EDUCATION AND ECONOMIC DEVELOPMENT

A Cross-Country Study

In Partial Fulfillment of the Requirements for a Master of Arts in Peace and Development

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Abbreviations

EFA- Education For All

GDI- Gender Development Index

GDP- Gross Domestic Products

GNI- Gross National Income

GPI- Gender Parity Index

HDI- Human Development Index

IMF- International Monetary Fund

MDGs- Millennium Development Goals

PPP- Purchasing Power Parity

PRSP- Poverty Reduction and Strategy Paper

SAP- Structural Adjustment Programme

UN- United Nations

UNDP- United Nations Development Programme

UNESCO- United Nations Educational, Scientific and Cultural Organisation
Abstract

Debate on whether there exist a relationship between education and economic development abound. Some scholars have the view that education is a prerequisite for economic development: education is seen as a key for enhancing labour efficiency and people’s potentials in terms of skills and income, and education can also be used to promote democracy. Other scholars say that there is no convincing evidence of the contribution of education to economic development. However, studies have mainly been done in developed countries, reviewed literature showed that there is scant information on cross-country research that has been done in Africa.

The paper used regression analysis and qualitative methods. The study revealed that countries that invested a lot in education and had high levels of human capital were also economically strong. The study also revealed that investments in schooling take long to materialize. This study also discovered that the correlation between education and economic development is covariant, the stock of human capital is necessary in order for the productive sectors of the economy to grow, in turn the growth of the productive sectors leads to more opportunities for human resources to develop and apply their skills and talents.

The results further showed that there was a correlation between the level of a country’s economic development and inequality both in the education sector and in society in general. This study discovered that the more developed a country is, the lesser the levels of inequality. The paper concludes that a stock of qualified human capital is the core of economic development, and hence developing countries ought to invest more in human capital.

**Key words:** Economic development, Education, Human capital Regression Analysis.
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CHAPTER ONE

This chapter gives an introduction to the research topic, as well as the general problem that will be treated in the paper. The chapter also discusses the significance of the study, the aim and the research questions.

1.0 INTRODUCTION

The discussion on the link between education and economic development is one of the most contested topics. Some have the view that education and economic development are intertwined and that the two cannot be separated, while others see no robust connection between the two. The proponents of the link between education and economic development see education as a key for enhancing human capital efficiency and potentials in terms of skills and income, and that education can also be used to promote democracy. Education is also seen an important tool for improving people’s health status, reducing inequality and fertility among others. Improved health status of people results in high productivity, and this raises national income and growth (Barro, 1998; Aghion et al 1999).

Human capital is thus perceived as one of the most important assets in augmenting inequality and poverty, therefore investing in human capital through education is seen as one way of improving people’s lives by enhancing their functioning and contribution to societal wellbeing. The proponents of the link between education and economic development cite the United Nations as one of the institutions that have recognized education as a fundamental human right under the Declaration of Human Rights in 1948. Another organization that is cited as prioritizing education as a prerequisite for economic development is the World Bank, an example of the World Bank’s commitment to promoting education was the provision of US$50 million to the government of Ethiopia to help in the funding of the General Education Quality Improvement Programme (GEQIP). The rationale behind the investment is that improvement in people’s education status would ultimately result in reduced social problems such as poverty- both directly and indirectly (Aghion etal, 1999; Sen, 1999; www.worldbank.org).

Further some economists argue that education is important in the development process. For example Judson (1998) states that labor economists’ interests on the linkage of education and growth is to see how education affects a person’s competitiveness on the labor market while developmental economists focus on how education impacts on the developing economies. As
for the growth economists, their interest is to see how the investment in education results in increased earnings of individuals.

However, much of what has been written on the link between education and economic development has mainly concentrated on the role of human capital and economic growth. Further, early scholars such as Adam Smith, Heinrich Von Thunen and Alfred Marshall among others recognized the importance of the relationship between economic development and human capital development through education (Permani, 2009).

Much of the literature and public discussion about education and economic development is centered around what Todaro and Smith (2010) say: “the interaction between economically motivated demands and politically responsive supplies in determining how many quality school places are provided, who gets access to these places, and what kind of instruction they receive and, the important distinction between social and private benefits and costs of different levels of education and the implications of these differentials for educational investment strategy” (ibid:387).

On the other hand, some scholars such as Nwomonoh (1998) state that there is no robust relationship between education and economic development. Nwomonoh states that there is an ever-increasing unemployment among the educated in most of the developing countries. Data from Pakistani, Peru and Sudan show that unemployment increases with the years spent at school. Kenya shows that the unemployment rates are higher among graduates from higher levels compared to those from lower levels. It is also argued that education has no direct effect on both growth and productive capacity (Permani, 2009).

Nwomonoh (1998: 14-15) states that in developing countries social networks play an important role in allocating jobs, hence, some graduates have to wait until they get connected by their peers to get a job. “Underdevelopment is also exacerbated where secondary-school leavers take jobs once only done by primary-school graduates. Moreover, there are students seeking entry into fields such as engineering and business studies that are experiencing great unemployment” (ibid). The above evidence shows that education does not always make a positive contribution towards job creation and economic development in general. The argument is that “differentials between occupations cause the high unemployment” (ibid).

Therefore, the net effect of education on economy is that it affects the distribution of income. As much as education increases the chances of social mobility and income, it also serves to
widen the inequality gap between the educated and the uneducated (Simmons, 1980 cited by Nwomonoh, 1998).

1.1 Problem Statement

As already alluded to in the introduction, there are disagreements among scholars on whether there exist a relationship between education and economic development, and whether the former is a prerequisite or an outcome of the later. Some have the view that education is as an important tool for addressing social problems such as inequality and poverty. It is argued that education improves people’s lives and their functionality in society so that they are able to contribute to the welfare of society. On the basis of the above, education is considered as a prerequisite economic development (Barro, 1998). Aghion et al (1999) see education as an important tool for improving people’s health status and fertility among others. Improved health status of people results in high productivity, and this raises national income and growth. Michealowa’s (2000) view is that education has “ripple effects” in the economy. His argument is that education not only benefits those who are educated but those who learn indirect from the educated, apart from that, they also benefit from increased income of the educated.

Other studies found that there is no convincing evidence of the contribution of education to economic development. A study done in Hong Kong revealed that education was “only considered as a pre-condition for long-run economic growth, indicating no urgency for investing in education” (Haulman, 1996; Chen, 1997 cited by Permani, 2009:13). For Easterly (2006: 299-303) education is rather just one of the indicators used to measure economic development in a country. He thus perceives education as an outcome of economic development.

According to Seetanah, (2009) Africa recorded high enrolment rates between 1960 and 1995. In the former year, the average gross primary school enrolment was 40%, this figure doubled in 1995 to 80%. The increase in secondary school enrolment was eightfold, from 3.4% to 27% during the same time. During the same period, Africa lagged behind the rest of the world in terms of economic growth. According to Bloom and Sachs (1998) per capita income growth averaged 1.5 percent in the 1960s while in the 1970s and 1980s it averaged 0.8 percent and 1.2 percent respectively. Further, 15 of the 20 poorest countries in the world in 1996 were
found in Africa, and 47 percent of the Africa’s inhabitants lived in abject poverty – less than US$1 per day (ibid).

In the Sub-Saharan Africa, the literacy rates for women were 52% while that of men were 68.9% on average in 2002. However, these literacy rates vary from country to country; for example, it is less than 20% in Niger and Burkina Faso while in Zimbabwe, South Africa, Seychelles and Mauritius it is over 80%. Within the Southern Africa region all countries (except Angola and Mozambique) have very high enrolment rates. This is however not the same in the countries bordering the Sahara desert, these countries have lower enrolment rates. Ten countries in the Sub-Saharan Africa have secondary school enrolment of about 8% while the rest of the countries have enrolment rates slightly exceeding 20%. “Enrolment rates in higher education in Sub-Saharan Africa are by far the lowest in the world. Although the gross enrollment ratio increased in the past 40 years – it was just 1% in 1965- it still stood at only around 5% in 2002” (Seetanah 2009: 147).

In terms of economic growth during the period 1985 to 1996, per capita growth rate was around -0.6 percent per year; 21 of the 42 countries whose data was available experienced a decline in their per capita income. Over the same period western countries, Latin America and Asia experienced per capita growth rates averaging of 14.9 percent, 7.4 percent and 5.9 percent respectively. However, a few African countries experienced success, countries such as Equatorial Guinea and Mozambique had average growth rate average of 8.4 percent and 5.9 percent respectively. Others such as Botswana and Mauritius had average growth rates of more than 4 percent while Uganda had an average grow of 3.3 percent (Bloom and Sachs, 1998).

Africa’s overall slow growth rate in the midst of intensive efforts over the years is a source of concern. Education levels seem to be increasing but most countries experience slow growth rate. However, as earlier alluded to, there were a few success stories among some countries (Equatorial Guinea, Mozambique, Botswana and Mauritius). The above paradox (growth in education levels but slow economic growth rates) has an implication on the debate on the linkage between education and economic development.

One perspective on the linkage between education and economic development recognizes the important role that education plays in economic development of a country while the other perspective states that there is no convincing evidence of the relationship between education
and economic development. Education is seen as one of the indicators (outcomes) of economic development, and not a prerequisite. Scholars such as Mackintosh (2004) state that there is a link between education, poverty and inequality. Education systems in most African countries are built on the already existing social structures that carry inequalities with them. Thus education systems can perpetuate inequality- especially when factors such as gender are not taken into consideration (ibid). Further in Africa, there are very few empirical studies that have been done on the importance of education in economic development. The field still remains under researched in Africa. The above stated reasons make Africa an interesting case to study the relationship between education and economic development.

