

**A STUDY ON THE IMPACT OF GOVERNMENT EXPENDITURE (HEALTH AND
EDUCATION) ON ECONOMIC GROWTH: CASE FOR SUB SAHARAN AFRICA
(SSA)**

**By
Stephen Nkomo**

THESIS

Submitted to

KDI School of Public Policy and Management

in partial fulfillment of the requirements

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MASTER OF DEVELOPMENT POLICY

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Committee in charge:

Professor Jong-Il YOU, Supervisor



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ABSTRACT

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By

Stephen Nkomo

The impact of government spending on economic growth remains a topical issue, particularly in SSA where there is high dependency on the government for the provision of public goods. This study assesses the impact of education and health public spending on economic growth for 34 SSA countries for the period 1995-2010. Using the fixed effects technique for the cross-country panel data estimations, the study concluded that education and health public spending have positive impact on economic growth in SSA countries through the human capital mechanism. Further analysis also shows that the impact of education public spending on economic growth is more pronounced as compared to that of health public spending implying that education spending should be given more priority.

***Key words:** Economic growth, Sub-Saharan Africa, Health and education, Government spending, Fixed effects, Panel data.

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1. INTRODUCTION

Government spending in education and health in Sub-Saharan Africa (SSA) countries has been on an increase as nations grapple with the continuous demand for public goods and services by the citizenry. This is against constrained fiscal space largely emanating from declining commodities prices for the extractive sectors in SSA (IMF Regional economic outlook SSA, 2014;04). In order to complement SSA governments' expenditure in the provision of health and education, multilateral institutions such as the World Bank (WB), United Nations Children Fund (UNICEF), World Health Organisation (WHO), and International Monetary Fund (IMF) often come to the rescue of SSA.

Whilst SSA government spending on education stood at 18.7% of total government expenditure in 2013 is ranked as the highest globally (IPC, 2014), the region has remained poor as compared to other regions of the world. In addition, World Health Organisation (WHO) global health expenditure data base show that 15.5% of total government expenditure was dedicated to health in 2014 (WHO, 2016). In 2002, public spending in education to gross domestic product was 14 percent and expenditure on health was 8 percent (Bingxin, Anuja & Shenggen, 2008). Whilst the trend shows that SSA countries have been prioritizing education and health spending, there seemed to be a decline in the transport and communication spending from 6.4 percent in 1980s to 3.8 percent in 2005 hence the reason why there are huge infrastructure gaps in the region that also have negative impact on economic growth. Economists are, therefore, divided as to whether public spending, particularly in education and health has positive impact on economic growth in SSA.

This paper seeks to determine the impact of social public expenditure on economic growth as it constitute the greater proportion of SSA public expenditure. Specific emphasis will be on health and education public expenditure's impact on economic growth. Expenditure in education and health is considered as investment in human capital by human capital theorists, for example, Schultz (1963) and Becker (1993) because people cannot be separated from their knowledge, skills, health or values in the same way they can be separated from their financial and physical assets (Iheoma, 2012). As such, spending in health and education

should be viewed as productive expenditure as it has the potential to catapult SSA's growth potential through increase in productivity and per capita incomes. Such developments would in turn help in the reduction of poverty rates in the SSA which is currently ranked as the poorest in terms of poverty rankings (IMF, 2014)

1.1. Background

Policy makers, the world over, are divided as to whether government expansion is beneficial to economic growth. Some scholars are of the view that increasing government expenditure helps to stimulate aggregate demand for a stagnant economy (Nkiru & Izuchukwu, 2013). According to the Keynesian economics, governments can address depression through borrowing from the private sector and increase spending in the economy as this will cascade down through the multiplier effect (Sachs and Larrain, 1993). Keynes argued that government expenditure boosts economic activity by way of injecting purchasing power into the economy. Thus people would spend more thereby spurring growth of the overall economy through the multiplier effect.

However, proponents of the endogenous growth models such as Barro (1990), are of the view that only productive government expenditures such as infrastructure development will, in the long run, positively affect the growth rate of a country. Endogenous growth economists see improvements in national productivity as being derived from faster pace of innovation and investment in human capital. They argue that government and private sector institutions should invest more in health and education so as to nurture innovation, and provide incentives for economic agents to be inventive (Iheoma, 2012). Others like Mitchel (2005) are of the view that increase in government expenditure result in a fall in economic performance of a country. It is therefore important to empirically investigate whether or not, public spending in education and health impact positively on growth.

