

Impact of Education Expenditure on the Economic Development. An Empirical Investigation in Case of Kuwait

Author's Details:

⁽¹⁾Syed Khurram Arslan Wasti - Corresponding author. Quality Assurance Specialist at Arab Open University-Kuwait ⁽²⁾Omayma Karrar - Director of Quality Assurance and Accreditation Department, Arab Open University-Kuwait ⁽³⁾Shumaila Waqar Zaidi - Researcher

Abstract

It is a proven fact that investment in education always increases economic growth and is considered as one of the main pillar of human capital interest. It's contribution in return for skilled labor, which ultimately leads towards economic development with a healthy lifestyle. The objective of this study is to explore the relationship between education expenditure and economic development. For this purpose, we have used different econometric techniques. These include unit root analysis to check stationarity, Johanssen Cointegration to judge long-run relationship, VAR for lag selection criteria, Vector Error Correction Model (VECM) to review the dynamic stability of long-run equilibrium. The study incorporates impulse response function and variance decomposition analysis to find out responsiveness of economic growth to the shock imposed on predictors. Furthermore, Granger Causality test has also been applied to check the direction of causality among variables. The study has used annual data started from 1980 to 2016 and obtained from world development indicators of World Bank and the central bureau of statistics Kuwait. Results indicate that there exists a strong positive and significant relationship between education and economic development in the case of Kuwait.

Key Words: Unit Root, Johanssen Cointegration, VECM, Granger Causality, Impulse Response,

Introduction

The main purpose of this paper is to analyze whether the economic development is affected by education and other related variables. Investment in human capital appears to play an important role and affects the country's economic growth. The skilled workforce has a direct impact on efficiency and productivity of economic development. It is evident that before 19th century a considerable amount of investment in human capital was ignored and countries main focus was on other projects. The concept of education is building the knowledge system during this century by enhancing technologies and method of productions. Now education has become one of the crucial determinants of economic development. The past few decades have witnessed an ample amount of increase in primary and secondary education as well as purposely focused on higher education. So considering the fact and importance of education, one can say no country has prosperity unless they focused on all level of education and subsequently built up their human capital. A consistent effort is required to elevate the education sector at all levels otherwise; it will adversely affect the national income of the country. Sufficient investment in the education sector and training of human capital can play a vital role in economic development. In the days of the neoclassical era, education was not considered as a major factor of efficient production and ignored for a long time. (Herberger, 1998). Clearly, the educational requirements within any country characterize one of the main factors of the structure and development of that country's production, exports and constitute an imperative element in a system's volume to borrow foreign technology effectively.

The government of Kuwait fully support the education system in all parts of the country irrespective of social class. Kuwait ranked at 63rd in Human Development Index (HDI) as per UNDP report 2011. Among GCC countries Kuwait expenditure on education sector is significant.

Objectives

- To empirically examine the causal relationship between education expenditure and economic development.

- To explore long run and the short run relationship between education expenditure and gross domestic product.
- To examine the effect of all related independent variables on GDP and its future implications.

Literature Review

Berthelemy and Varoudaskis (1996), they purposely focused on education sector as it plays an important role to boost up economic development. Dension (1967) is one of the founder of researchers who highlighted the importance of education in the society and important for the growth of economies. Benhabib and Spiegel (1994) studied on cross-countries and used physical and human capital stock. Their results indicate positive results from human capital to total factor productivity. Francis and Iyare (2006) used cointegration and VECM model to diagnose causal relationship for multiple Caribbean countries. They came to a point with proven causality impact on education to economic development. It is their point of the study that more spending on education will lead towards higher development in the country.

According Ozturk (2001) education sector is one of the fundamental ingredients of growth, and no country will have prosperity unless they focused on their education portfolio. The author also explained that efficiency of work improves in all segment of the economy and hence leads towards economic prosperity. In addition to this, it plays a vital role in enhancing economic and social structure and subsequently improves income distribution pattern in the economy. Barro examines the relationship between education and economic growth and highlights a significant direct relationship between them. In the same way, various other studies that worked on school and their linkages to economic growth. Hanif and Arshed (2016) recently analyzed the relationship between school education and economic growth; they conclude that tertiary education enrollment has the highest impact on economic growth.

