

A Correlation Analysis of the Demand for Education and Economic Growth in Nigeria: The Spearman Rank Correlation Coefficient Approach

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Abstract

It is worrisome to realize that despite the increase in the demand for education in Nigeria, labour productivity appears very low. Up till now; graduates of specialized education especially in engineering are unproductive. The poor delivery of the technical Know-how in Nigeria is however problematic. This study thus examined the correlation between demand for education and economic growth in Nigeria. The Spearman Rank Correlation Coefficient Approach was employed for the analytical study. The a priori expectation is that there is a positive correlation between the demand for education and economic growth. The result obtained from the estimation demonstrates a positive correlation between demand for education and the level of growth in Nigeria. This implies that higher school enrolment does contribute to growth in Nigeria although the result does not indicate the strength or the degree of the contribution. The results of the finding show that the past values of demand for education could be used to predict the future behaviour of economic growth in Nigeria. The findings and conclusion of the study however stressed the special needs for Nigerian policy makers to promote education as effective ways to combat illiteracy, poverty, hunger and disease and stimulate growth that is truly sustainable and to develop and implement strategies that give young people everywhere a real chance to find decent and productive work.

Keywords: demand for education, economic growth, illiteracy, poverty, spearman rank correlation coefficient

INTRODUCTION

As the world has entered the age of mass consumption of knowledge, the demand for education and human capital continue to increase at alarming rate. The world's most advanced economies and the emerging economies are currently experiencing profound high demand for education. The support for increase in the demand for education is matched by the available data on school enrollment world wide. In China for example statistical surveys show school enrollment increasing at all levels from 1993 to 2000s. The percentage of children who eventually enter lower secondary school (grades 6-9) increased from 66% to 72%, and the percentage that entered upper secondary school (grades 10-12) increased from 23% to 31%. The vast majority of children in Vietnam attend primary school, but even there the enrollment rate increased by 5 percentage points across survey rounds. These recent increases in enrollment stand in sharp contrast to the changes that took place from the late 1980s to the early 2000s. Although income growth in many nations was also robust during this earlier period, school enrollment continue to increase. The official rates reported in the UNESCO statistical yearbook and rates calculated using retrospective data from the 1997-98 VNLSS show that from 1988-93 the secondary gross enrollment rate fell from 44% to 32%, but rose steadily thereafter. The Africa development statistics

show a similar trend, although the timing is somewhat different.

The trend of school enrollment in Nigeria is similar to what obtains in the emerging economies. Primary education in Nigeria refers to the education which children receive from the age of 6 years to 11 years plus. It is the foundation level of the educational system which runs for six years, and it is aimed at developing basic literacy, numeracy, communication skills and transmission of the culture of the people to younger generations. Information gathered through the education data bank shows that as at 1998, there were 41,814 primary schools with an enrolment of 16,348,324 (13.75% of these were females) and 468,770 teachers (26.45% of these were non-qualified teachers). The teacher/pupil ratio at the level was 1:38 while the completion rate was 64.1 percent and the transition rate of products to Junior Secondary Education level was 39.1 percent. The structure of our population in Nigeria is such that about 45% of the people are within the age bracket of six to twelve years. According to the provisions of National Policy on Education, this is the corresponding age group for primary education. Obviously, the enrolment pattern in the Nigeria educational system follows the pyramidal structure of the nation's population distribution. The primary level has the largest enrolment, followed by the secondary

level and then the tertiary level. This enrolment structure, no doubt, depicts the structure of our social demand for the various levels of education.