1.2. Trends in African governments spending

African governments expenditures grew at 3.8 percent on average for the period 1980-2002. It was much retarded in the 1980s at 2.92 percent annually because of a brief contraction that occurred after 1982 only to recover after 1986 when many African governments implemented macroeconomic structural adjustments. African countries, on average, gained momentum in expanding government expenditures in the 1990s, with an average of 4.8 percent per annually. Notably, Botswana had the most rapid public expenditure growth pattern during the period 1980-2002, mainly attributed to the outstanding performance of its economy driven by the increased revenue flows from diamond proceeds (Bingxin, Anuja & Shenggen, 2008).

In terms of percentages of public expenditure to GDP, Africa spent more with an average of 27-34 percent over the period 1980-2002 and was 10 percent higher than Asia and Latin America. The major spending governments were Zimbabwe, Botswana, Nigeria, Malawi, and Ethiopia with a high of between 35-67 percent of their GDP whilst the least spenders were Uganda and Cote d'Ivoire with a low of between 3-16 percent (Bingxin, Anuja & Shenggen, 2008).

The top three expenditures for Africa in the year 2002 were education, defence as well as health. Education spending was the largest with at 14 percent, but was relatively smaller than in Asian developing countries and comparable to Latin America. Expenditure on defence amounted to 8 percent of total government expenditures for African countries which was also similar to that of Asian countries (Bingxin, Anuja & Shenggen, 2008). Expenditure on health also stood at 8 percent for African countries. Whilst the trend shows that African countries have been prioritizing education and health spending, there seemed to be a decline in the transport and communication spending from 6.4 percent in 1980 to 3.8 percent in 2002 hence

the reason why there are huge infrastructure gaps in the region that also have negative impact on economic growth.

The provision of health and education is widely viewed as fundamental in the promotion of broad based economic growth because of its role in terms enabling a healthy workforce and literate worker with high skills needed for boosting productivity both at firm level and at country level. With this in mind, we need to determine whether public spending on health and education enable economic growth with particular emphasis on SSA. If not, then strategies must be penned to ensure that SSA also realise the benefits that accrue from increased health and education spending. Economic and political institutions may need to be adjusted to realise the impact of health and education expenditure on growth. Table 1 below shows composition of African governments selected expenditure components as percentages of GDP for the period 1980-2002 (Bingxin, Anuja & Shenggen, 2008).

Table. 1

Composition of total government expenditures for Africa: 1980, 1990, 2000, 2002				
	1980	1990	2000	2002
Agriculture	6.42	5.15	4.05	4.52
Education	12.33	14.6	14.72	13.98
Health	3.75	4.58	8.38	8.26
Transport & communication	6.49	3.98	3.49	3.76
Social Security	5.69	6.72	6.05	7.17
Defence	14.87	13.63	8.67	7.5
Other	50.46	51.33	54.63	54.81
Total	100	100	100	100

Adapted from Shenggen Fan, Bingxin Yu, and Anuja Saurkar (2008) based on *International Monetary Fund Government Financial Statistics Year Book* for various years

1.3. Statement of the problem

There have been a number of empirical studies on the impact of government expenditure components on economic growth with conflicting outcomes. A meta-analysis conducted by Nijkamp and Poot (2002) on the past empirical studies on public expenditure and economic

growth of 41 studies showed that 29% of the sample studies had a negative impact, 17% revealed a positive impact with 54% showing an inconclusive relationship. These studies also have their limitations in terms of differences in statistical techniques used, heterogeneity of the underlying data sets, differences in time under which the researches were undertaken and differences in variable measurement techniques as these tend to yield different outcomes (Easterly, 2003).

This study seeks to fill the literature gap in the field of public expenditure and growth using panel data for 34 selected SSA countries for the period 1995-2010. Focus is on the components of public expenditure, that is, health and education, to determine whether they deter, enhance or indeterminate on economic growth in SSA.

1.4. Purpose of the study

The purpose of this study is to examine empirically the impact of public expenditure (health and education) on economic growth focusing on SSA's public expenditure data from 1995-2010. The results will contribute to policy making and informed public expenditure budgetary allocations to key sectors that enhance growth.

1.5. Research question

This research paper seeks to answer the following question:

- What is the impact of public expenditure components (health and education) on economic growth in SSA?

1.6. Objectives of the study

The major objective of this study is as follows:

- To determine the impact of public expenditure (health and education) on economic growth in SSA. The outcome will aid policy making with regards public expenditure prioritisation to key sectors.

1.7. Hypothesis to be tested

This study aims to determine whether or not, health and education public expenditure has impact on economic growth over the period from 1995-2010.

- Health and education public expenditure has impact on economic growth in SSA.

1.8 Structure of the Paper

This study is organized as follows. Following the above introduction, a review of existing stock of literature relevant to the study is presented in chapter 2. This will be followed by Chapter 3 which discusses methodology of the study, data, model specification and definitions of the variables used. Chapter 4 will focus on results, interpretation and discussion. Finally, chapter 5 contains conclusion and policy recommendations.