Kim and Hagiwara (2010) studied the theoretical linkages for the Asian countries, and they conclude that countries should focus on balance investment between general and specific human capital. People should also be concerned about research, primary and secondary education. Holland et al. (2013) found a typically positive trend in employment if an economy focused on their tertiary education. Bashir et al. (2012) have used different theories and model to access the association between education and economic growth. They reached a conclusion where their results indicate a positive significant empirical link between both variables however they also highlighted that education growth causing reduction in population growth in West Virginia. Babatunde and Adefabi (2005) examined the long run relationship between education and economic growth and used Johansen Cointegration method, and subsequently, they adopted the VECM method. Their results indicate that a well-educated labor force positively influences economic development.

Barro (2011) reached to a conclusion for the panel analysis of 100 countries and redirected that growth is positively linked with the started level of average years of schooling attainment of the adult male at secondary and higher level. His study also highlighted that girls education is not playing a significant role in the labor market. Afzal et al. (2010) concluded that there exists a Cointegration between school education and economic growth. This study also exhibits a direct relationship between school education and economic growth for both in short and long run.

Chaudary et al. (2009) investigated the role of higher education and growth of the economy. VAR results indicate that a long run relationship exists in the system. A unidirectional causality is running from education to economic development. Kakar (2011) used a time series analysis and confirmed a long and short relationship between education expenditure and economic development. It is evident that a bidirectional causality exists between education expenditure and economic growth (Yousif, 2008). It is also established in case of GCC countries that results of one country cannot generalized for the other GCC countries. Countries should rather focus on their human capital in order to boost growth. Muysken and Nour (2005) found a positive correlation between education training and technology as well as between education and wages. Low quality of teaching

adversely affects the infrastructure and subsequently economic development. More spending on education leads towards the enhancement of economic growth on a larger scale. Islam (2014) briefed that gross domestic product causing education however education does not cause GDP.

Some of the researchers indicate that a one-way causality between economic growth to a number of graduates and similarly one causal relationship between economic growth and number of vocational high school graduates (Yurtkuran and Terzi, 2015). Odior (2011) pointed out that relocation of government expenditure to education has a significant impact on the economy. They used social accounting matrix, and their result indicates that investment in education gives an effective yield. Banik and Khatun (2011) studies various states of India and found a bidirectional causality between education and economic development. A positive correlation between both variables also enlightens the primary influence of government intervention in the education sector. Danacica et al. (2010) used VAR model and concluded a unidirectional causality between economic growth and education sector.

Methodology and Model Specification

In line with the objectives, a time series data from 1980 to 2016 has obtained from different sources including World Development Indicators of World Bank and Kuwait Statistical Bureau.

Present study has been used following model for the analysis

$$Y = f (K, L, E, Inf, Pop)$$

The above model classified as “Y “stands for output, “K” is named as capital stock, “L” is labor force available in the country, “E” stands for education expenditure, Inf for inflation and “POP” for the population. Y represents Gross Domestic Product of Kuwait, K for Capital Stock available in the country over time, L used for labor force and E is expenditure on education. Gross Domestic Product (GDP) is a total output of goods and services produced within the country during a fiscal year. We have used gross fixed capital formation as a measure of capital stock. Gross fixed capital formation is a macroeconomic concept usually use to measure the net investment in the economy. Furthermore, L represents the total labor force willing to work in the country. Following econometric model was evaluated for the objectives of the study.

$$RGDP = \beta_1 + \beta_2 EE + \beta_3 LPR + \beta_4 GFCF + \beta_5 INF + \beta_6 POP + \epsilon_i$$

Where,

RGDP: Real Gross Domestic Product

EE: Government Expenditure on Education

LPR: Labor Force Participation Rate

GFCF: Gross Fixed Capital Formation

INF: Inflation

POP: Population of Kuwait

ϵ_i : Error Term

Data Analysis

Analysis of the data start with descriptive analysis followed by unit root tests, Vector Autoregressive for lag selection, Cointegration test through Johnsen, Vector Error Correction Mechanism, impulse response and variance decomposition test.

Table 1 represents the descriptive statistics that highlight the highest means accounted for EE and lowest noted against INF. Furthermore, LPR represents the lowest standard deviation that ensured this variable as most consistent input. However, on the other hand, INF holds the highest standard deviation that indicates fluctuations in the variable over time.

Table 1: Descriptive Statistics

Tests	RGDP	EE	LPR	GFCF	INF	POP
Mean	19.13	21.47	13.83	21.38	3.40	14.60
SD	0.47	0.69	0.40	0.71	2.78	0.29
Jarque - Bera	1.10 (0.58)	1.70 (0.42)	5.11 (0.07)	4.40 (0.11)	6.19 (0.04)	2.50 (0.29)

Values in parenthesis reflecting p values.