1.2 Significance of the study
Debate on whether there exist a significant relationship between education and economic development abound. Studies on the relationship in developing countries especially Africa have been scarce, reviewed literature showed that there is scant information on cross-country research that has been done in Africa.

This study was thus carried out in the field of Peace and Development because of the perceived importance of education on the citizenry. It is said that educated people can better take control of their lives and can better make rational political decisions. Hence, empirical evidence from this study may add new insights to the debate on the linkage of education and economic development, with particular reference to African countries. It is also hoped that this study will contribute to the understanding of the importance of increasing budget allocation to the education sector by the developing countries in order to ensure that access and participation is granted to the whole population, having in mind that the benefits of education are perceptible in the long term.

In addition, it was envisaged that the study would supplement the existing body of literature in a way. The study is also significant in the sense that most of the studies on the relationship between education and development have concentrated on the growth regression frameworks; reviewed literature shows that there is no study that has been done on Africa that has used a combination of qualitative and quantitative methods, and this was the method approach that this study adopted. Furthermore, this study departed from the previous studies in the following ways: first I used regression analysis (curve estimates), second, educational index was used as opposed to using only educational attainments and/or literacy rates. Third, I
focused the study in the recent past covering the time period 1992 to 2005, and statistics on countries were based on the 1992 and 2005 HDI reports.

1.3 Delimitation
The study focused on certain aspects of development and education. Since development is multidimensional, the study focused on economic development with an emphasis on GDP per capita. Inequality was also considered, however, it was restricted to gender inequality. The rationale for focusing on gender inequality was that education, development and inequality are intertwined. On education, as much as education involves both formal and informal, this study considered only formal education- measured by educational attainment, completion rate and adult literacy.

1.4 Aim
The general objective of the study was to determine the relationship between education and economic development. The relationship was determined at global and regional level using regression analysis while qualitative methods were used to determine the relationship on seven African countries that formed the case studies.

1.5 Research Questions

1. What is the relationship between education and economic development?
2. How does economic development affect the relationship between education and inequality?

1.6 Limitations of the Study
This study had its own limitations, among the major ones encountered were:

- It was difficult to find some statistics on both education and economic development on some cases.
- Data collection from the UN agencies had limitations, for example one of the documents (UNESCO, 2011) stated that statistical systems in some countries especially the developing countries were weak and that the coverage and the definition of variables differed among many countries.
- It was difficult to compute regression analysis on North America owing to the small sample size, so this region was not included in the regression analysis section.
1.7 Theory
The theory used in this thesis is the endogenous growth theories pioneered by Paul Romer and Robert Lucas. In this theory, human capital is considered as a key factor of production and knowledge acquired through education or learning by doing is the core of economic growth. Thus the differences in growth rates among different countries is as a result of the differences in human capital stock, so that the higher the human capital stock, the more developed an economy is likely to be (Aghion and Howiit, 1999).

1.8 Methods
This was a desk study that relied on the available literature on the relationship between education and economic development. The study used both quantitative and qualitative methods. Regression analysis was used as a quantitative method in determining the relationship. Quantitative data was analyzed using SPSS while qualitative data was analyzed manually.

1.9 Thesis Disposition
The rest of the paper is organised as follows: the next chapter presents the theoretical framework. This section discusses the endogenous theory—this is the theory that guided the study. The chapter also has an in-depth discussion on the existing literature on the relationship between education and economic development. Chapter three covers the methods used in this study. Chapter four presents the findings of the study. The final chapter provides a discussion of the findings and conclusion of the study.
CHAPTER TWO

This chapter introduces the theoretical framework that guided this study and that was used to interpret the findings. This chapter also explores other studies that have been done on the relationship between education and economic development. Other than that the chapter contains definition of the major concepts used in the study.

2.0 THEORETICAL FRAMEWORK

2.1 Endogenous Growth Theory

The theoretical framework that guided this study is the endogenous growth theory. The rationale behind the choice of this theory was that it deals with the relationship between human capital and economic growth; hence it was fitting since this study also focused on the relationship between education and economic development. The theory was thus used in the interpretation of the findings of the study. Endogenous growth theory arose to build on the earlier neoclassical approaches to economic growth in the mid 1980s. In the 1950s the Solow-Swan model identified labour and technological advancement as one of the prerequisites of long term economic growth. Technological advancement was introduced in order to know how an economy could have more output with a given volume of inputs (Permani, 2009).

The Solow-Swan model argued that production increases with increased technological know-how and advanced technology. The rationale was that investment in human capital would result in high productivity, which would eventually lead to high profits and high earnings. This argument was mainly advanced by Schultz- who is said to be one of the pioneers of human capital theory. According to human capital, education was seen as a key factor in increasing the stock of human capital, and from that time (1960s) the “human capital in economic growth became very popular among economists” (ibid, 2).

However, in the 1980s, Paul Romer and Robert Lucas introduced the endogenous growth theory, and it was meant to build on the Solow-Swan model. According to this theory (endogenous), research, human resource development and education are important in the accumulation of technological knowledge (Oketch, 2006).

Romer and Lucas, just as the Solow-Swan model, believed that broad categories such as acquisition of knowledge and human capital were not subject to diminishing returns; they argued that investments in human capital and knowledge would spill over to the economy as a whole. Secondly, around the 1990s, they reformulated the Solow model, this time with an
emphasis that technological change was brought about by entrepreneurs who wanted to respond to market demands. They stated that any entrepreneur or entity that tries to respond to the needs of the market tends to invest more in research and development (R&D), so that they will always maintain an edge over their competitors. When using R&D, knowledge is translated into activities or goods and services that have practical value (Permani, 2009; Oketch, 2006).

Romer maintained that, if the education sector were strong, benefits would trickle down to other spheres of the economy, and to society in general. His general argument was that knowledge drives economic growth. Romer identifies three elements to differentiate knowledge and physical capital. He starts by asserting that acquisition and advancement of knowledge has a positive effect on production possibilities. He also believes that knowledge can never be hidden; once it is acquired, it must be shared for the benefit of all. Romer further argued that the initial acquisition of knowledge tends to be quite costly, but once that initial stage is complete, knowledge is often reproduced at a much lower cost (Oketch, 2006).

In addition, Romer argued that as much as a firm may double its input into research, that does not automatically result in the same amount of knowledge produced. Finally, he stated that new knowledge acquisition tends to be more profitable when it results in more efficient production. He believes that knowledge acquisition has many positive side effects. What is important for economic growth and development is to have a large number of people who are skilled; the more skilled people an organization has, the greater the economic growth and development will be. In other words, an economy with a large stock of human capital will undergo faster economic growth and development (Canton, 2000; Oketch, 2006).

Lucas’ contributions to the model were also centred on the accumulation of human capital. He argued that education and learning by doing were the two sources of human capital. He believed that growth could only be sustained with a high stock of human capital produced through education. Lucas further said that a country’s ability to innovate or catch up with advanced economies was dependent on the rate at which accumulation of human capital occurred. He thus stated that the differences in the levels of development in countries were mainly attributed to the different rates at which these countries accumulated human capital (Aghion and Howitt, 1999).
According to Lucas’ argument, governments should be investing more in human capital accumulation through education. This creates a positive correlation between education and economic development. In a nutshell, this model gives education a central role in the economic growth process (Canton, 2000). The endogenous theory thus makes a good link between knowledge accumulation and economic growth. Thus it was fitting to use this theory in testing the relationship between education and economic expansion.

2.2 Definition of Concepts

2.2.1 Development
Development is a multidimensional concept that has been defined differently by different people. From the traditional perspective, development was perceived to mean the steady and sustained annual growth rate of 5% to 7% or more of gross national income of a national economy. The above definition of development was seen to be more tailored towards economics leaving out the social aspect, so during the 1970s, the definition of development changed so that it came to be defined in terms of reducing “poverty, inequality, and unemployment within the context of a growing economy” (Todaro & Smith, 2010:14-15).

The definition of development by Todaro and Smith (2010) that defines development within the context of reducing poverty, inequality and unemployment was the one used in this paper. The rationale for choosing this definition was that education, development and inequality are closely connected. According to Unterhalter (2005) some social institutions can perpetuate inequality. For example gender imbalance in the education sector determines the gender differences in labor market participation and income outcomes, and this has an impact on the broader development goals. Hence, it was fitting to use the definition of development as advanced by Todaro and Smith.

Scholars such as Amartya Sen have defined development in terms of human goals. Sen uses what he calls the capability approach in defining development. He (Sen) argues that in measuring poverty, it is important to not only measure it using income but the freedoms that a person enjoys also. He thus defined capabilities as “the freedoms that a person has in terms of the choice of functionings, given his personal features (conversion of characteristics into functionings) and his command over commodities” (ibid, 18). On the basis of Sen’s capability approach, development has been seen to include health and education aspects.
Apart from that, Sen (quoted by Todaro and Smith, 2010) argues that development “aims at improving people’s lives and also enabling people to enjoy freedoms.” According to Sen it is illogical to measure poverty in terms of income, what is important is what a person is or can do. He further stresses the need to look beyond commodities but that human wellbeing is important. On the basis of the above, it is clear that development cannot only be measured in terms of commodities.

O’Brien and Williams (2007) state that issues of development and economic growth stem from different motives, among them include; the desire to improve people’s living standards through eradication of poverty, and reducing inequalities. Development is thus both a process and a condition. It is a process in that it aims at transforming societies so that they are self-sustaining in terms of economic growth. Development is a dynamic process that strives to overcome social, political and economic challenges that societies face. However, when a society reaches self-sustaining economic growth, development is said to be a condition. The definition of development as a process and condition implies that it involves a transformation from a less to a more desirable state.