2. LITERATURE REVIEW

2.1. Theoretical literature

A number of theories developed to date have been used to explain the relationship between government spending and economic growth. These include: Human capital theory, Keynesian Theory and Endogenous Growth Theory. These shall be treated in turn.

2.1.1. Human capital theory

The human capital theory, developed by Schultz in the 1960s, sought to explain the economic gains of investing in health and education to improve agriculture productivity. The reasoning was logically expanded to show the transmission mechanism from better education to improved productivity as a significant benefit to the broader economy (Iheoma, 2014). The demonstrations by Schultz showed that human capital in America contributed more to the economy than physical capital output, further buttressing the importance of human capital in the production process. Becker (1993) advanced Schultz's ideas by positing that expenditure on education, training and health is investment in human capital in that people cannot be separated from their skills, health, knowledge or values the same way we can separated them from their physical assets. Thus government spending in the provision of health and education can be viewed as a fundamental basis on which balanced and sustained economic growth can be attained. Amakom (2010) argued that the central theme of the human capital theory is that investment in human capital through education and health is an important ingredient for economic growth.

2.1.2. *The Keynesian Theory*

Keynes propounded that government expenditure has a positive relationship with economic growth as it stimulates aggregate demand in the economy. He viewed government

expenditure as an exogenous variable which can be used as a policy instrument to stimulate economic growth. An increase in government consumption leads to a surge in employment, investment and profitability through the multiplier effect (Sachs J.D and Larrain F. 1993). The theory was developed by Keynes as a solution to the effects of the great depression that occurred from 1929 to the 1930s (Keynes 1964).

2.1.3. *The Endogenous Growth Theory*

The theory posits that economic growth comes from technological advancement, that is, the ability of an economic agent to utilize its productive resources effectively over time which is complemented by sound human capital development. This is largely attributed to the capability to manage and operate newly created production facilities in a more efficient way and adaptation to rapid structural changes in the production processes (Barro and Xavier 2001).

2.2. Empirical literature

Economic growth has been an important parameter for measuring the performance of every economy and government performance in terms of key deliverables. At the same time, its complexity has divided economists and policy makers as to whether or not, government expenditure has positive impact on economic growth. Researches on the impact of government expenditure on economic growth, particularly education and health public spending, have yielded a variety of opinions as summarized below.

Bleaney et al (2001) researched on the impact of government spending on economic growth focusing on 22 Organisation for Economic Cooperation and Development (OECD) countries using panel data from 1970-1995 using OLS and General Least Square (GLS) methods. They concluded that only productive government expenditure has an impact on economic growth.

They found education and health were significant though they constitute a greater proportion of public consumption. However, this study did not focus on African countries. Also, OLS is not the best method for panel data because it is vulnerable to endogeneity.

Eggoh, et al (2015) tested the relationship between human capital (measured by health and education related variables) and economic growth for 49 African countries from 1996-2010 applying cross sectional and dynamic panel techniques of estimation. Results showed that public spending on health and education have negative impact on economic growth, with human capital stock indicators (literacy rate and gross primary enrolment) having a slightly positive impact. This, however, focused on Africa as a whole and not the SSA region block.

Nkiru. P, and Izuchukwu. D (2013) looked at the total education expenditure by the Nigerian government using time series analysis for the period 1977-2012. Their results showed that government spending in education has an impact on growth through the development of a sound human capital base. Time series focuses on the short and long run relationships while panel data emphasises the causality, prompting this paper to use panel data with more representation from African States.

A research by Gregorious and Ghosh (2007), using heterogeneous data and GMM technique for 15 developing countries, found out that countries with large public spending tend to experience higher economic growth but the overall effect varies from country to country. The results may be biased on regional differences. This study will look into developing countries in one region, that is, SSA. Using panel data for 14 developed countries for the period 1970 to 1990, Devarajan and Vinay (1993) used OLS estimation method on five year moving averages to test effect of public expenditure components on growth. Health, communication and transport had a positive relationship with economic growth whilst defense and education had a negative relationship to growth. Endogeneity from OLS may make the results biased

hence the need to use fixed effects models that can perfectly recover causality from observational data (Wooldridge, 2013).

Muthui J.N, et al (2013) conducted an empirical investigation into the impact of public sector expenditure components of Kenya using time series data from 1964-2011 and vector error correction model. They concluded that public expenditure on health, expenditure on public order and security and, transport and communication have positive impact on economic growth. However, defense had a negative impact, whilst expenditure on education had an indeterminate impact. This, however, shows long run association which may not necessarily mean causality.

