# The Impacts of Higher Education on Economic Growth in Kenya: Cointegration Analysis

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*Abstract:* **Knowledge antagonism within a globalizing economy is prompting a fresh consideration of the role of education in development and growth. The Government of Kenya spends over 30% of its budget on education to cater for free compulsory education and subsidized secondary education. It is commonly assumed that education has an important positive effect on economic growth, but as to whether education at different levels and economic growth in Kenya has a significant relationship has been a point of contention among different scholars. The paper presents an evaluation of the effect s of various levels of education on economic growth in Kenya. Explicitly, the study sought to determine the following: The effect of university enrollment on real GDP and the the effect of middle level colleges' enrollment on real GDP. The study adopted a correlational research design in which an evaluation was made to establish the degree and direction of relationship between the dependent variable (real GDP per capita) and the independent study variables using secondary data from the Kenya National Bureau of Statistics and Ministry of Education (1972 - 2010) for all the variables. It was hypothesized that education (various levels of the education system) does not significantly affect real GDP per capita in Kenya. The study employed multivariate co-integration methodology to evaluate the relationship among the variables. The relationship revealed that output from primary education has positive but insignificant effect on real GDP per capita while output from secondary education and enrolment in middle level colleges were positively and significantly related to real GDP per capita. Enrolments in universities were found to have a negative and significant effect on real GDP per capita. Based on the objectives, study recommends that the government should increase enrollment in schools education. It also recommends an increase in budgetary allocation to education as well as a review of the school curricula especially in universities with a view of making the education system more responsive to growth in Kenya and provide for jobs to avoid the negative impacts due to joblessness.**

*Keywords:* **Higher education, economic growth, Vector Error Correction Model.**

## 1. INTRODUCTION

**1.1 Background to the Study:**

Education is widely seen as one of the most promising paths for individuals to realize better, more productive lives and one of the primary drivers of national economic development. According to Adams and Bjork (1969), developing countries have a common belief that education can contribute to the goals of economic growth, nationhood and enhancement of human dignity. Many scholars therefore agree on the importance of education as a means of social and economic development. It affects how well individuals, communities and nations grow. It helps improve living standards, enhance the quality of life and can provide essential opportunity for all (Airy, 1972). In line with this, Kenya African National Union (KANU) in its manifesto identified ignorance as one of the problems to be tackled after Kenya's independence in 1963 (KIE, 2001). In the Sessional Paper Number 10 of 1965, the Kenyan Government committed itself to the eradication of ignorance, poverty and diseases. In the year 2001, the Kenyan Parliament enacted the Children's Act, which recognizes education as a basic right to all children. Thus, the Act states the responsibility of the parents and government in providing education to the child. This therefore shows that the Kenyan government holds education as a

major investment in the country. Since then, Kenya has undertaken rapid and massive expansion of education at all levels. It accounts for a major percentage of the country's Gross Domestic Product (Republic of Kenya, 1997)

In 2008, the government of Kenya unveiled a comprehensive and ambitious development plan aimed at transforming the country into a middle-income economy by 2030 (GoK, 2007) and political stakeholders are now trying to address some of the major challenges facing the country. But, judging by the current trajectory of growth and the state of higher education in particular, it appears increasingly unlikely this target will be achieved. Literature indicates the newly-industrialized economies including Brazil, China, India, Korea, Singapore, and Taiwan have previously struggled with issues broadly similar to those facing Kenya. These challenges include high levels of illiteracy, low GDP, low levels of funding for academic research and development (R&D), and brain drain due to non-returning students especially in Science Technology, Engineeering and Mathematics, STEM areas (Mazzoleni, 2008)

The commitment of governments in the provision of education shows that education is commonly regarded as the most direct avenue to rescue substantial number of people out of poverty owing to tendency of employment opportunities especially for higher skilled workers to be created (Babatunde & Adefabi, 2005) and which eventually leads to growth. It is perhaps in recognition of this that academic researchers and policy makers have been preoccupied with analysis of the effect of education on economic growth. As a matter of fact, the role of education in any economy is more crucial today than ever before because of the knowledge based globalised economy. Such attention is also rooted in the fact that productivity greatly depends on the quantity and quality of human resource, which itself largely depends on investment in education. In other words, investment in education leads to the formation of human capital, comparable to physical and social capital, and that makes a significant contribution to economic growth ( Pradhan, 2009).