In making reference to the UNDP (1990), O’Brien and Williams (2007:297) state that the people are the real wealth of a nation, and hence, the hallmark of development should be to enable people live health and enjoyable lives. Because of that, the UNDP’s definition of development encompasses education, health and income. It is thus said to be holistic than only emphasizing on economic growth.

2.2.2 Measurement of Development

Concerning the measurement of development, there are different indicators that are used. Among the commonly used indicators include:

Gross National Income (GNI)

According to Todaro and Smith (2010:43) “gross national income is the most common measure of the overall level of economic activities. It is calculated as the total domestic and foreign value added claimed by a country’s residents without making deductions for depreciation of the domestic capital stock.” GNP does not take social and cultural aspects in its measure of development; hence, it takes a narrow view of development.
Development is also measured by Gross Domestic Products (GDP); this is the monetary value of goods and services produced in a country by both citizens and non-citizens. The difference between GDP and GNI is that while the former includes the value of goods and services produced within the country, the later includes the value of goods and services produced by the residents of a country both within and outside the country (ibid).

This paper used GDP per capita as the measure of development. It is defined as the monetary value of goods and services produced in a country divided by the total population (Todaro and Smith, 2010).

The United Nations Development Programme in 1990 came up with another measure of development which basis the classification of countries on human development. It goes beyond classifying countries on the basis of income to include- life expectancy and education. The countries are all ranked into three categories on the scale 0-1. The first group of countries with high a HDI are ranked from 0.8000 and above, and comprise developed countries. The second group comprises countries with an HDI of between 0.5000 and 0.7000 while the third group has an HDI of less than 0.5000 and is made up of poor countries (O’Brien and Williams 2007:297). The three domains used to measure development include longevity (number of years one is expected to live from birth), knowledge (adult literacy and the average age of schooling), and the standard of living (income) (Todaro and Smith 2010:49).

2.2.3 Education

Education has become a catchphrase among various stakeholders such as UN agencies and the governments. Most of them are interested in accessing the ability of their populations on how prepared they are to meet the challenges of the present knowledge based society. People are expected to utilize knowledge in order to not only maintain the ever-dynamic technologies but to foster their literacy skills in personal, social and economic development (Stigler, 1987).

Education is a multidimensional concept that encompasses the different categories and sectors. Formal education includes primary, secondary, tertiary and specialized training programmes. And this (Formal education) is the area of interest of this study. On the other hand an informal education system includes among others non-credit forms of education and
peer-learning systems that take place within a cultural setup or in a job (such as internships, apprenticeships, formal company training programmes and industrial related training).

**Adult Education**

Adult education is one of the measurements of education. Stigler (1987) makes reference to UNESCO’s definition of adult literacy as the ability of a person aged 15 years and above “who can with understanding both read and write a short simple statement on his everyday life. She further states that governments world over adhere to UNESCO’s definition of adult literacy, and that this is definition coupled with a grade completion usually the fifth grade.

**Gross Enrollment Rate**

Gross enrollment rate is the number of students enrolled in either a primary, secondary or tertiary institution regardless of age, “expressed as a percentage of the total population in the theoretical age group for primary, secondary or tertiary respectively” (www.worldbank.org).

**Gender Inequality in Education**

There is interplay between economic development, education and inequality. Educational attainments give a picture of the available knowledge and skills in a country. When the educational attainments are higher, the knowledge and skills in the labour force tend to be high also. In terms of participation in the economic activities, gender differences in educational attainments tend to determine gender differences in the labour market. Thus, one of the ways in which both males and females can be empowered is to raise their educational attainment. Unterhalter (2005) states that gender gaps in educational attainments are more pronounced in the developing countries than in the developed countries.

**2.3 Literature Review**

A series of studies have taken into account the positive relationship between education and economic development. Some of the studies have concentrated on the impact of education on economic development. Among the studies that show a strong link between education and economic development include:

Barro and Sala-i-Martin’s (1996) study focused on the relationship between educational attainment specifically on secondary and tertiary level and GDP. The study revealed that there was a positive correlation between education and growth. GDP grew by 1.1% per annum per
every 0.68 years average increase in secondary schooling while every 0.09 years increase on average in tertiary education resulted in 0.5% growth per year. Their conclusion was that countries with high stock of human capital tend to develop faster than those with less stock of human capital.

The above study is similar to a study done by Jenkins (1995) whose study was on the relationship between the index factor productivity and education attainment levels. The study discovered that for every 1% increase in educational qualification, GDP grew on average by 0.42% to 0.63%. Related to Jenkins’ study was a study done by Mingat (1998), the study focused on the investment in human capital such as education on economic growth in Hong Kong. The study revealed that the sustained growth that Hong Kong experienced was mainly attributed to massive investment in education. The study further revealed that the impact of education on growth was only felt after 20 years. Chandra’s (2010) study on causal relationship between education investment and growth in India for the period 1951-2009 revealed that there was a positive correlation between education and growth.

The case of Hong Kong relates to a research done in Venezuela by Fiszbein and Psacharopoulos (1992) that focused on finding the linkage between investment in education and GDP growth. The findings of the study were that investment in primary education yielded higher growth rate whereas investments in higher education particularly tertiary education had low returns. Their conclusion was that the cost of tertiary education tends to offset the benefits.

Permani’s (2009) findings were also concurrent with the findings of Jenkins, Barro and Salami-i-Martin, and Mingat, although Permani’s study was on the rapid development of the East Asian countries. The study used the data that covered the period 1965 to 1990. The findings of the study showed that economic growth in East Asia was mainly attributed to rapid development in the education system at all levels (primary, secondary and tertiary). The education system in all the countries saw the rapid enrolment rates, and this success in high enrolment resulted in high growth rates. The study concluded that the impacts of education were felt after a long period of time.

Related to the above study was a research done by McMahon (1998) on education and growth in East Asia. The study used endogenous growth models. The results of the study concluded that human resource development through education was central in the fast GDP per capita
growth in the region. The study further revealed that secondary education was key to the successful export oriented growth strategy that the countries in the region adopted.

De Meulemeester and Rochat (1995) carried out a cross-country study involving Japan, France, United Kingdom and Sweden on the relationship between higher education and economic growth. The study revealed that there was a positive correlation between education and growth in all the above-mentioned countries. Another study like that of De Meulemeester and Rochat that looked at different countries was the one done by Berg and Fink (2008). Their study involved a cross-section of countries showing how much GDP share was allocated by each of the countries towards education, and the effect that this had on economic growth. Their findings were that the countries that allocated a large share of their GDP to education, experienced high growth rates than those that had less allocations.

All the aforementioned studies focused on the linkage between education and GDP, they all revealed a positive correlation between education and growth. Further, all the above studies revealed that the effects of education on growth were felt after a long period of time.

Another group of proponents that argue that education is essential for the countries to be able to achieve high levels of development focus on the social benefits of education on individuals and society.

Matsuura (2002), Sachs (2008) and Balatti and Falk (2002) have similar views on the relationship between education and development. They all viewed the relationship in terms of education’s impact on people’s wellbeing. Matssura’s (2002) study used Amartya Sen’s ‘capability approach’ as point of departure. According to the (Matsuura’s) study, development happens when people are capable of achieving what adds value to their livelihood. Therefore, the ultimate goal of development is not only to promote, but also to expand the freedoms of what people enjoy. He calls these ‘valuable beings and doings’.

Sachs (2008) carried out a study that looked at the impact of education on health. Sachs discovered that education plays a pivotal role in population control. His argument was that education is critical in ensuring that girls are competitive on the labour market since this often leads to high income and lower fertility rates. At macro level, the relationship between education and development is seen in the sense that education is a valuable asset to the development of individuals in that it contributes to productivity. Thus, both Matsuura and Sachs viewed education as a valuable asset to people’s wellbeing.
Like Sachs’ study, Balatti and Falk (2002) focused on the impact of education on the wellbeing of people. They state that education leads to improving physical wellbeing of individuals through improved eating and increasing good health habits. Good health among citizens leads to less expenditure by governments so that the resources meant for the health sector are channeled to other sectors of the economy. Education also leads to employment and quality working life. This in turn can result in high income, savings and investments. These factors according to Balatti and Falk (2002) are the corner stone of development.

However, other scholars dispute the notion that there is a positive relationship between education and development. They state that there is no robust correlation between the two variables (education and development). Among them include Ansari and Singh (1997) who carried out a time lag study on public spending on education and growth. They used the data that covered the time period 1951 to 1987. Their findings were that there was no long run relationship between public spending on education and growth. The above findings relate to a study done by Pradhan (2009). Using data from 1951 to 2009, the study focused on investigating whether public spending on education in India corresponded to economic growth. The study revealed that there was no direct relationship between education and growth.

Other studies such as that by Brist and Caplan (1999 cited Permani, 2009) used cross-country studies to dispute the existence of a relationship. They used data from a study of 58 developing countries over a period of 8 years. Their conclusion was that “schooling enrolments were unable to explain cross-country variation in the growth rates of real GDP per capita, life expectancy, and fertility.” (ibid: 3). Another study similar to that done by Brist and Caplan was the one done by Hanushek and Kimko (2000) using data collected from 100 different countries from 1960-90. The results of the study showed that as much as there was a strong correlation between the quality of labour force and economic growth, the labour quality was not related to the investment in formal education in the countries studied. Thus, there was no direct relationship between education and growth.

Bosworth and Collins (2003) also used cross-country data to dispute the perceived impact of education on growth. They too like Brist and Caplan, and Hanushek and Kimko used data collected from 84 countries over a period of 40 years (1960-2000) to determine the relationship. Their findings were that 2.3% of the world’s growth was attributed to worker
output while only 0.3% was attributed to increased human capital, measured by education. They thus concluded that education was not necessarily a prerequisite of economic growth but rather an outcome.

