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ECONOMIC GROWTH IN BANGLADESH: AN ECONOMETRIC ANALYSIS WITH SPECIAL REFERENCE TO EDUCATIONAL EXPENDITURES (1973-2010)

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Abstract: The prime element of human development is education. Education is one of the fundamental factors of economic growth. No country can achieve sustainable economic growth without substantial investment in human capital that means education. It improves the quality of their lives and leads to broad social benefits to individuals and society. In this paper, the relationship between education and economic growth in Bangladesh aspect due to different experience in many other countries. The major objective of this study is to examine the dynamic linkage between educational expenditure and economic growth using annual time series data covering the period from 1973 to 2010 in Bangladesh. In this circumstance the unit root test, the cointegration test, the Error Correction Modeling and Granger Causality test are applied so that the short and long run relationship between educational expenditure and economic growth are known. In terms of data used and econometric techniques used in the paper is an improvement over the early studies. The stationarity of the data have been examined by using Augmented Dickey-Fuller (ADF) test. The paper also applies Johansen-Juselius cointegration test and error correction models to explain the short run dynamics of long run relationship between educational expenditures and economic growth. The study found that there is bidirectional causality from educational expenditures to GDP and GDP to education. As it is found that long run relationship between education and economic growth, therefore, spending on education can further help to improve economic growth. The implication of the result is that the role of education as an independent stimulus to the GDP growth not only in the long run but also in the short run can not be ignored. The Granger Causality test also supports the results. The relationship between educational expenditure and economic growth is quite high and positive and statistically significant obtained from the empirical study.

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Key Words: Education, Economic Growth, Expenditures, Human Development, Regression Model, Unit root, Cointegration, Causality, Bangladesh.

Introduction

It is not necessary here to review the important role of education in achieving the social and cultural development of a country. Recently, however, special attention has been directed to the relation between education and economic growth. It is becoming the deep conviction of many newly independent countries striving for rapid development but Asia and Africa, that the expansion and raised of the level of education is the prerequisite basis of socio-economic development. Education enriches people's understanding of himself and world. It improves the quality of their lives and leads to broad social benefits to individuals and society. Education raises people's productivity and plays a very crucial role in securing economic and social progress and improving income distribution.

Meanwhile, in the industrially developed countries, such human factors as scientific creativeness, technological talents, labourer's skill and the abilities to use completely all available resources ; have been recognized as affecting economic growth as well as physical capital and the labour force. The development of these factors, which might be identified as "human resources", will depend largely on the quantitative and qualitative development of education. It is necessary for future economic growth to increase the total investment in the development of all available national resources. Education directed to the development of human resources; should be considered as one of the most important forms of investments.

It is worthwhile to mention two things. Most of the earlier studies involved developed economies, while this study is in a developing economy that has seen considerable and steady increase in the expenditures on education. It is necessary to see whether the results of this study can be differ from, those obtained for the developing economies by researchers in future. Under these circumstances, education should be looked upon not as a mere item of consumption but as an investment in economic growth. Education is an indispensable factor in the full utilization of the fruits of this period of rapid acceleration of technological innovation. In this context, the viewpoint of regarding education as an investment should be more emphasized.

Education in Bangladesh

Bangladesh is the most densely populated country in the world. The major part of ours is rural which indicates that our economy is agricultural based. Especially basic education can improve the capacity of individuals to live a decent life and to escape from the hunger trap. The basic idea is that being educated improves rural people's capacity to diversity assets and activities, to have access to information on health and sanitation, to enhance human capital in addition to increasing productivity in the agricultural sector; these are all essential elements to ensure food security in the long- run. Education in every sense is one of the fundamental factors of development.

Human resources development through education is inevitably important for a country like Bangladesh. Most of the people in Bangladesh live in the rural areas and they are not able to contribute their best to our economy due to lack of basic and proper education. Education enhances social and economic self- reliance, child survival, and improves state of health and also leads to lower fertility rate in the rural areas. It also plays an important role that influence of the life style in the rural areas. The available studies suggest that the mutual influences level of education and economic life can be fruitfully examined. The need to understand just how these mutual influences might work is perhaps more pressing in rural than in urban and suburban education, because the economic base of rural area has changed so dramatically since the 1990's. In Bangladesh, very few attempts have been made to study the relationship between the level of education and level of income of household and the contribution of education on social change in the rural areas.