Turning to the role of education in the growth process; education is a very vital aspect of any nation's contemporary and policy issues being a versatile variable for economic growth, which explains a good percentage of the average annual increase in labor productivity. Thus there seem to be a significant correlation between formal educational achievement and productivity. Some economists see reason to believe that in today's world economies many skills and capabilities come by way of learning through formal and informal education, within and outside schooling altogether. The central idea is that the successful completion of education is a signal of ability. The dominant model of the demand for education is however based on human capital theory. The reason is that undertaking education is investment in the acquisition of skills and knowledge which will increase earnings or provide long-term benefits. An increase in human capital can follow technological progress as knowledgeable employees are in demand due to the need for their skills, whether it be in understanding the production process or in operating machines. Studies from 1958 attempted to calculate the returns from additional schooling (the percent increase in income acquired through an additional year of schooling). Later results attempted to allow for different returns across persons or by level of education. Statistics have shown that countries with high enrollment/graduation rates have grown faster than countries without. The United state has been the world leader in educational advances, beginning with the high school movement (1910–1950) (Eric 1986). There also seems to be a correlation between gender differences in education with the level of growth. More development is observed in countries which have an equal distribution of the percentage of women versus men who graduated from high school.

OBJECTIVE OF THE STUDY

A mere perception of the data on education and economic growth suggest that, education should contribute meaningfully to labor productivity. But in some world economies it could be that we have this causality relationship backwards. For example, if education is seen as a luxury good, it may be that richer households are seeking out educational attainment as a symbol of status, rather than for their educational attainment leading to productivity and efficiency. Nigeria seems to be an example of such country. It is worrisome to realize that despite the increase in the demand for education in Nigeria, labour productivity appears very low. Up till now; graduates of specialized education especially in engineering are unproductive. Nigeria continues to rely heavily on Germany, Japan, China etc for

electrical and electronics, automations and automobiles in spite of the millions of graduates that have been produced in these areas. The poor delivery of the technical Know-how in Nigeria is all the more worrisome. There is thus the research need to investigate the causality relationship between demand for education and economic growth in Nigeria. There is also the research need to ascertain the trend in school enrollment. What is the role of education in growth process? Are increases in school enrollment correlated with the economic growth? What is the size and magnitude of the correlation coefficient between school enrollment and economic growth? These queries motivate the quest for empirical verification and quantification of the issues raised with respect to role of education in the growth process of Nigerian economy. It is therefore the objective of this paper to investigate the causality relationship and correlation between the demand for education and economic growth in Nigeria using spearman rank correlation coefficient approach. The paper is therefore organized as follows. Following the introductory section, Section 2 reviews the literature. The methodology of the study is discussed in Section 3. A correlation analysis of the demand for education and economic growth of Nigeria is considered in Sections 4. Finally, Section 5 presents the summary and conclusions of the paper.

LITERATURE REVIEW

There is a large literature on the demand for education in developing countries. The focus in some cases is on the market-determined demand for education. Handa (1996) saw it as the major regulator of individual's demand for education. However, and according to Colclough (1994), there is an equally important non-market component to the demand for education, especially for rural children. These non-market factors manifest themselves through households' characteristics that affect the time and opportunity cost of schooling. Indeed, the role of education in fostering economic growth is well recognized in the literature. Thus, the justification for higher demand for education is often based on its impact on (a) individuals' lifetime incomes (i.e., the social rate of return). Authors like; Psacharopoulos, (1985,1994); Anyanwu, (1996, 1998a) testified to this in their findings. The relationship between the demand for education and economic growth have been discussed by authors like Levine and Renelt (1992); Mankiw et al., (1992); Anyanwu, (1998b); Barro and Sala-i-Martin, (1995); Barro, (1996a, b); Sala-i-Martin, (1997); Duflo, (2001); and Coulombe et al, (2004). The fostering economic development and poverty reduction in general were examined by Romer, (1986); Lucas, (1988); Squire (1993); Ravallion and Chen, (1997); Sen, (1999); and Schultz, (1999). On education capital and growth, Bassanini and Scarpetta (2001), Bils and Klenow (2000), and Sianesi and Van Reenen (2003) estimated