Musaba et al (2013), investigated the impact of public expenditure components on economic growth in Malawi for the period 1980-2007 using vector error correction model. They concluded that there was no significant relationship between public sectoral expenditure variables (agriculture, defence, education, health, social protection, and transport and communication) and economic growth in the short-run. In the long run, however, expenditure on agriculture and defence exhibited some positive impact on economic growth and was statistically significant. Education, health, and transport and communication, and social protection exhibited some negative relationship to economic growth, though statistically significant. Since the results are from one country, they cannot be generalized to the rest of SSA hence the need to conduct a research with a bigger sample.

And, Wahab (2011) used a model accommodating asymmetric adjustments of growth to changes of government spending to examine the effects of aggregated and disaggregated government spending components on growth using a sample of 97 countries and OECD/non-OECD subsample countries. Wahab (2011) concluded that while overall government expenditure appeared to have positive impact on growth, government consumption, including

education, had no statistically significant impact on growth. On the other hand, government investment expenditure showed some positive impact on growth particularly when its growth falls below its trend growth level, whilst the impact would become negative as government investment expenditure increased beyond its trend growth. Benos (2009) used panel data for 14 EU countries on the impact of fiscal spending on growth, concluded that public spending on human capital enhancing activities such as education and health and social protection do not have a significant impact on growth.

Muduki and Masaviru (2012) investigated the components of public expenditure for Kenya, that is, education, health, transport and communication, economic affairs, agriculture and defense, on economic growth for the period 1972-2008. They concluded that education expenditure was highly significant on growth, with economic affairs, and transport and communication were weakly significant. However, defense and health expenditure outlays were insignificant determinants of economic growth with agriculture expenditure having a significant negative impact. These results cannot be generalized to the SSA region hence the need to broaden the sample to include other SSA countries.

In a study conducted by Singh and Weber (1997) for Switzerland on the impact of public expenditure components (education, health, transport, social welfare, justice and defense) on economic growth, employing OLS estimation method for the period 1950-1994, they found out that only education and health expenditures have a permanent growth effects. However, education showed positive effect while health had negative effect. OLS method suffers from endogeneity and the study cannot be generalized to the SSA region where most countries have low GDP per capita levels.

Devarajan, et al (1996) focused on the components of public expenditure and their impact on economic growth for a sample of 43 developing countries from 1970-1990. Using OLS

estimation, they concluded that increase in the share of current public expenditure has positive and statistically significant effects on growth whilst capital expenditure showed a negative effect on per capita growth. Public spending in health and education had negative effects on per capita growth though they were not statistically significant. They observed that seemingly productive expenditures, if used excessively, could become unproductive. Thus, developing countries misallocate public spending in favour of capital spending at the expense of recurrent spending. Endogeneity maybe the major set-back when using OLS estimation.

In a study by Gisore, et al (2014) on the effect of government spending on economic growth in East African Countries for the period 1980-2010, focusing on disaggregated expenditures. They used balanced panel fixed effect model and the Levin-Lin-Chu (2002) technique to test for the presence of unit root. Empirical results showed that health and defence public expenditures exhibited positive and statistically significant impact on economic growth for East African countries. Education and agriculture expenditures were, however, insignificant. However, there is need to narrow down the research to health and education with a sample selection that is a true representative of the SSA region.

2.3. Summary of literature

The research findings of the empirical studies that have been reviewed above have yielded different outcomes with some arguing that indeed public expenditure in health and education impact positively on economic growth. However, others are of the view that public expenditure (health and education) does not have impact on growth as public expenditure increase result in fall in economic performance by way of crowding out the private sector, public investment in physical economic enabling infrastructure such as roads, power plants and communication, among other reasons. In general, there is ambiguity in the empirical results which necessitate that further research be conducted to refute or accept the claim that

public expenditure (health and education) has impact on economic growth with particular emphasis on SSA. As such, this paper will focus its attention on the impact of government expenditure in education and health on economic growth in SSA for the period 1995 to 2010 within the human capital theoretical framework, that is, government spending in education and health improve human capital which result in improvement in productivity (economic growth). The reviewed literature is summarized in table 2 below.

Table. 2

<i>Selected summary of literature on the impact of government expenditure (health and education) on economic growth</i>				
Authors	Sample size	Methodology	Impact of component on economic growth	
			Health expenditure	Education expenditure
Bleaney et al (2001)	22 OECD countries	OLS and General Least Square	Positive	positive
Nkiru. P, & Izuchukwu. D (2013)	Nigeria	OLS		positive
Ashauer (1989)	USA			insignificant
Benos (2009)	14 EU countries	Fixed effects	negative	negative
Devarajan and Vinay (1993)	14 developed countries	OLS	positive	negative
Muthui J.N, et al (2013)	Kenya	Vector Error Correction Model	positive	insignificant
Musaba et al (2013)	Malawi	Vector Error Correction Model	negative	negative
Wahab (2011)	97 countries			insignificant
Muduki and Masaviru (2012)	Kenya	Vector Error Correction Model	insignificant	positive
Singh and Weber (1997)	Switzerland	OLS	negative	positive
Devarajan, et al (1996)	43 developing countries	OLS	negative	negative
Eggoh, et al (2015)	49 African countries	Generalized Method of Moment (GMM)	negative	negative
Gisore, et al (2014)	East African countries	Fixed effect model & the Levin-Lin-Chu (2002) technique	positive	insignificant