Bangladesh is a poor country. It has a large number of population with about 16 cores .Most of the people are here illiterate. Only near about 50% people are educated. Educational enrollment is not satisfactory. Every year 30 % students are dropping out from the school .Because of the in- attainments of education we are obviously suffering each year with a number of untold crisis's. The literacy rate is lower than any other developed countries. Education may play a vital role to increase our economic growth and may enhance economic development. But it is poverty that hampering our educational attainments.

The education system of Bangladesh may broadly be divided into three stages as- primary, secondary and higher education. We have a traditional education system known as madrasa education. Besides we have a system of education as- formal and non formal education. Our

govt. is taking initiatives to increase educational attainments but the results are not so fruitful, as we expect. The reasons are many like: poverty, poor health, insufficiency of educational institutions and so on. Now it is proved that education can help a nation to change their economic growth. Developed countries have a cent percent of educational attainments and their economic growth is above 10%, whereas we have only 4.5%.

Psacharopoulos shows the percent of the Economic Growth rate (by country) explained by Education. The report shows that England 12% in Growth where as Germany it was only 2% but Canada it was in 25% share in GDP growth rate explained by education. At the same time, Brazil, Mexico, and Nigeria was 3.3%, 0.8% and 16% respectively. In South Korea and Malaysia the share of GDP by education was 15.9% and 14.7% respectively.

According to Base Year Most Recent Estimate (MRE) 1995 shows that the Expenditure on Primary education in South Asian countries is 46.5 % of education budget and 0.83% of GDP in Bangladesh in 1990-99. In Bhutan it was 67.0% of education budget and 2.50% of GDP in 1991/98 where as in India it was 34.3% of education budget and 1.25% of GDP in 1990-97. Maldives expensed on primary education 42.9% and 1.25 of education budget and of GDP respectively in the year 1990- 98. Nepal 46.8 and 0.80% respectively in the same year. At the same time, in 1991-98 Pakistan and Srilanka expensed 54.0, 18.1% and 0.78, 0.53% of their education budget and of GDP respectively. Based on the results, it can be concluded that education is one of the factors that explain economic growth, but the explanation varies depending upon the level of development of a country.

Objective of the Study

The central focus of this research is to show the causal relationship between education and economic growth, yet the main objective of this study is to find whether there is a linkage between educational expenditures and Gross Domestic Products in Bangladesh and economic development in the long run. The specific objectives of this study are to:

1. Analyze the short and long run Causal relationship between education and economic growth.
2. Assess the contribution of education to socio-economic development in Bangladesh.
3. provide some policy suggestions in respective of showing causal relationship between education and Economic growth.

Practical Scenario of Education in Bangladesh

In Bangladesh UNESCO publishes a report on education and GDP relationship as expenditures on education increase, raises the GDP volume in the long term period. In 1975 the expenditure was 1.1 % and 0.94 in the year 1980. But expenditure is increased 1.26% of GDP. In 1999 as expenditures increases to 2.42% and the GDP volume raised to 2370.9 billion Tk. In 2001 educational expenses goes to 2.46 % the GDP volumes goes to 2732.0 billion and 4724.8 Tk. for GDP as educational expenses becomes 2.46% of GDP in 2006. at the similar fashion the educational expenditure stands in 2.39% of GDP as it raise to 6149.4 billion TK. The report concludes that in spite of increasing pattern of GDP volume, the percentage of educational expenditures of GDP is not increased at all in Bangladesh for the change of time and it is remained the same to near about 2.45%.

In the words of Dr. A.M.R. Chowdhury, deputy executive director of BRAC,

Bangladesh's leading institution for non-formal education: "Education is the backbone of sustainable development. Education stimulates and empowers people to participate in their own development" (Chowdhury et al, 1). A plan for sustainable development must address the issue of education because it plays a critical role not only in expanding further educational opportunities, but also in fostering basic intellectual abilities such as literacy that are crucial to success in a world where power is closely linked with knowledge. Primary education must receive a great amount of attention in developing nations for this reason.

In Bangladesh the expansion of primary education is crucial, just as it is in other developing nations within South Asia and beyond. Bangladesh's low literacy rate of 39% (Chowdhury et al, 47) is one of the many low development indicators that remind us how far our nation has yet to go in its pursuit of sustainable development. Primary education has been a priority in Bangladeshi politics since independence from Pakistan in 1971: basic measures to implement universal primary education were taken from the outset. However up until recent times, enrollment, as well as government spending on the education sector, has remained very low; little progress was seen in the primary education sector throughout the 1970s and 80s.