Jarque-Bera test revealed that residuals for all variables are normally distributed except in case of inflation where we have rejected the null hypothesis¹ of normal residuals. The study has further used unit root test through Augmented Dicky Fuller (ADF) and Phillips-Pearson (PP).

Table 2: Unit Root Results

Variables	ADF		PP	
	Level	1 st Difference	Level	1 st Difference
RGDP	-1.28	-5.61*	-1.20	-5.52*
EE	-1.78	-6.79*	-1.64	-7.67*
LPR	0.36	-2.92*	1.19	-2.89*
GFCF	-0.87	-6.09*	-0.74	-6.09*
INF	-3.48*	-6.16*	-3.26*	-7.62*
POP	-0.01	-4.82*	-0.01	-4.85*

*: Significant at 1% level of significant

Table 2 shows that all variables are non-stationary at the level, however, becomes stationary after taking first difference except for inflation. In addition, it is noteworthy to apply the further test for the long-run relationship between variables.

Table 3 Johansen Cointegration Results

Johansen Cointegration Test			
Hypothesis	No of CE (s)	Trace Statistics	Maximum Eigen Statistics
None		361.87*	137.87*
At Most 1		224.00*	95.32*
At Most 2		128.67*	62.04*
At Most 3		66.63*	46.11*
At Most 4		20.52*	17.7*
At Most 5		2.81	2.81

*: Significant at 5% level of Significance

Results of unit root suggested that all variables are integrated at order one except inflation which is integrated at level. For the selection lag length Vector Autoregressive (VAR) has deployed and most of the methods, including AIC method, indicates three lags are suited to the model under study. Based on all that Johansen test (Table 3) for integration applied and outcomes shows that there is four long-run Cointegration equations exists in the model and subsequently proved a long run relationship among variables. After confirming, the long run relationship among variables study has used Vector Error Correction Model (VECM), and its result reported in table 4.

¹ H0: Residual are normally distributed
H1: Residual are not normally distributed

Table 4: Vector Error Correction Model Results (Long Run)

Statistics	Coefficient	SE	P-Value
Long Run	-2.84	1.28	0.04
R- Square = 0.83			
Adjusted R- Square = 0.44			
F-Stats = 3.45			
Durban Watson Stats = 1.98			

It is evident that sign of the long-run coefficient is negative and desired p-value shows it is significant which means there exists a long-run causality among variables. The coefficient of determination represents 83% contribution of explanatory variables into RGDP whereas adjusted R-Square results show 44%. F-test results indicate that overall model is significant and DW stats shows model is free from autocorrelation. However, on the other hand, table 5 represents short-run causality which demonstrates none of the variables have short-run causality.

Table 5: VECM Results (Short Run)

Variables	Wald Test (F-Statistics)	P-Value
EE	1.77	0.21
LPR	1.17	0.37
GFCF	0.03	0.99
INF	0.53	0.67
POP	0.94	0.45

To ensure the efficacy of VECM, a different diagnostic that includes serial correlation LM test, heteroscedasticity test, and normality test are applied, and their results are available in table 6.

Table 6: Diagnostic Checking

Diagnostic	Through	Results	P-Value
Serial Correlation LM Test*	Chi-Square	2.78	0.43
Heteroscedasticity Test: Breuscg-Pagan-Godfrey**	Chi-Square	18.76	0.76
Normality Test***	Jarque-Bera	0.38	0.82

*: Null Hypothesis: No Serial Correlation

** : Null Hypothesis: No Heteroscedasticity

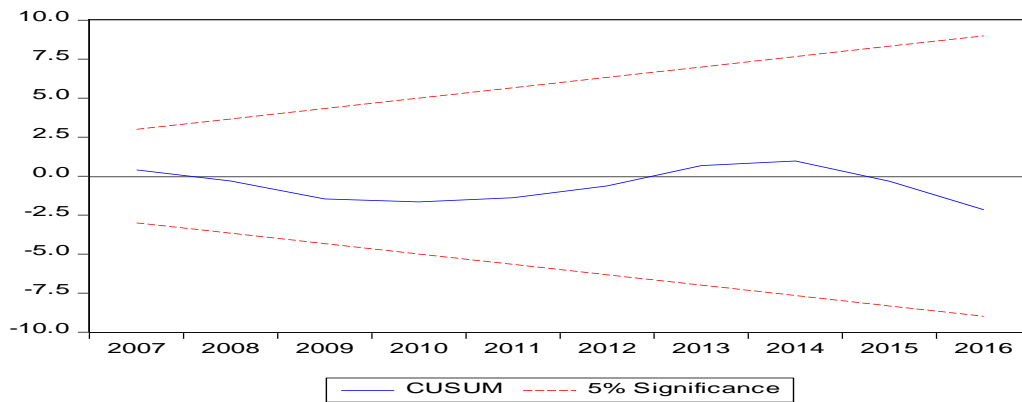
***: Null Hypothesis: Residuals are Normally Distributed