In the same vein, Nampota et al (2009) argue that there is no clear relationship between education and development. Although they neither focused on cross-country data nor carried out a time series study, their findings collaborated well with the findings of Bosworth and Collins’, and Hanushek and Kimko’s study. Their argument was based on the analysis of data on scientists and engineers trained in different countries relative to their income. Their findings were that there was no relationship between their education level and income. The reasons cited were that there was no guarantee that getting higher education would lead to higher income, and development. They thus concluded that there was no convincing evidence that investment in education leads to economic development.

From the above studies, it can be noted that there is no agreement on whether the relationship does exist between education and, economic growth and development. This lack of agreement among the different scholars set the centre stage for this study.
CHAPTER THREE

This chapter discusses the methods used in the study, including how data was searched from the databases, and how the analysis was done.

3.0 METHODOLOGY

This was a desk study that used both a quantitative and qualitative methods focusing on the analysis of available literature on the relationship between education and economic development. The study used regression analysis when looking at the relationship (between the above-mentioned variables) at Global, Regional and quintile level. The study used time-series period by comparing educational index of 1992 and GDP per capital of 2005 with that of 2005 (both educational indg index and GDP per cepita). The rationale for comparing different time periods was to see whether there was any correlation between education and economic development. However, when focusing on the case studies, the study used qualitative methods.

3.1 Data Collection

The study was based on relevant literature relating to the issues under investigation. Various sources were consulted, and these included; Human Development Report of 2005 and 1992, official websites for UNDP, UNESCO, IMF and World Bank. Peer reviewed articles were also collected from Linnaeus University library databases. Journals were collected from databases such Academic Search Elite (EBSCO), BSP (Business Source Premier), Science Direct, DOAJ, and JSTOR. Others were LibHub, PAIS (Public Affair Information Service), Social Science Citation Index, Worldwide Political Science, and Google Scholar. Data was also collected from UNDP, IMF, World Bank and UNESCO’s official websites. Data was also collected from books.

The major key searching words for the articles from the databases were development, education, economic development, developing countries, human capital, and science and technology. I did searches using a combination of the above words. I also thoroughly went through all the articles to ensure that they were of appropriate quality, and I further searched all the journals’ websites to ensure that the articles were from peer-reviewed journals.
3.2 Case Studies

Africa has been one of the most discussed continents in terms of underdevelopment relative to other continents. Most African countries rank low on the HDI and their economic indicators leave much to be desired. Apart from that African countries exhibit great diverse when it comes to the level of development - countries such as Botswana, South Africa and Mauritius - to name a few - are doing well economically relative to other African countries.

3.2.1 Selection of Cases

This study selected countries as cases from different regions of Africa and with different levels of economic development. These include: Malawi and Botswana from Southern Africa; Nigeria and Ghana from West Africa; Tanzania from East Africa, Rwanda from Central Africa, and Egypt from North Africa. The rationale for choosing countries from different regions was to get a clear picture of what obtains in different parts of Africa in terms of the relationship between education and economic development. This made it possible to infer the findings to other countries.

3.2.1.1 Nigeria

Nigeria is Africa’s most populous country, Nigeria was included in the study for the following reasons; the country is a key producer of oil and gas; like most African countries, the economic impact of formal education has been the subject of debate. According to Oyelere (2010:328) “despite the massive increase in human capital investment via education,” Nigeria has not experienced significant economic development neither has it invested much in the education sector. In addition to this, the country is said to be experiencing lower living standards and real income for the many educated (in the midst of huge profits from oil and gas exports) relative to the period between 1983 and 1998. This situation has raised a lot of questions relating the relationship between education in economic development.

3.2.1.2 Botswana

It has been one of the most successful countries in Africa in terms of economic development. There are many factors that are attributed to its success, among them include the stable political system and sound economic management. The country has experienced tremendous economic growth and its expenditure on education has been increasing in the recent past. This is said to have led to increased enrolment rates at all levels of education, for example, in 1975 the primary school enrolment rates were 58 % and this increased to about 91 % in 1991.
There were also increases in enrolments at both secondary and tertiary level.

The growth in the enrolments rates is attributed to the government’s decision to abolish school fees at primary and secondary level in 1970s. At tertiary level, the government provides scholarships to all the citizens. Further, for many years, the education in Botswana is said to have been receiving a big percentage of its GDP (Siphambe, 1999: 292). The above scenario is different from what obtains in other countries that are also endowed with abundant natural resources like Nigeria. Thus it was ideal to include Botswana in the study.

### 3.2.1.3 Malawi

Malawi is one of the least developed countries in the world. The country is found in southern Africa. According to Wikeley et al (2008) arable land is one of Malawi’s main natural resources, and hence, the economy is mainly dependant on agriculture. The service and industrial sectors of Malawi are somewhat small. Like most African countries, Malawi has a small professional workforce relative to its demands.

The government has for sometime used different strategies to try and reduce poverty levels in the country. For this reason the country launched the Vision 2020 in 1997 that aims at making Malawi a middle-income country by 2020. The Vision 2020 is anchored on human capital development through education; hence, Malawi considers education as one the pillars to attaining economic development (ibid).

Further, the Malawi Poverty Reduction and Strategy Paper (PRSP) list human capital development as one of the ways of reducing the high poverty levels in the country. Wikeley et al (2008: 67) argues that “of all the pillars Malawi has adopted for poverty reduction, science and technology arguably affect all the pillars, and hence the need for expansion of both undergraduate and postgraduate education.” On the basis of the above, Malawi is an interesting case to consider on how education and Economic development are linked.

### 3.2.1.4 Ghana

Ghana is one of the countries in Africa that have experienced sustained economic growth of 4-6% between 2000 and 2006. The strong economic growth rate of Ghana are said to be trickling down leading to poverty reduction in the country. For example the poverty rate reduced from 52% in 1991/1992 to about 29% in 2005/2006. Because of this growth, Ghana is poised to meet the millennium development goals and to become a middle-income country.
However, the economic growth and reduction in poverty are said not to have resulted in the reduction of inequality and unemployment (employment is said to be predominantly informal) (Palmer, 2009).

The World Bank recently recommended that Ghana needed to invest highly in among others education. In response to the World Bank’s recommendation, the country came up with the New Education Reform that was aimed at meeting the needs of the industry and to sustain the economic growth of the country (Palmer, 2009).

However, despite the efforts that have been put in place in to ensure universal access of education in Ghana, the education system and the economic development are said to be benefiting the economically advantaged members of society (Rolleston, 2011: 338). It is thus vital to know how what the relationship is between education and economic development, taking Ghana as one of the case studies.

3.2.1.5 Tanzania

Tanzania developed its ‘Development Vision 2025’ that aims at making it a middle-income country by the year 2025. The vision recognizes the role of human capital in the form of education in its quest to achieve the middle-income status. In the early 1990s, Tanzania overhauled its education system in order to make it more responsive to the needs of the industrial sector. In particular, the country embarked at increasing the enrolments and gender balancing at all levels of the education system. The country further resolved to increase funding to the education system, in its entire quest, the country’s main focus was to enhance science and technology capacities especially at the tertiary level (UNESCO, 2005).

Despite the efforts and pronouncements that have been made about promoting education and economic development in Tanzania little has been done. The country is beset by both socioeconomic problems and the education is said not have made a big impact in the economic development of the country. However, on a brighter note, 39% of the students at tertiary level concentrate in the sciences (UNESCO, 2005). The scenario given above makes Tanzania an interesting study on the relationship between education and economic development.
3.2.1.6 Rwanda

Beginning the 1990s, Rwanda’s poverty reduction strategy paper has focused on reducing poverty among its population. The strategy also makes mention of the MDGs, and preliminary findings are that Rwanda is likely to meet some of the MDGs. With regards to education and training policy, Rwanda aims at meeting the goals of Education For All (EFA). Thus, in the PRSP Review from 2004, Rwanda considers the attainment of the MDGs and EFA as priorities within the education system. Education is thus considered as one of the tools the country intends to use in order to achieve socioeconomic development (Hayman, 2006).

Within the education system, Rwanda has placed much emphasis on expanding the tertiary education and science and technology at all levels of the education system. The rationale behind this is that the country lost a lot of professionals during the genocide as some were killed while others fled the country, hence the need to replace them so that they can drive the country’s economy to greater heights. Between the period 1990s and 2000, many public and private universities were opened so that skilled manpower could be trained in order for them to drive and attain long-term socioeconomic development (ibid).

From the above, it can be noted that Rwanda is making strides so as to achieve socioeconomic development- with an emphasis on education. It would thus important to see how the country has been performing, in terms of achieving development using its strategy of education. On the basis of the above, Rwanda was included in this study.

3.2.1.7 Egypt

Egypt has one of the strongest economies in Africa, the country embarked on Structural Adjustment Programme in the 1990s. This led to the reduction in expenditure in most social services such as education and health. The country later developed a strategy on education and training. This resulted in increased enrolments at all levels of the education system, and classes became overcrowded. The reason for introducing the education and training strategy was on increase the stock on human capital. The rationale was that with increased highly skilled human resource, the country would be better managing its socioeconomic affairs (Amin and Al-Bassusi, 2004).

Egypt’s desire to develop using different strategies, one of which is education makes it an interesting case to study the relationship between education and economic development within the context of Africa.
3.3 Data Analysis

Data analysis involved the use of two different approaches. The testing of the relationship between education and economic development at Global, Regional and Quintile level involved regression analysis, and was analyzed using a statistical package called SPSS while that involving case studies was analyzed manually.

3.3.1 Multiple Regressions on SPSS

Data on education and economic development from different countries was analyzed using SPSS version 18. This (SPSS) “is a computer programme designed to aid the statistical analysis of data” (Brace, et al, 2009:3). The programme is widely used by social science researchers in analyzing quantitative data that consist of measurements of different variables. Data on education and economic development of countries was entered in the Data Editor window and saved. The Viewer window was used to display and inspect the outputs. A data file was thus produced that contained the collected data that was used to perform multiple regressions (ibid).