that an additional year of schooling raises the growth rate by 0.3 to 3 percentage points per year. Measures of educational attainment reflect the knowledge and skills, or human capital, of the population. Recent research shows that the impact of human capital and education on economic growth in World Education Indicators (WEI) countries may be even stronger than in OECD countries (OECD/UIS, 2003). Overall, the WEI (OECD/UIS, 2003) study results indicate that for every single year that the average level of schooling of the adult population is raised there is a corresponding increase of 3.7 percent in long-term economic growth. Education has also been found to play a crucial role in the adoption of new agricultural technologies (Foster and Rosenzweig, 1996). In addition, education is seen as a means to improve health and reduce fertility (Schultz, 1999 and 2002; Strauss and Thomas, 1995), being an intrinsic good in itself (Sen, 1999). Behrman (1999), and Glewwe (2002) provide recent reviews of the microeconomic literature on the impact of education on income and other outcomes in developing countries. This support for education among economists is matched by equal or greater enthusiasm among development policymakers (UNDP, 1990; World Bank, 2001). One example demonstrating the focus policymakers have placed on education is that two of the eight Millennium Development Goals (MDGs) adopted at the United Nations Millennium Summit in September 2000 focus on education: first, for all children to complete primary school by 2015, and second, to achieve gender equality at all levels of education by 2015. The Millennium Declaration also stressed the special needs of Africa, and called upon African governments to promote gender equality and the empowerment of women as effective ways to combat poverty, hunger and disease and to stimulate development that is truly sustainable and to develop and implement strategies that give young people everywhere a real chance to find decent and productive work. Further, they called on nations to support the consolidation of democracy in Africa and assist Africans in their struggle for lasting peace, poverty eradication and sustainable development, thereby bringing Africa into the mainstream of the world economy.

Chow and Shen (2005) investigated the relationship between educating spending and economic growth in china. Their paper offers an explanation of the quantitative changes in education spending by the framework of demand analysis, including the changes in the ratio of educational funding to GDP in the period 1991-2002. Growth effect is estimated mainly by using cross-provincial data, while time series data were used to estimate the price effect. Changes in government and non-government spending through time were satisfactorily explained by the income and price effects. Demand for education services in the three levels of primary school, secondary school and

higher education and aggregate demand for all education services were equally investigated. They found low price elasticities of demand for secondary and primary education realizing that since primary school education is compulsory, price has limited effect on enrollment. The estimated education variable has the wrong negative sign implying that higher education spending did not contribute to growth in China.

METHOD AND MATERIALS

Spearman Rank Order Correlation Model

Spearman Rank Order Correlation is most useful when a researcher might be willing to investigate a relationship between two variables and such variables may be qualitative so that the relationship between them cannot be measured numerically. For such cases Spearman Rank order correlation can be used. In using the spearman Rank order correlation, we assign rank to the data and measure the relationship between their ranks instead of their actual numerical values. The formulae for computing such relationship is given as:

$$r^1 = 1 - \frac{6\sum D^2}{n(n^2-1)}$$

This formula is applicable under the following assumptions:

- (i) There are two variables to investigated say X and Y
- (ii) There is a random sample of n pairs of the two variables, which can neither, be numeric or non-numeric
- (iii) Each of the variables is ranked relative to all the positive values of the variables are ranks are denoted by R(x) and R(y).
- (iv) Where a value occurs twice, each value will be assigned the mean of the rank for which it is tied. For example, if 40 occurs twice and it occupies the 7th In the ranking, then both values should occupy 7th and 8th i.e. $7+8 \div 2 = 7.5$, therefore each value should be assigned 7.5 in the array.
- (v) Ranking can either be in ascending or descending order. The same rule must apply in either case.
- (vi) The values of r^1 may assume range from +1 to -1. When $r^1 = 1$, it denotes a positive and direct relationship between the two variables X and Y. when $r^1 = -1$, it denotes an inverse or negative relationship between the two variables. Where no relationship exist between the two pairs of the variable, $r^1 = 0$.

The hypothesis

The recent trend in demand for education in Nigeria shows that people are quite interested in education. It is instructive to investigate the correlation between this trend and the growth in output. Based on these we can set up the hypothesis.