3. METHODOLOGY

Analyzing country data, this research tries to empirically examine the impact of government expenditure components, that is, education and health on economic growth in SSA using a representative sample of 34 countries. The study focus on the time between 1995 and 2010 where there is data for a greater proportion of SSA countries. The OLS estimation for cross sectional analysis will be used in order to test the long run impact and fixed effects method will be applied on panel data to cater for differences in countries and time factors that may not be observed. Fixed effects method is preferred for this analysis.

3.1. Model specification

The model to be used in this study borrows from the human capital theoretical framework following the ideas of Schultz (1960s) and further developed by Becker (1993) to show the importance of both education and health in fostering economic growth. Investment in human capital via health and education can be a catalyst for economic growth through increased productivity. Becker (1993) expanded this idea further by postulating that spending in training, medical care and education would ultimately be considered investment in human capital with greater probability to contribute positively to productivity. Proponents of endogenous growth buttress the importance of public and private spending in health and education in order to nurture innovation as well as provide incentives for individuals to be creative.

This study first uses period averages cross sectional data for 1995-2010 where each country has one observation. Thus the following OLS cross section regression model will be applied:

$$rgdp_growth_i = \alpha_0 + \beta_1 Educ_i + \beta_2 Health_i + \beta_3 X_i + \varepsilon_i \dots\dots\dots (1)$$

Where **rgdp_growth** represents economic growth, **Educ** measures government spending in education as a percentage of total government spending, and **Health** is the variable for government spending in health as a percentage of total government spending. The variable **X** is the vector for control variables that also affect economic growth such as **terms of trade**, **inflation rate** (standard deviation) as an indicator of macroeconomic stability. Other control variables include **gross fixed capital formation** as a percentage of GDP as a measure of the investment ratio and **inflows of foreign direct investment** (% of GDP) as a measure of the attractiveness of SSA as an investment destination of choice. **External debt** as a percentage of GDP is used to show the impact of national external debt on economic growth for the sampled countries. Initial GDP per capita is used to test for the conditional convergence borrowing from neoclassical growth theory (Barro and Sala-i-Martin, 1995). Military expenditure and institutional variables (rule of law, political instability and government effectiveness) are also considered as control variables that affect economic growth. The elements α , β_1 , β_2 and β_3 are the coefficients of the independent variables.

To incorporate panel data, the fixed effects model is adopted borrowing Eggo et al (2015). Panel data allow us to control for omitted variables without actually observing them. It allows us to control for variables that differ across entities but are constant over time and those that vary over time but are invariant across entities. We can control for these variables even if we do not know or observe them (Stock and Watson, 2011). λ caters for unobserved country specific effects.

$$rgdp_growth_{it} = \alpha_0 + \lambda_{it} + \beta_1 Educ_{it} + \beta_2 Health_{it} + \beta_3 X_{it} + \varepsilon_{it} \dots \dots \dots (2)$$

3.2. Definition of important variables

Economic growth

Gross domestic product is the total of spending by consumers, investment made by firms, excess of exports over imports, and government spending adjusted for inflation. The change in GDP from one year to the other denotes economic growth rate. Economic growth remains central to economic development. While there is no agreed formula for stimulating economic growth, reliability and availability of socio-economic data remains pivotal for policy makers to better understand their countries' economic situations (World Bank, n.d). This study will use real GDP growth as a measure of economic growth.

Government expenditure in education

Relates to public expenditure in the provision of education at all levels in SSA for the period under study. Government spending on education include expenditure on services provided to individual students and services provided on a collective basis. Education expenditure is expected to exhibit positive impact on economic growth in line with the human capital theory by Schultz and later by Becker (1993).

Government expenditure in health

Health expenditure relates to public expenditure in the provision of health services to the citizenry. A health population produces a productive workforce which is expected to contribute positively to economic growth through increased supply of health services and hence a healthy and productive workforce.

Terms of trade

Terms of trade index is calculated as the percentage ratio of the export unit value indexes to the import unit value indexes, measured relative to the base year 2000. The movements in the

terms of trade depend primarily on world socioeconomic and political conditions and is, therefore, exogenous with regards the coexistent economic growth for an individual country (Barro, 2003).