In performing regression analysis the following procedure was done; I went to the top menu of the window, then clicked on Analyze after which I clicked on regression from the top down menu, and then curve estimates from the pop up menu. Then I selected the variables I was interested in- by clicking on it in the left hand panel of the curve estimates dialogue box. The variables were then moved to the desired boxes (dependent and independent). By clicking on OK, the model summary and parameter estimates were produced.

Thus, the study used regression analysis to establish a functional relationship between education and economic development. A functional relationship involves establishing a relationship of how a dependent variable depends on an independent variable. This study used multiple regression analysis that allowed in predicting a dependent variable with multiple independent variables. Regression squares which appears in the model summary, symbolized as $R^2$, was used, and it ranges from 0.00 to 1.00, with the later indicating the strength of the relationship between independent and dependent variables. It is important to note that $R^2$ does not indicate the direction of the relationship but rather measures the variations in the dependent variable that are explained by the independent variable. Thus this study used multiple regression analysis in predicting the relationship between education and economic development. Educational index was used as an independent variable while GDP per capita
was a dependent variable. A general pattern relating to education and economic development was established at the world level, then the regional level before dividing it using quartiles.

3.3.2 Qualitative Data Analysis

In analysis the case studies, I formulated questions in line with my objective and research questions- and I then applied the questions to all the cases, and compared the data involving all the cases. A matrix display was constructed which had questions in rows while the case studies were in the top columns with the responses below. Thus both education and development indicators from the cases were compared to see if there was any correlation in different countries (cases).

3.4 Reliability and Validity

Polit and Beck (2010: 106) define “reliability as the accuracy and consistency of the information obtained in a study. Statistical reliability is the probability that the same results would be obtained with a completely new sample of subjects- that the results are accurate reflection of a wider group than just a particular group of subjects. Validity on the other hand is refers to the degree to which inferences made in a study are accurate and well founded.”

With regards to this study, it was reliable in the sense that it relied on data from official documents from governments and international organisations such as the World Bank, UNDP, UNESCO, UNICEF and IMF. Further, the study measured the relationship between education and economic development at global, region and also the case studies. In addition the case studies were drawn from different regions of Africa, hence, having a good representation of all the regions. This study was also reliable and valid in that it used method triangulation- that is- the study used both qualitative and quantitative methods. Both methods have their own shortcomings, when used in combination they offset the shortcomings of each approach, and this helped in validating the conclusions.
CHAPTER FOUR

This chapter presents the results of the study. Both the findings from the regression analysis and structured focused comparison are presented under this chapter.

4.0 PRESENTATION OF FINDINGS

4.1 Findings from Regression Analysis

In understanding the relationship between education and economic development, the first part of findings of this study are based on the regression analysis covering the countries in the 2005 HDI report. The countries are further divided into their respective regions, and according to their income per capita. The second part covers the findings from the selected cases using qualitative method.

In the regressions below, I used data from the Human Development Report of 2005 whose data include 177 countries. I also used the HDI report of 1992. In computing the Regression (curve estimates), GDP per capita was used as dependent variable while education index was used as an independent variable (both GDP per capita and education index were from the HDI reports). I opted to use education index because it is a comprehensive measure of education as it covers adult literacy (with two-third weight) and combined primary, secondary and tertiary gross enrolment ratio (with one-third weighting). Further earlier studies such as those by Barro and Lee (1993), used enrolment ratio or literacy rates but not in combination. These measures are readily available but they are not as holistic as education index.

Regression analysis allowed the investigation of the relationship among one dependent variable- GDP per capita- and a number of independent variables- adult literacy, combined completion rate of primary, secondary and tertiary education- collectively called education index (Lazar et al, 2010). A high value of $R^2$ indicates that the independent variables are a good predictor of the dependent variable- it also indicates that the data points are close to the values predicated by $R^2$ equation. On the other hand a low value of $R^2$ shows that the data points are scattered away. In this case the independent variables are said to be a poor predictor, hence the relationship is not statistically significant (ibid).

This paper uses statistical significant not to mean importance but meaning results not occurring by chance. It must be noted that in statistics, the phrase statistical significance does not mean important but it means ‘probably true’- in other words it means that the results did
not occur by chance. Therefore, when the results are highly significant, the interpretation is that there is a high probability that the results are true, and did not occur by chance. In the case of $R^2$ a value below 0.5 is not considered as significant. The same applies with the term strong or weak relationship, when the value is below 0.5 the relationship between the independent and dependent variables is said to be weak (Brace et al, 2009).

4.1.1 Global (All countries)

Table 1- Global level

<table>
<thead>
<tr>
<th>Equation</th>
<th>Model Summary</th>
<th>Parameter Estimates</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>R Square</td>
<td>F</td>
</tr>
<tr>
<td>Linear</td>
<td>.357</td>
<td>95,445</td>
</tr>
</tbody>
</table>

The independent variable is Education Index.

Table 1 presents the results of the relationship between education index and economic development at the global level, the value of regression squares ($R^2$) for the model that has been derived by using education index as an independent variable and GDP per capita as the dependent variable is 0.357. This value shows the proportion of variance in GDP per capita that is explained by the independent variable- educational index. This can also be explained in
terms of percentage- that is- 35.7% of the variation in GDP per capita in the world during 1992 to 2005 was explained by educational index. At 35.7%, the independent variable (education) was a poor predictor of the dependent variable (GDP per capita). Further, as observed the data points cluster around the line of best fit when the value of educational index is 0.7, this therefore means that the value of education index has to be around 0.7 before the real connection between education and economic development can be seen.

4.1.2 Regional Level
The following findings are a comparison of the relationship between Education and Economic Development in different regions of the world. Regression analysis in this regard helped me explore the relationship among a number of independent variables and a single dependent variable (Lazar et al, 2010).

Table 2. East Asia

<table>
<thead>
<tr>
<th>Equation</th>
<th>Model Summary</th>
<th>Parameter Estimates</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>R Square</td>
<td>F</td>
</tr>
<tr>
<td>Linear</td>
<td>.412</td>
<td>14,040</td>
</tr>
</tbody>
</table>

The independent variable is Education Index.
Table 2 summarises the results of the relationship between education index and GDP per capita in East Asia.

The value of $R^2$ is 0.412. This value shows the proportion of variance in the GDP per capita that can be explained by the education index. Thus this explains that more than 41% of the variations in GDP per capita in East Asia can be explained by education index. The remaining 58.8% of variations is explained by other factors that were not included in the regression model. In the case of the above findings, it can however, be stated that the relationship between education and economic development is relatively weak. These findings are similar to what obtains at the global level although in the case of East Asia the relationship is stronger relative to the global level.

Table 3. Europe and Central Asia

<table>
<thead>
<tr>
<th>Equation</th>
<th>R Square</th>
<th>F</th>
<th>df1</th>
<th>df2</th>
<th>Sig.</th>
<th>Constant</th>
<th>b1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Linear</td>
<td>,285</td>
<td>18,775</td>
<td>1</td>
<td>47</td>
<td>,000</td>
<td>-98483,766</td>
<td>126344,200</td>
</tr>
</tbody>
</table>

The independent variable is Education Index.
The above Model Summary and Parameter Estimates are a summary of the regression analysis of the strength of the relationship between education and economic development represented by education index and GDP index respectively- in Europe and Central Asia. The findings show the value of $R^2$ to be 0.285. The value of 0.285 when computed to percentages is 28.5 %—these findings show that there is a weak relationship between education and economic development in Europe and Central Asia. These findings are similar to what obtains when this relationship is measured at global level. They all show that when measured using the education index and the GDP, the relationship is not statistically significant. Apart from that, the data points cluster around the line of fit when the value of educational index is around 0.9. This shows that in the region of Europe and central Asia, the connection between education and economic development was only seen when the values of educational index was 0.9.

**Table 4. Latin America**

<table>
<thead>
<tr>
<th>Equation</th>
<th>Model Summary</th>
<th>Parameter Estimates</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>R Square</td>
<td>F</td>
</tr>
<tr>
<td>Linear</td>
<td>.244</td>
<td>9.983</td>
</tr>
</tbody>
</table>

The independent variable is Education Index.
Table 4 reports the results of regression analysis for Latin America. From the table above, the regression squares ($R^2$) value for the analysis is 0.244. This figure represents the variations in the GDP per capita as explained by education index. At 24.4 %, the relationship between education and economic development in the Latin America is not statistically significant. These findings are similar to the findings of Europe and Central Asia region, East Asia and at the Global level. They all show that the relationship between education and economic development is relatively weak.

**Table 5. Middle East and North Africa**

<table>
<thead>
<tr>
<th>Equation</th>
<th>R Square</th>
<th>F</th>
<th>df1</th>
<th>df2</th>
<th>Sig.</th>
<th>Constant</th>
<th>b1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Linear</td>
<td>.409</td>
<td>11,745</td>
<td>1</td>
<td>17</td>
<td>.003</td>
<td>.28033,046</td>
<td>52851,008</td>
</tr>
</tbody>
</table>

The independent variable is Education Index.
Table 5 summarises the results of the relationship between education and economic development that has education index as an independent variable and GDP per capita as a dependent variable. The value of regression squares ($R^2$) = 0.409, indicating that education index accounts for 40.9% of the variance in GDP per capita. This regression indicates that as much as the relationship between education and economic development is relatively weak in general, it is however, slightly stronger than in other regions such as Europe and Central Asia and in East Asia.