Serial correlation LM test represents that there is no serial correlation persist in the residuals. Breuscg-Pagan Godfrey test shows no heteroscedasticity in the model and in the last normality of residuals judged through Jarque-Bera test that shows the normal result.

Table 7: Granger Causality Test

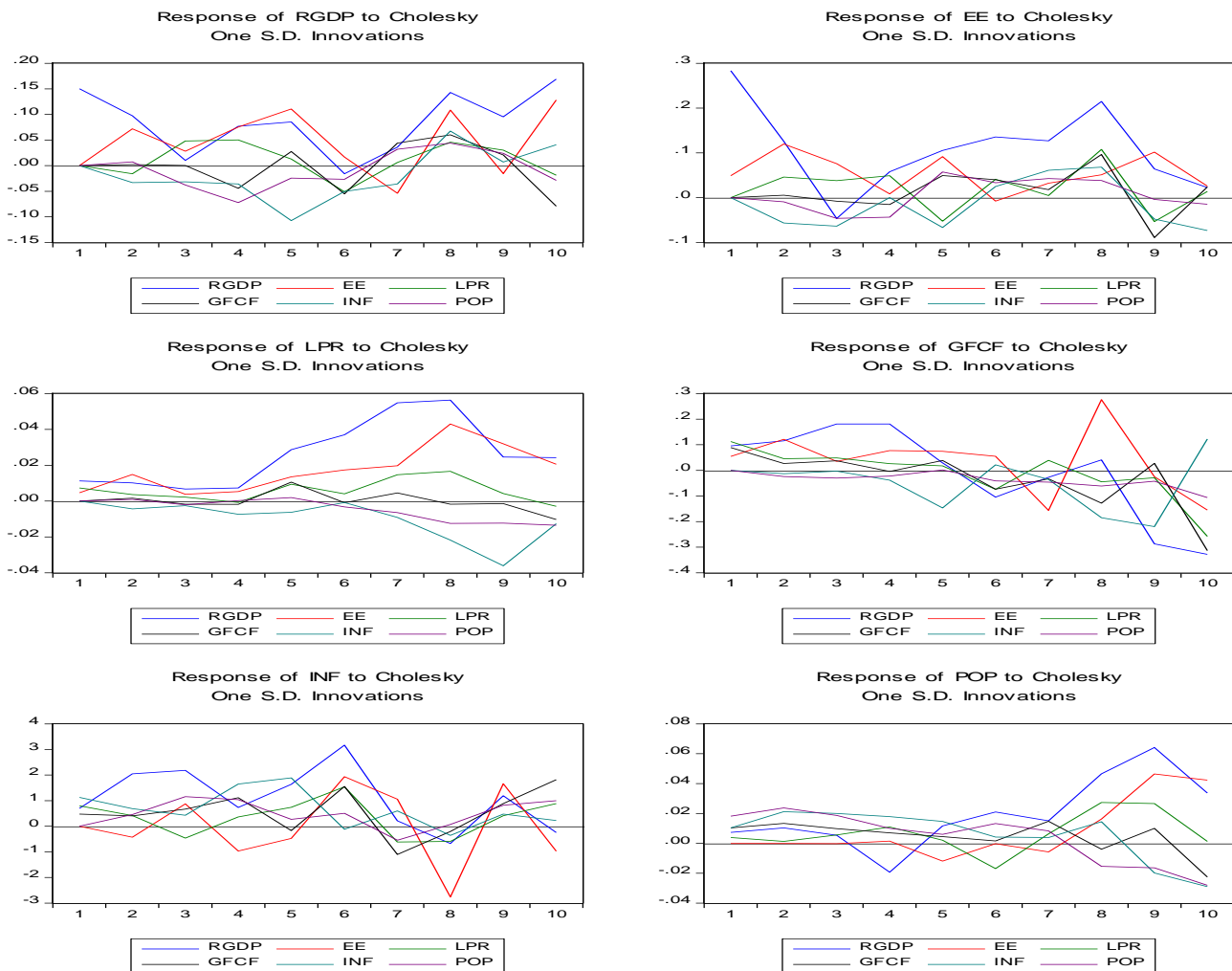
Null Hypothesis	F-Stat	P-Value
RGDP Does not Granger Cause EE	3.11	0.043
RGDP Does not Granger Cause LPR	3.13	0.042
RGDP Does not Granger Cause POP	4.89	0.007
GFCF Does not Granger Cause LPR	4.47	0.011
LPR Does not Granger Cause POP	5.47	0.005

Table 7 represents the results of Granger Causality test that shows RGDP causing EE, LPR, and POP. GFCF is causing LPR and LPR causing a POP.