Additionally there have been problems of inequity and access. The 70s and the 80s saw a marked gender disparity in enrollment levels as well

as attendance, completion, literacy rates and achievement levels. Marginalized and disadvantaged groups in general particularly the rural and urban poor—have had significantly less access to education than other groups. The Bangladesh government is proud that its education programs dramatically improved in the 1990s, especially during the latter half of the decade. The 90s saw a rekindled dedication to the expansion of primary education and as a consequence the Bangladeshi primary education system experienced significant enhancement during this period. A large part of this renewed commitment was a direct result of the 1990 World Conference on Education for All (WCEFA), which encouraged all participating nations to expand their vision to meet goals in the education sector, especially the goal of making primary education universal. Following this conference, donors in Bangladesh invested in the education sector much more heavily and NGOs increased their involvement in assisting the Bangladeshi government in meeting its primary education goals.

The Government of Bangladesh itself took many initiatives in the years following the WCEFA, including: the 1993 Compulsory Primary Education Act, which made the five-year primary education program free in all government schools and declared education for girls in rural areas free through grade eight; the establishment of the ministry for Primary and Mass Education in 1992, which set as its objective the universalization of primary education as well as the elimination of the gender- and poverty-gaps; demand-side interventions such as the Female Stipend program, the Food for Education (FFE) program; and most recently the Primary Education Development Program (PEDP II), a six-year program beginning in the year 2000 which aims to increase access, quality and efficiency across the board in the primary education sector .

These measures have resulted in impressive gains in the achievement of Bangladesh's primary education goals. Nationwide enrollment rates have sharply increased, dropout rates have gone down, significant progress has been made in raising equality of access between different geographic and socioeconomic groups, and the gender gap has literally been removed at the primary level. Girls have actually overtaken boys in rates of enrollment, completion, and attendance in primary schools (Kabeer et al, 292). However, Bangladesh still faces obstacles towards the long-term success of its education system. For example:

- Government expenditure on education in Bangladesh is currently the lowest in South Asia (2.3 of GNP, compared to 3.5 regional averages ["MGD Issues"]).
- Net enrollment rate is still only 80% (Chowdhury et al 16). This means that about three million children 6-10 years old are currently not enrolled in school (Dhar).
- At least 15% of primary school age children never enter the educational system. Most of these children are poor. When this figure is combined with the 25% primary school dropout rate, it is seen that 40% of Bangladeshi children never receive a full primary education (USAID).
- Bangladesh is over-reliant on NGOs to reach the disadvantaged groups.

Data and Method

The paper is developed with the secondary data basically in order to show the long run relationship between education and economic growth. In this context, several econometric and growth models are used and taken the help of local and international journal and reports. In some cases, primary data are used for showing the present educational condition in the short term. The present study is based on review and analysis of secondary documents and literature on budget and education. Analyses of trends and characteristics of budget on education have been made mainly in terms of share of education sector wise in revenue, development and total budget and national income. A simple time series analysis has been carried out in order to notice long- run relationship among education budget, sector wise education budget, total budget, literacy rate, net enrolment and GDP in Bangladesh. In this context, data on education and growth have been shown from 1973 to 2010, so that a concrete result is found.

The Methodology

Research methodology is a way to systematically solve the research problem. It may be understood as a science of studying how research is done scientifically. The aim of this paper is to analyze the co- integration between education and economic growth in Bangladesh using dynamic causality analysis methods. Various methods have been developed for econometric analysis of time series data. The dynamic relationship between education and economic growth are analyzed through econometric technique such as unit root test, autoregressive vector (VAR), Granger causality test, co integration and error correction mechanism etc.

Empirical Results

The econometric approach of this paper is based on the Autoregressive Vector (VAR). The chosen methodology is justified by the nature of the analysis performed in this study. The first step of this paper was to examine the stationary of the variables. If all the variables are stationary I(0), then there is no problem to estimate the coefficients using the variables with initial specification. However, most of the main macroeconomic variables are non- stationary, integrated of order higher than zero.

If the series are non- stationary but cointegrated, then the estimation as an autocorrected model is admissible. If the variables are non- stationary and are not cointegrated then the specification of variables as differences is necessary.