Foreign Direct Investment

Foreign direct investment (FDI) inflows, expressed as a percentage of GDP, play an important role in SSA by way of injecting fresh capital into the region. FDI can contribute to economic growth if the host country's economic environment is investor friendly and also through employment creation and tax payment, technological transfer and other related backward and forward linkages. However, it may also impact negatively on growth by way of externalization of the proceeds thereby starving the local financial market of the much needed savings for reinvestment and crowding out domestic companies.

Inflation rate

The inflation variable is the annual average of retail price index (Consumer Price Index) measured as percentages changes of the general price levels. It is, theoretically, assumed that an increase in inflation rate has an impact of raising the costs of production, general price levels making it difficult for economic agents to plan. Thus lower inflation rates would result in stable and sustained economic growth whilst substantial increases in prices tend to exhibit negative impact on economic activities and hence economic growth.

External debt

External debt refers to the gross national debt from international creditors by the country's citizens, companies as well as the government expressed as a percentage of gross domestic product. Loans extended to SSA usually attract high interest rates because of the perceived countries' and regional risks. The high risk premium makes it impossible for the credit

facilities to make a positive impact on economic growth. However, if the credit facilities are put to good use in the form of productive capital accumulation, it may contribute to economic growth. Literally, we would expect external debt to have a negative impact on economic growth in SSA.

Gross Fixed Capital Formation

Gross fixed capital formation is a measure of annual investment as a percentage of GDP from 1995-2010. Investment is considered a key enabler of economic growth especially if it translates in the accumulation of physical infrastructure such as roads, power stations, manufacturing plants, for example. Thus gross fixed capital formation is expected to exhibit positive impact on economic growth.

Military expenditure

Military expenditure includes both recurrent and capital expenditures relates to spending on armed forces (including peace keeping forces), defence ministries and other state agencies linked to defence projects, training of paramilitary forces and military space programs, according to Stockholm International Peace Research Institute (SIPRI, n.d).

Institutional variables

Institutional variables such as rule of law, political stability and government effectiveness are increasingly being considered as of significance in determining economic growth. Institutional theory postulates that countries that observe rule of law, have stable political environment and effective government would have stable growth rates. However, lack of rule of law, political instability and ineffective governments result in low growth. The rule of law variable was first considered for growth analysis by Keefer and Knack (1995).

3.3. Data

This study will use public expenditure data for a sample of 34 SSA countries for the period 1995-2010 with spending on health and education being the variables of interest. Expenditure data is from Statistics of Public Expenditure for Economic Development (SPEED) gathered from IMF Government Finance Statistics year book for various years and World Bank Development Indicators. Data for economic growth, inflation, foreign direct investment, initial GDP per capita, gross savings, population growth, military expenditure, rule of law, political stability, government effectiveness, terms of trade and gross fixed capital formation are from the World Bank Development Indicators. The selected sample seem to have some consistency in terms of data availability and reliability for the period under review.

Table 3: Data description and sources

Variable name	Description	Source
Real Gdp_growth	Real GDP growth in percentages	World Bank Development Indicators (WDI)
Initial GDP per capita	GDP per capita for 1995	
Education expenditure	Public education spending as a % of total government spending	WDI & International Monetary Fund
Health expenditure	Public health spending as a % of total government spending	
Inflation	Inflation in percentage	World Bank Development Indicators (WDI)
Foreign direct investment	Foreign direct investment as a % of GDP	
External debt	Total national external debt expressed in percentages of GDP	
Terms of trade	Percentage ratio of the export unit value indexes to the import unit value indexes	
Current account		
Gross fixed capital formation	Domestic gross capital formation as a % of GDP	
Military expenditure	Military spending as a % of total government spending	
Rule of law	-2.5 to 2.5 scale	
Political instability	-2.5 to 2.5 scale	
Government effectiveness	-2.5 to 2.5 scale	

To comply with the econometric procedure, this study will expose the data to the Hausman specification test. This evaluates the consistency of an estimator as a measurement tool when

compared to an already known alternative, less efficient estimator. Basically, the test assumes that both random effects and fixed effects estimators are consistent and evaluates them under the null hypothesis that the random effects estimator is more efficient. Rejection of the null hypothesis using the Hausman test is taken to mean that the key random effects assumption (the unobserved effect is uncorrelated with each explanatory variable) is false and thus, the fixed effect estimates will be used (Wooldridge, 2013)