Graph 1: Cusum Test

Graph 1 represents the cusum test that shows that estimated parameters of this model are stable under 5% level of significance.



Graph 2: Impulse Response

Graph 2 is impulse response results showing a multivariate analysis. In this research ten years has been taken as a period to review track progress. Like if, an impulse is given to present period what outcome we may expect during upcoming ten periods. With impulse given to RGDP (own shock), the response of RGDP is positive for all period except a fall in period eight. The magnitude of all other variables response remains positive for almost all periods. Similarly when an impulse was given to EE, LPR, INF, and POP the responses are positive for most of the periods. In case of GFCF, the responsiveness is positive up to 5th periods then a fluctuated response can witness.

Table 8: Variance Decomposition of RGDP

Periods	SE	RGDP	EE	LPR	GFCF	INF	POP
1	0.15	100.00	0.00	0.00	0.00	0.00	0.00
2	0.20	82.94	13.42	0.63	0.01	2.83	0.13
3	0.21	72.63	13.52	5.76	0.01	4.72	3.33
4	0.26	56.96	17.45	7.58	2.94	5.04	10.01
5	0.32	45.63	24.03	5.26	2.74	14.99	7.31
6	0.33	41.92	22.21	7.20	5.30	16.02	7.33
7	0.34	39.99	23.09	6.71	6.57	15.94	7.67
8	0.40	41.63	24.03	6.17	7.00	14.37	6.76
9	0.42	44.17	22.60	6.29	6.79	13.46	6.65
10	0.48	46.23	24.44	4.95	7.94	10.99	5.43

Table 8 represents variance decomposition of RGDP, if we look at the RGDP, the error variance is 72.63% in period three which is declining in next periods and fall at 46.23% in period ten. Similarly, in case of POP and LPR error variance is also declining from period five to ten. In case of EE, it is 13.52% and has increased up to 24.44% in period ten. However, between period three to ten, it is increasing and decreasing. In GFCF and INF magnitude of error variance varied over time.

Summary

The purpose of present research is to examine the relationship between education expenditure and its impact on economic development. To review the short and long causal relationship among different referenced variables and their future implications. The study has used annual data started from 1980 to 2016 obtained from world development indicators of World Bank and the central bureau of statistics Kuwait. Analysis of data starts from the descriptive analysis, for stationary check ADF and PP methods have been used. Vector Autoregressive model has been used to select a lag length for the data. Johansen Cointegration test used to determine the long-run relationship between variables. For the dynamic stability of long-run equilibrium Vector Error Correction Model (VECM) has been used to find out whether the error term of long-run equations has adjusted to converge towards long-run equilibrium and its speed of adjustment. To judge the efficacy of model, diagnostic techniques have been applied to the model to check serial correlation, heteroscedastic and normality of residuals. Granger causality test applied to understand the direction of causality link among variables. The present research also evaluates impulse response and variance decomposition method.

Results demonstrate that all variables are non-stationary at the level, however, becomes stationary at first difference. Vector Autoregressive model suggested three lags that have been used throughout the econometric analysis. Johansen Cointegration results show that there exists a long run relationship among variables under study. Based on the satisfactory preconditions, VECM model applied, and their results indicate a long run dynamic stability. However, no evidence cited for short-run causality. Diagnostic checks are applied to further validate our model, results in support for no serial correlation, no heteroscedasticity, and residual normality. It has seen in the granger results that RGDP granger is causing to EE, LPR, and POP respectively. GFCF granger causes LPR whereas LPR to POP. Furthermore, impulse response function supports positive impact of shock affected explanatory variables on economic development. Variance decomposition also claims that significance

of POP, GFCF, and LPR to forecast error variance of RGDP has reduced with the passage of time. In addition, own shock over RGDP also declined significantly.

Therefore, the overall analysis pointed out a long run relationship between education and economic development and other factors also playing a significant role to boost the growth.