H₀: there is no relationship between the demand for education and gross domestic output

H₁: there is a relationship between the demand for education and gross domestic output.

DATA ANALYSIS AND DISCUSSION

The ranking of 29 samples of the demand for education and gross domestic output are shown on the table below.

Table1: Demand for education and growth rate output in Nigeria

Year	Demand for Education	Ranking	GDP	Ranking	D	D ²
1980	18.0	16	4.1	7	9	81
1981	18.0	16	-26.8	1	15	225
1982	18.0	16	-0.3	11	5	25
1983	18.0	16	-5.4	6	10	100
1984	18.0	16	-5.1	6	10	100
1985	34.0	3	9.4	2	1	1
1986	34.0	3	3.1	8	-5	25
1987	27.0	9	-0.5	10	-1	1
1988	26.5	9	9.9	1	8	64
1989	24.0	10	7.4	4	6	36
1990	24.9	11	8.2	3	8	64
1991	25.9	10	4.7	6	4	16
1992	28.9	7	3.0	8	-1	1
1993	31.2	5	2.7	8	-3	9
1994	33.2	4	1.3	10	-6	36
1995	32.2	5	2.2	9	-4	16
1996	34.0	3	3.4	8	-5	25
1997	33.3	4	2.9	8	-4	16
1998	33.8	3	2.6	8	-5	25
1999	24.0	10	2.8	8	2	4
2000	34.9	2	3.8	7	-5	25
2001	35.5	1	4.6	6	-5	25
2002	36.0	1	3.5	7	-6	36
2003	35.5	1	10.2	1	0	0
2004	35.0	2	6.6	4	-2	4
2005	35.0	2	6.5	4	-2	4
2006	35.0	2	6.0	5	-3	9
2007	35.0	2	6.5	4	-2	4
2008	35.0	2	6.4	5	-3	9
ΣD ²						986

$$r^1 = \frac{1-6 \sum D^2}{n(n^2-1)} = \frac{1-6(986)}{24360}$$

$$r^1 = \frac{1-5916}{24360}$$

$$r^1 = 1-0.2428571 = 0.7571429 = 0.76$$

DISCUSSIONS

The result obtained from the estimation demonstrates a positive correlation between demand for education and the level of growth in Nigeria. It offers an explanation for the quantitative changes in the demand for education by the framework of increase in school enrolment in the period 1980-2008. This implies that higher school enrolment does contribute to growth in Nigeria although the result does not indicate the strength or the degree of the contribution. The study results indicate that for every single year that the average level of schooling of the youth and

adult population is raised there is a corresponding increase in long-term economic growth. This result is similar to the one obtained by Bassanini and Scarpetta (2001), Bils and Klenow (2000), and Sianesi and Van Reenen (2003) which found that an additional year of schooling raises the growth rate by 0.3 to 3 percentage points per year in OECD countries. According to their findings, educational attainment reflects increase in the knowledge and skills, or human capital, of the population and contributes positively to productivity and growth.

CONCLUSION AND RECOMMENDATION

Our findings provide justification for higher demand for education in Nigeria. It implies that higher educational attainment has the potential to impact positively on (a) individuals’ knowledge and skills (b) individuals’ lifetime incomes (i.e., the social rate of return) (c) adoption of new agricultural technologies and (d) means to improve health and reduce fertility. The findings and conclusion however stressed the special needs for Nigeria, and called upon the governments to promote education as effective ways to combat illiteracy, poverty, hunger and disease and to stimulate development that is truly sustainable and to develop and implement strategies that give young people everywhere a real chance to find decent and productive work. Further, we call on government to implement the UN recommendation on the funding of education and also align with the Academic Staff Union of University (ASUU) in their struggle for higher budget allocation to education in order to providing lasting solution to education malady, illiteracy eradication and sustainable development, thereby bringing Nigeria into the mainstream of the world economy.

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