**Table 6. Sub-Saharan**

<table>
<thead>
<tr>
<th>Model Summary and Parameter Estimates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dependent Variable: GDP per capita 2005</td>
</tr>
<tr>
<td>Equation</td>
</tr>
<tr>
<td>-----------</td>
</tr>
<tr>
<td>Linear</td>
</tr>
</tbody>
</table>

The independent variable is Education Index.
Table 6 presents the results in the sub-Saharan Africa. In the above two (adult literacy and combined enrolment) independent variables and the dependent variable (GDP per capita), regression squares ($R^2$) is 0.349. This indicates that education index accounted for 34.9 % variance in GDP per capita. These findings are similar to those of Europe and Central Asia, and Latin America, showing that the relationship between education and economic development is not very strong.

Table 7. South Asia

<table>
<thead>
<tr>
<th>Equation</th>
<th>R Square</th>
<th>F</th>
<th>df1</th>
<th>df2</th>
<th>Sig.</th>
<th>Constant</th>
<th>b1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Linear</td>
<td>.761</td>
<td>12,730</td>
<td>1</td>
<td>4</td>
<td>.023</td>
<td>-2590.526</td>
<td>9614.621</td>
</tr>
</tbody>
</table>

The independent variable is Education Index.
The table above (Table 7) shows the summary results of the simultaneous regression analysis of two variables- education index (adult literacy, combined completion rate of the primary, secondary and tertiary education) and economic development (GDP per capita) in South Asia. The value of $R^2 = 0.761$. Thus 76.1% of the variance in GDP per capita was explained by education index while the remaining 23.9% of the variation was explained by other factors not included in this regression model. This regression provides an explanation for a strong relationship that exists between education and economic development in South Asia. These findings differ from the findings in other regions were the relationship was not strong. Further, these findings differ from those that obtain at global level.

These results are validated by what Nolan and Heinzen (2007:265) say that “data points (observations) that are closely clustered around the line of best fit are said to have less variance, and this increases the level of confidence in the predictive ability” of the strength of relationship between an independent variable and a dependent variable. In the case of the above findings, the data points are closely clustered around the line of best fit- hence increasing the prediction that the relationship between education and economic development in South Asia is of statistically significance.
4.1.3 Quintiles

Table 8. Upper Middle Income Countries

Model Summary and Parameter Estimates

<table>
<thead>
<tr>
<th>Equation</th>
<th>Model Summary</th>
<th>Parameter Estimates</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>R Square</td>
<td>F</td>
</tr>
<tr>
<td>Linear</td>
<td>.158</td>
<td>6,207</td>
</tr>
</tbody>
</table>

The independent variable is Education Index.

The table above presents the findings on the strength of the relationship between education and economic development within the Upper Middle Income Countries. The findings show a regression square ($R^2$) of 0.151. Thus this figure (0.151) represents the overall strength associated with the relationship between the independent variable and the dependent variable. Thus, at 15.1% the relationship between education and economic development is not statistically significant within the upper middle-income countries. It can thus be said that the relationship between the two variables is weak.
Table 9. High Income Countries

Model Summary and Parameter Estimates

Dependent Variable: GDP per capita 2005

<table>
<thead>
<tr>
<th>Equation</th>
<th>R Square</th>
<th>F</th>
<th>df1</th>
<th>df2</th>
<th>Sig.</th>
<th>Constant</th>
<th>b1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Linear</td>
<td>0.162</td>
<td>6.979</td>
<td>1</td>
<td>36</td>
<td>0.012</td>
<td>-24806.165</td>
<td>58372.796</td>
</tr>
</tbody>
</table>

The independent variable is Education Index.

The above Model Summary and Parameter Estimates are a summary of the regression analysis of the strength of the relationship between education and economic development within the High Income Countries. The findings show the value of $R^2$ to be 0.162 with data points spread around the line of best fit. The value of 0.162 when computed to percentages is 16.2% - these findings show that there is a weak relationship between education and economic development in High Income Countries. These findings are similar to what obtains when this relationship is measured at global level and within the Upper Middle Income Countries. However, at 16.2%, the relationship is slightly stronger than it is within the Upper Middle Income Countries (at 15.8%).
Table 10. Lower Middle Income Countries

Model Summary and Parameter Estimates

<table>
<thead>
<tr>
<th>Equation</th>
<th>Model Summary</th>
<th>Parameter Estimates</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>R Square</td>
<td>F</td>
</tr>
<tr>
<td>Linear</td>
<td>.182</td>
<td>11,335</td>
</tr>
</tbody>
</table>

The independent variable is Education Index.

The above model of regression analysis was derived from countries that fall within the Lower Middle Income Countries. The findings of this study show that the value of the $R^2$ from these countries on education index and GDP per capita is 0.182. When converted to percentages it is 18.2%. The above findings at 18.2% show that there is a weak relationship between education and economic development in among the Lower Middle Income Countries. In a nutshell the strength of the relationship between the two variables (education and economic development) is 18.2% out of the possible 100%. The higher the percentage of the relationship the stronger the relationship. These findings are similar to the findings on the strength of relationship between education and economic development with those High Income, Upper Middle Income Countries and at the Global level. They all show that the relationship is not statistically significant.
Table 11. Low Income Countries

Model Summary and Parameter Estimates

Dependent Variable: GDP per capita 2005

<table>
<thead>
<tr>
<th>Equation</th>
<th>R Square</th>
<th>F</th>
<th>df1</th>
<th>df2</th>
<th>Sig.</th>
<th>Constant</th>
<th>b1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Linear</td>
<td>0.075</td>
<td>3.714</td>
<td>1</td>
<td>46</td>
<td>0.060</td>
<td>995,933</td>
<td>1066,563</td>
</tr>
</tbody>
</table>

The independent variable is Education Index.

The above shows the regression analysis of the study on education and economic development among the Low Income countries. The findings of this study show that the value of the $R^2$ from these countries is 0.075. When converted to percentages it is 7.5%. The overall measure of strength associated with the relationship within Low Income countries is thus 7.5%. This percentage is too low to entail a significant relationship. It can thus be said that among the low-income countries, 7.6 % variance in GDP per capita is explained by education index, thus the relationship between education and economic development is weak. These findings are similar with those that obtain among the high income, upper middle income and the lower middle-income countries. However, the percentage is lowest among the low-income countries.
Table 12 reports the results of the time-series data from a cross-section of regions with significance discrepancy in the value of $R^2$. The findings show that South Asia experienced a decline in the value of $R^2$ from a near perfect correlation of 0.939 in 1992 to 0.761 in 2005. This represented a decline of 0.178. However, at 0.761 the statistical association between education and economic development was still strong. Another region that experienced a decline was Latin America from 0.363 in 1992, the value of $R^2$ reduced to 0.244 in 2005. This means that there was a reduction in the significance of correlation between education and economic development in the region.

However, it was the opposite in the Middle East and North Africa, and Sub-Saharan Africa. These regions experienced an increase in the value of $R^2$. In the case of the Middle East and North Africa, the value of $R^2$ increased from 0.191 in 1992 to 0.409 in 2005. The figure of 1992 doubled. As for Sub-Saharan Africa, the figure increased from 0.270 in 1992 to 0.349 in 2005. This represented an increase of 0.077. Thus, in the case of the Middle East and North Africa, and Sub-Saharan Africa, the independent variable (education) improved as a predictor of the dependent variable (economic development). The data points got closer to the values predicted by multiple regressions (see appendix).

<table>
<thead>
<tr>
<th>Year/Period</th>
<th>South Asia</th>
<th>Sub-Sahara</th>
<th>Middle East</th>
<th>Latin America</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value of $R^2$</td>
<td>0.939</td>
<td>0.761</td>
<td>0.270</td>
<td>0.349</td>
</tr>
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</table>
4.2 Case Studies

<table>
<thead>
<tr>
<th>Question/Year</th>
<th>Botswana</th>
<th>Ghana</th>
<th>Rwanda</th>
<th>Nigeria</th>
<th>Malawi</th>
<th>Tanzania</th>
<th>Egypt</th>
</tr>
</thead>
<tbody>
<tr>
<td>It was 81.2% while in 1994 it was 68.6%</td>
<td>57.9% up from 46.2% in 1994</td>
<td>64.9% from 57.9% in 1994</td>
<td>69.1% but in 1994 it was 55.4%</td>
<td>64.9% while in 1994 it was 48.5%</td>
<td>It was 69.4% up from 59.1% in 1994</td>
<td>71.4% while in 1994 it was 44.4%</td>
<td></td>
</tr>
<tr>
<td>What was the GDI and GPI?</td>
<td>0.639 and 1.13</td>
<td>0.549 and 0.56</td>
<td>0.450 and 0.62</td>
<td>0.456 and 0.70</td>
<td>0.432 and 0.55</td>
<td>0.464 and 0.48</td>
<td>No GDI. GPI 0.77</td>
</tr>
<tr>
<td>What was the gov’t expenditure on education as % GDP?</td>
<td>10.7% in 2005, and 6.2% in 1991</td>
<td>6.5% in 2005 while in 1991 it was 5.4%</td>
<td>3.8% in 2005, however figures for 1991 were missing</td>
<td>The figures for 2005 were missing but in 1991 it was 0.9%</td>
<td>5.8% and in 1991 it was 3.2%</td>
<td>2.2% while in 1991 it was 2.8%</td>
<td>It was 4.8% and in 1991 it was 3.9%</td>
</tr>
<tr>
<td>What is the GDP per capita (US$)?</td>
<td>12,387</td>
<td>2,480</td>
<td>1,260</td>
<td>1,128</td>
<td>667</td>
<td>744</td>
<td>4,337</td>
</tr>
<tr>
<td>GDP/cap annual growth rate (1990 -2005)</td>
<td>4.8%</td>
<td>2.0%</td>
<td>0.1%</td>
<td>0.8%</td>
<td>1.0%</td>
<td>1.7%</td>
<td>2.4%</td>
</tr>
<tr>
<td>Combined enrolment rate</td>
<td>69.5%</td>
<td>50.7%</td>
<td>50.9%</td>
<td>56.2%</td>
<td>63.1%</td>
<td>50.4%</td>
<td>76.9%</td>
</tr>
<tr>
<td>HDI Value</td>
<td>0.654</td>
<td>0.553</td>
<td>0.452</td>
<td>0.470</td>
<td>0.437</td>
<td>0.467</td>
<td>0.708</td>
</tr>
<tr>
<td>Employment main activity</td>
<td>Services- 50%</td>
<td>Agriculture- 55%</td>
<td>Agriculture- 90%</td>
<td>Services- 75%</td>
<td>Agriculture- 75%</td>
<td>Agriculture- 75%</td>
<td>Agriculture- 82%</td>
</tr>
</tbody>
</table>
4.2.1 Findings from the Case Studies

4.2.1.1 GDP per Capita, Expenditure and Education

This section covers the seven countries that formed the case studies of my research, and the section contains data on adult literacy rate, Gender Parity Index, gender related index, combined enrolment, and macroeconomic variables such as GDP per capita, and public expenditure on education as a percentage of the countries’ GDP. The section discusses the relationship between economic development and education.

