences,* Vol. 2, pp. 22-41.
10. Pesaran, M. H. and Shin, Y. (1999): An Autoregressive Distributed Lag Modeling Approach to Cointegration Analysis, *Centennial Volume of Rangar Frisch, Cambridge University Press*, pp. 371-413.
11. Pesaran, M. H., Shin, Y. and Smith, R.J. (2001): Bounds testing approaches to the analysis of level of relationship, *Journal of Applied Econometrics,* Vol. 16(3), pp. 289–326.
12. Phillips, P.C. and Perron, P. (1988): Testing for a Unit Root in Time Series Regression, *Biometrika,* Vol. 75(2), pp. 335-346.
13. Schultz, T. W. (1961): Investment in Human Capital. *The American Economic Review,* Vol. 51(1), pp. 1-17.
14. Sehrawat, M. and Giri, A.K. (2017). Does female human capital contribute to economic growth in India?: an empirical investigation. *International Journal of Social Economics.*
15. Singh, N.K., Sieng, L.W. and Sukani, M.N. (2018). Impact of education levels on economic growth in Malaysia: A gender base analysis. *Malaysian Journal of Society and Space,* Vol.14(4), pp. 13-26.