### 1.1.1 Education and Economic Development:

Economic development is defined as the adoption of new technologies, transition from agriculture-based to industry-based economy, and general improvement in living standards.

Schultz (1961) observed that rich countries devastated in World War II were able to quickly employ massive amounts of new physical capital while the poorest countries seemed unable to successfully utilize even small amounts. He theorized that a nation's capability to productively use physical capital is a function of its level of human capital and that if human capital does not increase alongside physical capital, then economic development cannot proceed. Schultz further observed that human capital is more likely to be the constraint to development because foreign investors are eager to invest in physical capital but not in human capital.

The econometric studies provide very strong and consistent evidence that more educated workers are more productive and that they earn higher salaries (Psacharopoulos and Patrinos, 2004). These results support Adam Smith's view that acquired abilities are a form of capital.

### 1.2 Statement of the Research Problem:

While several studies have been conducted on the impacts of education and economic growth, no consistent evidence exists for a significance relationship between education and economic growth, in a positive or a negative direction. Results and evidence differ by countries, analytical method employed, and categorisation of public expenditures.

Glewwe (2007), observes that disparities in the findings of these studies arise from a host of issues which Include: Varied proxies of education and varied meanings attached to the concept of human capital, limited data availability are among the issues that have cast significant suspicion on the dependability of growth regression on human capital pointers, the problem of parameter heterogeneity where most growth studies assume the impacts of explanatory variables to be the same in all countries yet in reality; countries vary widely in their characteristics especially developed and developing economies and endogeneity problems where it is assumed that it is always growth in the economies is caused by education.

The contradicting output of the studies prompted the study which was set to investigate and fill the gap of varying output. This was through thorough diagnostic analysis and an analysis of the extent of cointegration between the variables and investigating the long run and short run relationships between the variables using three stronger statistical checks of data analysis i.e. the Error Correction Model, ECM. This is with the view of finding the conclusive relationship on whether education enrollment could enhance, or deter economic growth in Kenya on a given time period.

### 1.2 Key Research Questions:

The key question for the paper was:

1. Does education cause economic growth?

### 1.4 Objectives of the Study:

The paper sought to answer the fundamental question of whether or not there is a link between growth of the economy and education in Kenya.

The specific objectives can be stated as follows:

i. To determine the effect of economic growth rate of enrollment in middle level colleges on growth rate of real GDP per capita

ii. To determine the effect of economic growth rate of enrollment in universities on growth rate of real GDP per capita

### 1.5 Significance of the Study:

The findings and recommendations of this research will be very beneficial to policy makers in the education sector and other sectors concerned with economic growth. This is because the stakeholders in the education sector would be able to design policies that optimize benefits from various education levels. Further, the findings of this research will be of use as a reference material for the academicians who intend to carry out studies related to this subject.

### 1.6 Scope of the Study:

This study evaluates the effect of education on economic growth in Kenya for the period 1970-2015. The real GDP Per Capita has been used as measure of economic performance in this study and is the dependent or explained variable while the enrollments in middle level colleges and universities have been used as measures of human capital from these educational levels. Middle level colleges include Teacher Training Colleges, National Polytechnics, Technical Training Institutes, Institutes of Technology and Youth Polytechnics.

### 1.7 Limitations of the Study:

The research relied on time series data from reports and government publications where there was difficulty of timely availability of published data from the Ministry of Education and other agencies.