3.4. Descriptive statistics

Table 4.1: The descriptive statistics summary for panel data

VARIABLES	(1) N	(2) mean	(3) sd	(4) Min	(5) max
Real GDP growth	519	4.973	3.310	-2.100	21.40
Fdi	510	3.284	4.887	-1.270	46.49
inflation	515	9.533	11.99	-3.290	132.8
External debt	527	73.00	54.00	4.120	357.3
Gross capital formation	532	19.30	9.327	-2.420	74.82
Military expenditure	489	9.099	5.601	0.680	34.12
Education expenditure	396	16.24	5.113	2.630	28.03
Health expenditure	544	10.29	3.697	1.620	28.20
Terms of trade	538	106.2	30.98	21.22	229.5
Current account	433	-4.799	8.634	-37.60	32.54
Rule of law	408	-0.668	0.653	-2.210	1.060
Government effectiveness	407	-0.700	0.609	-1.970	0.880
Political instability	408	-0.532	0.930	-2.990	1.120
Number of countries	34	34	34	34	34

In percentage terms, table 4 shows that the maximum education and health spending by the sample of 34 SSA countries is 28.03% and 28.20% of total government spending, respectively. The averages for education and health public spending are 16.24% and 10.29% of total government spending respectively. The health average is far below the Abuja agreed 15% target by African Union (WHO, 2016). It is imperative to note that the data has some missing observations for some countries hence the differences in observations. The difference is, however, insignificant as the panel data remains statistically strongly balanced.

The table below shows the correlation matrix for the panel data. A general rule is that, if the correlation between two independent variables is between -0.70 and 0.70, multicollinearity between the two variables is most likely not a problem.

Table 4.2: Correlation matrix for panel data

	R_gdp growth	Educ_exp	health_exp	gross capital formation	Fdi	external debt	terms of trade	current account	Inflation	Military_exp	gov_eff	political_inst	rule of law
R_gdp growth	1												
Educ_exp	0.0931	1											
health_exp	0.1503	0.1493	1										
gross capital formation	0.1501	0.1209	0.0263	1									
Fdi	0.0707	-0.024	0.0282	0.5082	1								
external debt	-0.112	-0.252	-0.0293	-0.2763	-0.016	1							
terms of trade	0.1907	-0.189	0.0122	-0.011	0.101	-0.1674	1						
current account	0.1196	-0.074	-0.219	-0.2597	-0.238	-0.1538	0.1167	1					
Inflation	0.0125	0.0228	-0.1126	0.0198	0.018	0.2362	0.0845	0.1072	1				
Military_exp	-0.016	-0.247	-0.1438	-0.1261	0.044	0.1559	-0.0121	-0.0189	-0.1523	1			
gov_eff	-0.058	0.2129	-0.05	0.3475	-0.074	-0.3939	-0.0489	0.1028	-0.0238	-0.5015	1		
political_inst	-0.113	0.0796	0.0992	0.323	0.004	-0.2611	-0.2588	-0.1159	-0.1195	-0.4458	0.642	1	
rule of law	-0.069	0.1322	0.0107	0.4468	-0.002	-0.3391	-0.1694	-0.017	-0.058	-0.4907	0.671	0.5056	1

4. RESULTS AND DISCUSSION

This sections gives an analysis of the results of the study based on cross country data analysis. OLS estimation for cross sectional analysis and fixed effects method are applied and analysed. Policy recommendations are made based on the fixed effects results.

4.1. Results and Interpretation

4.1.1. *Cross section regression results (period averages)*

In order to test the long-rung run impact of health and education public spending on economic growth, the period averages cross sectional regressions (borrowing from Barro (2003)) were run yielding results presented on the table 5 below. The standard errors shown in brackets are controlled for heteroskedasticity. The study included 34 countries because of unavailability of data for other countries. Real GDP growth is the dependent variable. The results table shows that, for all the four regression equations, education public spending is statistically significant at 5% level with some negative impact on growth which is against the theory. Health public spending is statistically significant for all the four regression equations, at 10% for equation 1 and 2, and at 5% for equation 3 and 4.

In all the equations, for example, the results show that increasing education spending by 5% will result in a decrease in real GDP growth of 0.07% to 0. 0.121%, holding other growth determining factors constant. Similarly, equation 3 and 4 show that increasing health public expenditure by 5% will result in an increase in real GDP growth of 0.2%, holding other determinants factors. These results suggest that education spending may be crowding out public investment in key economic enablers or there may be some form of efficiency gaps and resources leakages within the system because the education sector is usually broad which may make it difficult for education disbursements to reach the intended beneficiaries. The health spending results suggest that health public spending is effective in promoting growth in SSA and therefore should be enhanced.

Table 5: Results based on period averages cross sectional OLS regressions.