The findings of the case studies from table 13 revealed some interesting discoveries. On the nature of the relationship between education and economic development, the study revealed that the countries that had a high GDP per capita also had high adult literacy levels and high enrolment rates. For example, according to the findings, Botswana with a higher GDP per capita (US$ 12,387) than other countries had the highest adult literacy rate of 81.2% in 2005. Further, the findings of this study when viewed from what obtains in Botswana suggest a positive correlation between GDP per capita and education expenditure on one hand and the enrolment rates on the other. Botswana recorded a combined enrolment rate of 69.5% in 2005. The country’s expenditure on education was also the highest among the case studies (countries reviewed); the expenditure was 8.3% in 2005. School enrolments tend to have a significant impact on the literacy levels of a country.

Furthermore, Egypt with the second highest GDP per capita of US$ 4337 had the second highest adult literacy rate after Botswana, of 71.4%. In addition, the findings of this study revealed that despite having the second highest rate of GDP per capita, Egypt had the highest enrolment rate of 76.9%. However, Egyptian government’s expenditure on education -as percentage of GDP- was 4.8%.

Countries with low adult literacy rate and combined enrolment rates also had low GDP per capita. For example out of the cases reviewed, Malawi had the lowest GDP per capita of US$ 667, the country also had one of the lowest adult literacy rate for both sexes aged 15 years and above- of 64.1%.

It was also interesting to note that despite having the lowest GDP per capita among the countries that formed the case studies, Malawi had a higher combined enrolment rate than Rwanda, Tanzania and Ghana (all of which had higher GDP per capita than Malawi). These
findings contrasted those involving Botswana and Egypt that had high GDP per capita and enrolment rates.

However, Tanzania presents a different and an interesting case on the relationship between education and economic development. Tanzania has one of the highest adult literacy rates (69.4% in 2005 up from 59.1 in 1994) despite the low investment in the education sector. The country reduced its expenditure in the education sector from 2.8% in 1994 to 2.2% of the GDP in 2005. The country’s GDP per capita was US$ 744- which was the second lowest among the cases reviewed, and also a low average GDP growth of 1.7%.

Nigeria too presents an interesting case, the country had one of the lowest expenditures in the education system, for example, in 1991, expenditure on education was only 0.9 % of its total GDP with a growth average rate of 0.8% between 1990 and 2005. This low investment in education was reflected in its low education indicators, combined enrolment rate was 56.2 % in 2005 with an adult literacy rate of 69.1%.

The findings also revealed that although Ghana has made substantial progress by expanding access to education, the GDP per capita was US$ 2480, higher than that of Malawi, Nigeria and Rwanda’s, this study revealed that Ghana’s adult literacy rate and enrolment rates were much lower than the enrolment rates for these countries, its (Ghana) adult rate stood at 57.9 % compared to Malawi’s 64.1% (with a GDP per capita of US$ 667), Nigeria’s 69.1% (with a GDP per capita of US$ 1128) and Rwanda’s adult literacy rate of 64.9% with a GDP per capita of US$ 1260. However, Ghana had a much higher expenditure –GDP percentage-on education than Malawi, Nigeria, Tanzania and Rwanda including Egypt that had the second highest literacy rate but whose GDP per capita was much higher than that of Ghana.

4.2.1.2 Education, Development and Inequality

This study was also set to investigate the level of a country’s economic development in terms of both education indicators and development indicators, and the levels of Inequality. Gender discrepancies in the education system have implications on the labour market participation by different gender groups.

From table 13 and from the above findings, it is clear that educational attainment among the case studies varies with their levels of economic development. In countries with a high GDP per capita and high educational expenditure, the levels of inequality were low. For example,
Botswana, which had both the highest GDP per capita and education expenditure as percentage of GDP had a GDI value of 0.639. On the other hand, Malawi had the lowest GDP per capita with high inequality levels- GDI was 0.432, showing that the inequality levels (in education, health and income) in Malawi were higher than that of Botswana. The study furthermore revealed that there was a positive correlation between reduction inequality in education and higher incomes. Countries with lower GDP per capita had low GPI values. For example Tanzania had a GPI value of 0.48.

In addition, the study discovered that gender gaps in the education were more pronounced in countries that had generally low combined enrolment rates. A case in point is Tanzania with a combined enrolment rate of 50.4% had a GDI value of 0.464 and GPI value of 0.480. Another example is that of Rwanda it had one of the lowest combined enrolment rate of 50.9% and a GDI value of 0.45 and GPI value of 0.620. These were the same countries with the lowest GDP per capita and HDI value. This suggests that women in less developed economies have less access to education. Gender parity in the education sector is attained when the GPI ranges between 0.97 and 1.03. A GPI value of less than one shows that the disparity is skewed towards males while a value above one is in favour of females. This indicates that there is a correlation between the level of development of a country and the inequality in the education sector. The less developed the country is, the higher the levels of inequality in the education sector.
CHAPTER FIVE

This chapter presents the analysis of the study based on the findings. The theoretical framework has been used to explain the findings, and so are the previous studies.

5.0 ANALYSIS

The results from table 12 present some interesting findings on the linkage between education and economic development. In the case of South Asia, during the 1992-2005 period, the region experienced an almost perfect correlation (of 0.939) between education and economic development. However, this reduced to 0.761. One of the possible reasons for this decline was that as countries try to develop, there is emphasis on schooling but when it reaches an upper level of development, the emphasis is reduced. This would imply that during the period prior to 1992, there was a lot of investment in schooling in the region, since investment in schooling takes time to materialize; the benefits of investment were very high during the period of 1992-2005. This was the same with Latin America where there was a reduction in the power of the independent variable (education) to predict the dependent variable (economic development).

My findings collaborate with studies done by Mingat (1998) and Permani (2008). Mingat’s (1998) study focused on the investment in human capital such as education on economic growth in Hong Kong. The study revealed that the sustained growth that Hong Kong experienced was mainly attributed to massive investment in education. The study further revealed that the impact of education on growth was only felt after 20 years. Similarly Permani’s (2008) study was on the rapid development of the East Asian countries. The study used the data that covered the period 1965 to 1990. The findings of the study showed that economic growth in East Asia was mainly attributed to rapid development in the education system. The study concluded that the impacts of education were felt after a long period of time.

Furthermore, according to the endogenous theory, growth can only be sustained with a high stock of human capital produced through education. The country’s ability to innovate or catch up with advanced economies is dependent on the rate at which accumulation of human capital occurs. The differences in the levels of development in countries are mainly attributed to the different rates at which these countries accumulated human capital (Aghion and Howiit, 1999).
In the case of South Asia and Latin America, the regions have seen the emergence of emerging economies such as those of India and Brazil respectively. These countries invested in the education sector and are now experiencing the benefits of their investment. This provides convincing evidence that there is a correlation between education and economic development despite that investment in education takes long to materialize. The above discussion concur with the results obtained by Chandra (2010) whose study covered the post-liberalization period and found that India’s increased education expenditure and investment in technical education in the 1950s and 60s had a positive effect on economic growth.

The other interesting results involve that of Sub-Sahara Africa; the region experienced an increase in the value of multiple regressions ($R^2$) from 0.27 in 1992 to 0.349. As much as the value of $R^2$ was still low, the increase shows that the correlation between education and economic development was improving. This is an indication that most countries in the region were investing more in the education sector.

This is also seen from table 13; we see that countries in Sub-Saharan Africa like Botswana and Ghana increased their expenditure on education as a percentage of GDP. The higher the expenditure on education, the higher the GDP per capita annual growth rates were. For example, Botswana’s expenditure on education increased from 6.2% in 1991 to 10.7% in 2005. During the same period, the adult literacy rates increased from 68.6% in 1994 to 81.2% in 2005. At the same time, the country experienced an average growth rate of 4.8%. Apart from increasing its expenditure on the education sector, Botswana also abolished school fees at primary and secondary level during the 1970s that led to increased enrolments.

However, not all the countries in the Sub-Saharan region invested much in education. Because of this difference, the countries experienced different levels of development. For example Malawi’s expenditure on education as a percentage of GDP was 3.2% in 1991 and increased to 5.8% in 2005. This low increase in expenditure on education was also reflected in the country’s adult literacy rates that were 64.9% in 2005. At the same time, Malawi’s average GDP per capita annual growth rate was at 1.0% during the same period. The implication of the above discrepancy in development between Botswana and Malawi is that the higher the human capital stock a country has, the more advanced it will be. This shows that there is a positive correlation between investing in education and economic development of a country.
The above view is also supported by the endogenous theory. According to Romer if the education sector were strong, benefits would trickle down to other spheres of the economy, and to society in general. His general argument is that knowledge drives economic development. In the same vein, Lucas’ contributions to the model were also centred on the accumulation of human capital. He believed that growth could only be sustained with a high stock of human capital produced through education. Lucas further said that a country’s ability to innovate or catch up with advanced economies was dependant on the rate at which accumulation of human capital occurred. He thus stated that the differences in the levels of development in countries were mainly attributed to the different rates at which these countries accumulated human capital (Aghion and Howiit, 1999).