Most commonly used tests for the integration order of variables are Dicky- Fuller (DF) test, Augmented Dicky – Fuller (ADF, 1979) test, Philips – Peron test (PP, 1988) and Kwiatkowaski test (KPSS, 1992).

Unit Root Test

The Augmented Dickey- Fuller test is used to test for the existence of unit roots and determine the order of integration of the variables. The tests are done both with and without a time trend. It can be seen in the table 7.3.1 that presence of a unit root, which indicates nonstationarity, cannot be rejected for levels of the variables at the 5% and 1% level. It is found that the data series are non stationary at their level form. Because the ADF test statistics of their level form of the two variables are less than their respective critical values (in absolute terms). Hence, the null hypothesis of the non stationarity of the data is accepted at the 5% level of significance. It was also found that it could not be rejected for the first difference. However, the nonstationarity problem vanished after second difference. The results are as follows:

Table 7.3.1 The Augmented Dickey-Fuller Unit Root Test

		With an intercept but not a trend		With an intercept and a linear trend	
variables	lag	ADF statistic	Critical value	ADF statistic	Critical value
Y	1	1.370032	-2.9558	2.903446	-3.5562
X	4	3.493416	-3.6422(1%)	2.738688	-3.5514
X1	4	3.181029	-3.6422	-3.380182	-4.2605(1%)
X2	2	1.955631	-2.9472	-1.078994	-3.5426
X3	1	-0.773934	-3.0521	-2.11081	-3.7119

X4	1	2.005989	-3.0521	0.765616	-3.7119
X5	1	-1.627617	-3.0659	-1.080563	-3.7347
Δ^2Y	1	-3.792724	-2.9499	-3.828236	-3.5468
Δ^2X	1	-6.529241	-2.9499	-6.554486	-3.5468
Δ^2X1	1	-8.300020	-2.9499	-8.457023	-3.5468
Δ^2X2	1	-8.809772	-2.9499	-8.697374	-3.5468
Δ^2X3	4	-4.494893	-3.1583	-3.930980	-3.8730
Δ^2X4	1	-3.680736	-3.0818	-4.321890	-3.7611
Δ^2X5	0	-8.733983	-3.0659	-9.0883681	-3.7347

The test is conducted using Eviews-2 and 5.

Note: 95% critical value for the Augmented Dicky – Fuller statistic=-2.9665

Y= Gross Domestic Product(GDP) at the Constant Price, X1= Revenue Expenditure(RE), X2= Development Expenditure(DE), X= Total Educational Expenditure(TEE), X3= Total expenditure on Primary Education (TEPE), X4= Total Expenditure on Secondary Education (TESE), X5= Total Expenditure on Tertiary Education (TETE), Δ= First Difference, Δ^2= Second Difference. Critical values (5%) are from Mackinnon (1991).

The First Difference values are not reported as stationarity could not be achieved then. It can be said that the second difference of GDP growth and educational expenditures series do not have a unit roots problem and the variables series are stationary.

Cointegration Results

In this test, the null hypothesis of r cointegrating vectors is tested against the alternative hypothesis or r = 1 cointrgrating vectors. Hence, the null hypothesis r =0 is tested against the alternative r =2 and so forth. It is well known that the cointegration tests are varied to the choice of lag length.

The result of the cointegration tests are reported in table- 7.2.4. Since the variables Y, X, X1, X2, X3, X4, X5 (GDP at constant price, Total Educational Expenditure, Total Revenue Expenditure, Total Development Expenditure, Expenditure on Primary, Secondary and Tertiary Education respectively) are integrated of order one (two), it confirms the possibility of cointegration between them. In other words, the long run equilibrium relationship between educational expenditures and the GDP at constant Price can be examined. The Johansen's Maximum Likelihood (ML) cointegration technique is applied to explore the possibility of long run equilibrium. The estimated results, particularly

maximum eigenvalue and trace statistics, are presented in the Table-7.2.4.

Table 7.2.4 (1) Cointegration between GDP growth and Total Educational Expenditures (Y, X):

Null Hypothesis	Alt. Hypothesis	Eigen value	Trace statistics	5% crit.value	1% crit.value	Max. eigen value	5% crit.value	1% crit .value	Hypothesis
r=0	r=1	0.688591	42.55427	15.49471	20.04	41.99932	14.26460	18.63	None**
r<=1	r=2	0.015297	0.554944	3.841466	6.65	0.554944	3.841466	6.65	At most 1**

The test is performed using Eviews- 5.