## 2. LITERATURE REVEW

The theories which support the paper include;

### 2.1 Basic Economic Growth Model:

In this model, the chief factors of production are capital and labor. Output is therefore expressed as a function of these two factors. At a macro level, the model function is represented by the formula: $Y = F (K, L)$ …………………..………… (1)

### 2.2 Harrod-Domar Growth Model:

Domar and Roy Harrod, both economists, individually crafted an economic growth model founded on a fixed-coefficient in the early 1940's. This function works on the premise that capital and labor are utilized in a constant ratio to each other to generate total output.

The model can be expressed as follows in equation

$Y = K/v$ …………………………………………...…… (2)

Where v is a constant computed by dividing capital (K) by output (Y) and referred to as the capital-output ratio. It is essentially a degree of the yield of investment or capital.

### Endogenous or New Growth Theory:

This theory was developed in the 1980"s with the aim being to define more accurately the characteristics of economic growth. The driving force behind this theory was that Solow"s model though correct and sensible was incomplete and therefore there was need to develop a more complete theory (Cortright 2001).

This theory is described by Cortright (2001) as an assessment of the economy that encompasses two key points: first, it sees technological advancement as a result of economic activity and second, endogenous theory, he quips, holds that as opposed to physical objects, technology and knowledge are characterized by increasing returnswhich determine the process of economic growth.

The most popular new growth model which is also the simplest has been the linear or AK model expressed as;

$Y\ C^{\alpha}\ H^{\beta} = AK$…………………………………….........(3)

Where Y, K and L represents Income, capital and labor respectively

**Empirical Literature:**

Some of the studies done on the impact of education on economic growth include;

Abdul Latif et al (2007), used standard co-integration technique and used time series data for Malaysia. The divided education into primary school, secondary school and tertiary education. The finding was that GDP is co-integrated with all educational variables indicating a positive relationship.

Ararat (2007), employed the use of endogenous growth model and a system of linear &log linear equations. He projected the importance of different stages of education in triggering significant growth Russia and Ukrainian economies. The results indicated that there was negligible impact of educational achievements on economic growth. He however found that tertiary education has favorable results for income per capita growth in the long run.

Self et al (2004), studied on how education affects economic growth in India. In the study, education was categorized into its various levels with the aim of finding out how each level had significance on the expansion of the economy. Educational variables were broken down into gender in order that he could carry out a further analysis to determine whether results would varied by gender. The findings were that education at primary level had a significant causal impact on growth in comparison to secondary level of education. He found that educating females at the various levels had the potential for causing growth of the economy while a causal impact on growth in males was only atprimary level.

Barro and Sala-i-Martin (1995), found that male education achievement specifically at secondary and tertiary stages had significant positive growth effects. They also find a relationship between GDP and human capital, which is generally defined to include health and education, so that economies that remain behind tend to expand rapidly when they have high levels of human capital.

Masaviru and Mudaki (2012), investigated the impacts of composition of public spending on economic growth. It was concluded that spending on education was a very significant booster of economic growth. They therefore recommended increased expenditure on education as one of the key pillar/determinant of economic growth in Kenya.

## 3. DATA ANALYSIS TECHNIQUES

**Research Design:**

This research employed a descriptive research design.

Econometric Model of Data Analysis

This study focus on effect of each education level on economic growth, so the model is specified as follows;

$GDP = \beta_0 + \beta_1\ MLC + \beta_2\ UNI + \varepsilon$   ………………………*(3.1)*

Where GDP is growth rate of real GDP per capita (as a measure of economic growth)

$\beta_0$ is a constant term

$\beta_1$ and $\beta_0$ are coefficients

MLC is growth rate of enrollments in middle level colleges

UNI is growth rate of enrollments in universities and $\varepsilon$ is the error term. The estimation for the equation was done on the log transforms of all the variables, thus allowing the study to interpret the coefficient as elasticities. Z-statistics were used to test explanatory power of the model.