Endogenous growth theory can thus be used to justify the differences in the levels of development between Botswana and Malawi. The former has a high stock of human capital- literacy rates in Botswana are higher than that of Malawi. This is also reflected in their growth rates- Botswana with a growth rate of 4.8% while that of Malawi was 1.0%. In addition, Botswana’s GDP per capita (US$12,387) is much higher than that of Malawi (US$667). The implication of this is that investing in education leads to a win-win situation- more investment in education leads to faster economic development, which in turn leads to more investment in education. Education can thus be said to build on Sen’s (1999) ‘human capabilities’, that is, educated people are better placed to make better decisions, contribute more to the welfare of society and enjoy a better life.

A further review of the case studies shows that these countries were at different levels of economic expansion. Botswana and Egypt showed a correlation between education and economic development. While Tanzania, Nigeria and Rwanda’s expenditure on education was very low- ranging from 0.9% in Nigeria to 3.8% in Rwanda thus their level of development was low, relative to that of Botswana and Egypt. Thus the countries that had high investment in education were growing faster than those with low investments. The implication of the different levels of development among many countries particularly those in Africa, is that most of them have not made major investments in education, hence, they lack the necessary stock of human capital needed to drive their economies.

Another reason for the low investment in education in most African countries is that most of them have serious economic problems such as high inflation, high interest rates and
unemployment among others, thus they would rather address such problems were results are often visible within a short term. This enables the governments to capitalize on such achievements in a near term than to wait for the benefits of improved education that are not visible in a short term.

However, these findings on the relationship between education and economic development in Africa indicate a need for an appropriate strategy to allocate more resources in human resource development if the returns of education are to be realized. The need for more investments in the education sector as one of the ways of developing the economy is also supported by studies done in Asia (McMahon, 1998) and Venezuela (Fiszbein and Psacharopoulos, 1992) that point to the fact that there was a correlation between investing in education and economic development. In case of this study, the indicators on Botswana and Egypt show that the investment in education is proportional to the economic development of these countries. This therefore entails that African countries ought to invest more in education so as to have a well-educated workforce and the general population at large, that is essential for the growth of the productive sectors of the economy. In a nutshell, one of the ways in which poverty can be reduced in most developing countries is to increase budget allocations to the education sector especially those countries that have not invested much.

However, in the case of Ghana the situation was different; despite having the lowest literacy rates at 57% the country had the third highest growth rate of 2.0%. This could be used to argue for the view that education is an outcome of economic development. This tends to be the short-term effect. However, the benefits of investing in education take long before they can be seen. The case of Ghana also indicates that there is co-variant causality between education and economic development.

Having scrutinized the relationship between development and education in terms of expenditure and adult literacy, it is important to consider the level of economic development and the levels of inequality especially in the education system. The study revealed that differences in the educational attainment between males and females differ from country to country.

From the findings of my study, gender gaps were more pronounced in countries with low GDP per capita. Malawi and Tanzania had the highest levels of gender inequality in the educational attainment. Malawi’s GPI was 0.55 while that of Tanzania was 048. This
indicates that in these countries the gender disparity is in favour of males. Malawi and Tanzania also had the lowest GDP per capita among the case studies.

In contrast, Botswana has a near perfect parity in the education attainment. In Botswana, females have slightly surpassed males in educational attainment. Botswana’s GPI was 1.13, meaning that its education system is closer to perfect parity which is represented by one (1). The other country that showed the element of perfect parity was Egypt- with a GPI value of 0.77. The implication of these findings is that there is a close relationship between a country’s level of development and Gender disparity in the education system. The higher the level of development, the more gender parity there is in the education system.

The above results are similar to the views of Sachs (2008) he posits that gender equality in education plays a pivotal role in ensuring that girls are competitive on the labour market since it leads to high income and low fertility rates.

The rest of the countries – Ghana, Rwanda and Nigeria- all had gender disparity towards boys. This goes to show that as a country develops, gender disparities tend to diminish. In line with Todaro and Smith’s (2010) definition of development (a reduction in poverty, unemployment and inequality), the findings of the study revealed a positive correlation between education and development in that gender disparities tend to be low in high income countries, as observed from the case studies.
6.0 CONCLUSION

The debate on the link between education and economic development still remains as one of the most contested topics. The notion that education promotes economic development has resulted in many countries investing in education. This study has established that there exists a correlation across the countries including African countries, between education and economic development. Results from this study are in consistent with the view that differences in GDP per capita are explained by the variations in different countries in investing in human capital. Botswana is one example of the countries in the Sub-Saharan Africa that invested in education. The country started investing heavily in education in the 1970s; today Botswana has one of the most successful economies in Sub-Saharan Africa. This is one of the main examples that show that there is a relationship between education and economic development.

The correlation between education and economic development is covariant, the stock of human capital is necessary in order for the productive sectors of the economy to grow, in turn the growth of the productive sectors leads to more opportunities for human resources to develop and apply their skills and talents. It is much easier for the advanced economies to invest heavily in the development of human capital through education while most developing countries tend to struggle to invest in education in order to have sufficient stock of human capital necessary to drive their economies.

Against this backdrop, it necessary for poor countries such as those in Africa to increase their budget allocations to education if they are to have long-term goals of sustained economic development. A country with a well-educated population tends to grow faster economically as has been seen from studies done on East Asia. African countries should thus be concerned with investing more in education now and in the coming years if they are achieve sustained economic development or catch up with the more advanced economies.

Thus, human capital accumulation should be one of the top priorities of the national policy if developing countries are to realize meaningful economic and social wellbeing of the citizenry and the nation at large. Countries ought to increase their investment in education having in mind that the investment returns in education take long to materialize.

This study has also revealed that there is a positive correlation between the level of a country’s development and inequality both in the education sector and in society in general.
This study discovered that the more developed a country is the lesser the levels of inequality. The cases revealed that the levels of inequality were higher in Malawi than they were in Botswana.

This study has investigated the link between education and economic development in Africa using regression analysis and qualitative methods; however, the study did not investigate the social and private costs and benefits of education. Social costs are the opportunity costs to society that come as a result of the need to fund the education sector at the expense of other sectors. While private costs are the costs that students themselves bear. It would be interesting to investigate this aspect (of social and private costs and benefits) in Africa.
7.0 Reference


(Retrieved 01/07/11)
8.0 Appendices

Sub-saharan Africa

Model Summary and Parameter Estimates

Dependent Variable: GDP per capita 2005

<table>
<thead>
<tr>
<th>Equation</th>
<th>R Square</th>
<th>F</th>
<th>df1</th>
<th>df2</th>
<th>Sig.</th>
<th>Constant</th>
<th>b1</th>
</tr>
</thead>
<tbody>
<tr>
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<td>14.293</td>
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<td>42</td>
<td>0.000</td>
<td>-2151.831</td>
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</table>

The independent variable is Educational Index 1992.

GDP per capita 2005

Educational Index 1992
Middle East and North Africa

Model Summary and Parameter Estimates

Dependent Variable: GDP per capita 2005

<table>
<thead>
<tr>
<th>Equation</th>
<th>Model Summary</th>
<th>Parameter Estimates</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>R Square</td>
<td>F</td>
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<tr>
<td>Linear</td>
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The independent variable is Educational Index 1992.
South Asia

Model Summary and Parameter Estimates

Dependent Variable: GDP per capita 2005

<table>
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<tr>
<th>Equation</th>
<th>Model Summary</th>
<th>Parameter Estimates</th>
</tr>
</thead>
<tbody>
<tr>
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<td>R Square</td>
<td>F</td>
</tr>
<tr>
<td></td>
<td>0.939</td>
<td>61,518</td>
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The independent variable is Educational Index 1992.
Latin America

Model Summary and Parameter Estimates

Dependent Variable: GDP per capita 2005

<table>
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<th>df1</th>
<th>df2</th>
<th>Sig.</th>
<th>Constant</th>
<th>b1</th>
</tr>
</thead>
<tbody>
<tr>
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<td>29</td>
<td>0.000</td>
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<td>19798.830</td>
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</table>

The independent variable is Educational Index 1992.
Europe and Central Asia

Model Summary and Parameter Estimates

Dependent Variable: GDP per capita 2005

<table>
<thead>
<tr>
<th>Equation</th>
<th>Model Summary</th>
<th>Parameter Estimates</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>R Square</td>
<td>F</td>
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<td>Linear</td>
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<td>10,596</td>
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</table>

The independent variable is Educational Index 1992.
East Asia

Model Summary and Parameter Estimates

Dependent Variable: GDP per capita 2005

<table>
<thead>
<tr>
<th>Equation</th>
<th>Model Summary</th>
<th>Parameter Estimates</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>R Square</td>
<td>F</td>
</tr>
<tr>
<td>Linear</td>
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<td>11,199</td>
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</table>

The independent variable is Educational Index 1992.
All the Countries in the World

Model Summary and Parameter Estimates

Dependent Variable: GDP per capita 2005

<table>
<thead>
<tr>
<th>Equation</th>
<th>Model Summary</th>
<th>Parameter Estimates</th>
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<tbody>
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<td></td>
<td>R Square</td>
<td>F</td>
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The independent variable is Educational Index 1992.