References

- i. Afzal, M. Farooq, M. S. Ahmed, H. K. Begum, I. and Quddus, M. A. (2010). Relationship between School Education and Economic Growth in Pakistan. *Pakistan Economic and Social Review*. Vol, 48. No, 1. Pp: 39-60.
- ii. Al-Yousif, Y. K. (2008). Education Expenditure and Economic Growth: Some Empirical Evidence from the GCC Countries. *The Journal of Developing Areas*. Vol.42, No.1.
- iii. Babatunde, M, A. and Adefabi, R, A. (2005). Long Run Relationship between Education and Economic Growth in Nigeria. Evidence from Johansen Cointegration Approach. *Regional Conference on Education in West Africa*. Cornell Uni/CREA.
- iv. Barrik, A and Khatun, R. (2012). Role of Knowledge in Supporting Growth across Indian States. A cointegration and Causality Analysis Approach. *Modern Economy*. Vol.3, 346-354.
- v. Barro, R, J. (2001). Human Capital and Growth. *American Economic Association Review*. Vol, 91. No, 2.
- vi. Bashir, S. Herath, J. and Gebremedhin, T. (2012). An Empirical Analysis of Higher Education and Economic Growth in West Virginia. *Agriculture and Applied Association*. Annual Meeting. Seattle, WA.
- vii. Benhabib, J and Spiegel, M, M (1994). The Role of Human Capital in Economic Development Evidence from Cross Country Data. Vol, 34. Issue, 2. Pp: 143-173.
- viii. Berthelemy, G. C. and Varoudahis, A. (1996). Policies for Economic Take Off, Policy Brief no 12, OECD, Paris.
- ix. Chaudary, A. R. Iqbal, A. and Gillani, S. Y. M. (2011). The Nexus between Higher Education and Economic Growth: An Empirical Investigation for Pakistan. *Pakistan Journal of Commerce and Social Sciences*. Vol, 3.
- x. Danacica, D. E. Belasu, L. and Llie, L. (2010). The Interactive Casualty between Higher Education and Economic Growth in Romania. *International Review of Business Research*. Vol. 6, No.4, pp: 491-500.
- xi. Dension, E. (1967). Why Growth Rate Differ? *The Brookings Institution*, Washington DC.
- xii. Francis, B. and Iyare, S. (2006). Education and Development of Caribbean: A Co integration and Causality Approach. *Economic Bulletin*. Vol, 15. No, 2. Pp: 1-13.
- xiii. Hanif, N. and Arshed, N (2016). Relationship School Education and Economic Growth: SAARC Countries. *International Journal of Economics and Finance*. Issue, 1. 294-300.
- xiv. Holland, D. Liadze, I. Reinzo, C and Wilkinson, D. (2013). The Relationship between Graduates and Economic Growth across Countries. *BIS Research Paper No, 110*. National Institute of Economics and Social Research.
- xv. Islam, M. R. (2014). Education and Economic Growth in Bangladesh- An Econometric Study. *IOSR Journal of Humanities and Social Sciences (IOSR- JHSS)*. Vol. 19, Issue. 2, Version. 5, pp: 102-110.
- xvi. Kakar, Z. K. Khilji, B. A. and Khan, M. A. (2011). Relationship between Education and Economic Growth of Pakistan: A Time Series Analysis. *Journal of International Academic Research* Vol. 11. No, 1.
- xvii. Kim, Y, J. and Hariwara, A, T. (2010). A Survey on the Relationship Education and Growth with Implications on Developing Asia. *ADB Economic Working Paper*. No, 236.
- xviii. Muysken, J. and Nour, S. (2005). Deficiencies in Education and Poor Prospect for Economy in the

- a. *Gulf Countries: The Case of the UAE. Journal of Developing Studies. Vol.42, No. 6, 957-980.*
- xix. O. Odior, E. S. (2011). *Government Spending on Education, Economic Growth and Long Waves*
a. *in a CGE Micro Simulations Analysis: The Case of Nigeria. British Journal of Economics, Finance and Management Sciences. Vol. 1 (2).*
- xx. Ozturk, I. (2001). *The Role of Education in Economic Development: Theoretical Prospective.*
a. *Munich Personal RePEc Archive (MPRA). Paper #, 9023.*
- xxi. Yurtkuran, S and Terzi, H. (2015). *Does Education Affects Economic Growth in Turkey? A*
a. *Causality Analysis. Journal Faculty of Economics and Administrative Sciences. Vol. 30, Issue. 2, pp: 19-38.*