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**Stationarity Test:**

Non-stationary data as a rule are unpredictable and cannot be modeled or forecasted. The results obtained by using non-stationary time series may be spurious in that they may indicate a relationship between two variables where one does not exist. The Dickey and Fuller (1979) and the augmented Dickey and Fuller (ADF) methodologies are popular methods of testing for the presence of a unit root (that is, absence of stationarity).

**Co-integration Test:**

Time series is said to be integrated of order d, I (d), if stochastic trends or unit roots can be removed by differencing the series d times and a stochastic trend only remains after differencing only d-1 times, (Lutekepohl, 2007). Accordingly, a variable without a stochastic trend or unit root is also said to be integrated of order zero, I (0). A set of variables of the same integration order d (typically 1), are said to be co-integrated if a linear combination of the variables exists which is I (0). In econometrics, two (or more) economic variables are said to be co-integrated if a long run, or equilibrium relationship exists between (or among) them. This study used Johansen Co integration rank test to test co-integration.

## 4. EMPIRICAL RESULTS AND DISCUSSIONS

The unit roots results in summary and the order of integration are as shown in table 4.0

**Table 1: Stationarity Test**

| ariables | ADF Test Value | Critical Value at 5% | Remark | Order of Integration |
|---|---|---|---|---|
| GDP | -3.820275 | -2.943427 | Stationary | I (1) |
| MLC | -6.012810 | -2.943427 | Stationary | I (1) |
| UNI | 4.722127 | -2.945842 | Stationary | I (0) |

Table shows that all the variables were stationary at first difference i.e. I (1)

**Table 2: VAR Lag order selection criteria**

| Lag | LogL | LR | FPE | AIC | SC | HQ |
|---|---|---|---|---|---|---|
| 0 | 253.2978 | NA | 3.12e-13 | -14.60575 | -14.38129 | -14.52920 |
| 1 | 290.4621 | 61.21176 | 1.56e-13 | -15.32130 | -13.97451 | -14.86200 |

Basing results in table 4.4 the study employed the use of one lag in the subsequent analysis.

**Table 3: Unrestricted Cointegration Rank Test (Maximum Eigen value)**

| Hypothesized No. of CE(s) | Eigenvalue | Max-Eigen Statistic | 0.05 Critical Value | Prob |
|---|---|---|---|---|
| None * | 0.639748 | 24.81240 | 23.87687 | 0,0397 |
| At most 1 * | 0.553888 | 17.44430 | 16.58434 | 0.0521 |

The table above shows that there is only one cointegration equation in the long run

**Table 4: Cointegration Equation**

| | Coef. | Std. Err. | Z | P> 1-z | [ 95% Conf. |
|---|---|---|---|---|---|
| Dgdp | | | | | |
| mlc (LD.) | 0.36874 | 0.0118598 | 0.31 | 0.0031 | 0.0195573 |
| uni (LD.) | 0.21313 | 0.0269705 | -0.42 | 0.0045 | 0.0641741 |
| | constant | 0.0004798 | 0.0017737 | 0.0035 | 0.787 |

The result for the vector error correction model table 4. From the table, it can be seen that the both Middle level Colleges and university are positively and statistically significant at 5% level of significance with P values of 0.0031 and 0.0045 respectively .This shows that a unit increase enrollment at middle level college results into an increase of GDP by 36.874% while a unit enrollment at the university level results into an increase in GDP by 21.313%.

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## 5. CONCLUSION OF FINDINGS

Education plays a vital role in economic growth. The objective of the study has been to evaluate the impact of education on economic growth in Kenya. The study employed the use of Johansen cointegration methodology to determine the relationship among the study variables.

The results show that education in middle level colleges as well as university level affect economic growth at 5% significance therefore this implies that long run relationship exists between the variables.

**Policy Recommendations:**

The paper proffers the following recommendations;

Based on the findings of the study, various recommendations were made. It is recommended on the basis of findings of this study that the Kenyan government should keep education a top priority in public policies more enrollment should be encouraged and an increase in budgetary allocation to education.

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