** denotes the rejection of hypothesis at 5% and * denotes the rejection the hypothesis at 1% level of significance.

Trace test indicates that 2 cointegrating equations at 5% and 1% for first three variables but 1 cointegrating equation for later three variables. There is also linear deterministic trend in the equations.

The results that appear in Table- 7.2.4 suggest that the null hypothesis of no cointegration (H0: r =0) can be rejected at both 5% and 1% level of significance in case of both Trace and Max-Eigen value statistic due to the trace statistics and Max- eigen value is greater than their critical value. In that case, there is a stable long- run relationship between educational expenditures and Gross Domestic Products (GDP). On the other hand, the second row tests the null hypothesis of at most one cointegrating vectors (H0: r <= 0) can be rejected at 1% level of significance in case of both the trace and max- eigen statistics which implies that these variables have with more than one cointegrating equations.

Granger Causality

Granger Causality theorem (1988) mentions that there should be at least one direction of causality between the two variables, if they are cointegrated. Accordingly, the causality model has been estimated and that has been tested by F- statistics.

In order to determine if there is a Granger causality between education and Gross Domestic Product (GDP) growth.

F statistics is used to test the $H_0 : \sum_{i=1}^{n} \alpha_i = 0$.

Since, F statistic is statistically significant, the null hypthesis that gross domestic product (Y) does not Granger cause total Educational Expenditures (X) can be rejected. This means that Total Educational Expenditures Granger cause GDP growth. Granger

Causality is estimated using(1) lag and results are presented in Table-7.2.5.

Null Hypothesis	Lag	Obs	F statistic	Probability	Decision
X does not Granger Cause Y Y does not Granger Cause X	1	37	0.60846 4.67549	0.44077 0.03772	Rejected Rejected
X1 does not Granger Cause Y Y does not Granger Cause X1	1	37	0.13903 0.61751	0.71156 0.43742	Accepted Rejected
X2 does not Granger Cause Y Y does not Granger Cause X2	1	37	0.17033 8.36442	0.68241 0.00663	Accepted Rejected
X3 does not Granger Cause Y Y does not Granger Cause X3	1	18	2.77347 0.17687	0.11658 0.68004	Rejected Accepted
X4 does not Granger Cause Y Y does not Granger Cause X4	1	18	0.03176 8.26699	0.86095 0.01156	Accepted Rejected
X5 does not Granger Cause Y Y does not Granger Cause X5	1	18	0.03681 0.00401	0.85043 0.95033	Accepted Accepted

The tests are performed using Eviews-5.

Table-7.2.5 shows sector wise Granger causality. Result shows that Educational Expenditures Granger cause Gross Domestic product. That is causation goes from Educational Expenditures to Gross Domestic Product. From this result, it can be said that the educational attainments leads GDP growth.

Since, F statistic is statistically significant the null hypothesis that Total Educational Expenditure, Total Revenue Expenditure, Total Development Expenditure. Expenditure on Primary Education and Expenditure on Secondary Education does not Granger Cause GDP can

be rejected. This means that educational expenditures Granger cause GDP growth. From this result, it can be said that an increase in educational expenditures will influence gross domestic product. In case of tertiary education the null hypothesis is accepted. That is the expenditures on tertiary education has no or very few influence on GDP in Bangladesh.

Results reveal that there are presence of bi-directional causality between economic growth and education. Furthermore, results show the bi-directional causality between revenue expenditure on education and economic growth, and growth of expenditure on education sector wise and economic growth in Bangladesh.

Conclusion

In this paper, it is examined the causal relationship between education and National Income (GDP) growth for Bangladesh over the period 1973-2010 using a multivariate approach. The variables are GDP at constant price, Total Educational Expenditure, Total Revenue Expenditure, Total Development Expenditure, Expenditure on Primary, Secondary and Tertiary Education. The relationship between income and education can take three forms. Income can cause education to grow, these can help each other to grow or education can cause income to grow. Results show that there is bidirectional causality running from GDP to education and vice- versa. These results contradict many earlier studies which found unidirectional causality running either from education to growth or growth to education, but it is consistent with the prevailing situation in Bangladesh where GDP growth and educational expenditures are working in tandem. In the area of research studying causality between education and growth, especially in the developing economy, these results can provide a bench mark of comparisons for further research work.

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