VARIABLES	(1) R_gdp growth	(2) R_gdp growth	(3) R_gdp growth	(4) R_gdp growth
Education expenditure	-0.0982** (0.0380)	-0.0701** (0.0301)	-0.121*** (0.0326)	-0.0985** (0.0371)
Health expenditure	0.191* (0.0947)	0.155* (0.0844)	0.195** (0.0919)	0.189** (0.0896)
Log initial GDP per capita	-1.391*** (0.270)	-1.461*** (0.270)	-1.423*** (0.255)	-1.383*** (0.260)
Gross capital formation	0.0926** (0.0382)	0.0553 (0.0441)	0.0939** (0.0429)	0.0916** (0.0370)
Fdi gdp	0.199** (0.0928)	0.218* (0.106)	0.225** (0.0989)	0.202** (0.0899)
External debt	-0.0198** (0.00775)	-0.0178** (0.00822)	-0.0224*** (0.00774)	-0.0202** (0.00755)
Terms of trade	0.00327 (0.0130)	0.0138 (0.0149)	0.00168 (0.0133)	0.00370 (0.0127)
Current account	0.113** (0.0465)	0.104 (0.0629)	0.0897* (0.0518)	0.113** (0.0450)
Inflation	0.0451 (0.0294)			0.0450 (0.0289)
Military expenditure	-0.199** (0.0933)	-0.164 (0.103)	-0.242** (0.0864)	-0.204** (0.0841)
Government effectiveness	2.193 (1.322)	1.013 (0.740)	2.030*** (0.712)	1.959** (0.692)
Political instability	-0.944** (0.404)		-1.316*** (0.428)	-1.035** (0.486)
Rule of law	-0.309 (1.110)			
Constant	12.45*** (2.112)	12.47*** (2.195)	13.41*** (1.831)	12.42*** (2.013)
Observations	34	34	34	34
R-squared	0.786	0.693	0.767	0.785

*Robust standard errors in parentheses *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$*

All the regressions have negative and 1% statistically significant log initial GDP per capita coefficients. The estimated coefficient on log initial GDP per capita stresses conditional convergence hypothesis, that is, the lower the initial level of per capita GDP the higher the predicted growth rate as expounded by the neoclassical theory (Barro, 1996). Gross capital formation has a 5% statistically significant coefficient ,0.0916 (se 0.0370), implying that an increase in gross capital formation (private and public investment) by 1% will raise growth by 0.096%. The foreign direct investment (FDI) coefficient of 0.202 (se 0.0899) is significant

at 5% level implying that FDI has positive impact on growth in SSA. This shows that a 1% increase in FDI will result in a 0.202% increase in growth. For external debt, the coefficient of variable -0.0202 (se 0.00755) is significant at 5% level implying that an increase in external debt by 1% has the effect of reducing growth by 0.0202% due to the high costs of debt servicing, interest accruals, and repayment against constrained resources capacity of SSA countries.

In addition, current account has a 5% significant coefficient, 0.113(se 0.0450), meaning a 1% increase in current account raise growth by 0.113%. Military expenditure coefficient, -0.204 (se 0.0841), at 5% significant indicates that a 1% increase in defence spending result in a 0.204% decrease in growth. Equation 3 and 4 show that government effectiveness is important for growth. In 4, for example, the coefficient is positive and significant at 5% level, 1.959 (se 0.692), meaning that increasing government effectiveness by 1% has the effect of boosting growth by 1.959% SSA countries. Political instability variable with a 5% significant coefficient, -1.035 (0.486), imply that increasing political instability of SSA countries has the effect of reducing growth by 1.035%. Terms of trade coefficient, inflation and rule of law are insignificant.

It is imperative to note that the OLS estimation for cross sectional analysis has its fair share of limitations in that it measures the simple relationship between the independent and the dependent variable, tend to underestimate and can mislead policy makers as well as its failure to control for endogeneity. It does not take into account differences in time and countries characteristics within the SSA region. Panel data allow us to control for some types of omitted variables without actually observing them (Stock and Watson, 2011). We can also control for variables that differ across entities but are constant over time and for variables that vary over time but are constant across entities. Thus, we have to use the fixed effects method

to determine the true impact of education and health public spending on economic growth.

4.1.2. Fixed effects results

In order to determine whether to use the fixed effect method or not for the given panel data, the Hausman test was conducted and the results showed that we can safely use the fixed effects regression methodology as the probability value was below 5% ($\text{Prob} > \text{Chi}^2 = 0.000$). The impact of public spending in education and health for SSA countries is shown by the results in table 6 below. The regressions only captured 34 countries because of unavailability of data.

The results of table 6 show that, for all the estimated equations, education and health public spending for the sample countries has positive impact on economic growth which is in line with human capital theory. Education spending has a 5% level of statistical significance for equation 1, 2, 3 and 4 respectively, whether or not we control for inflation, rule of law and political stability. Equation 3, for example, coefficient of 0.122(se 0.0575) imply that if SAA governments increase their expenditure on education by 1% they will be 95% confident that economic growth will increase by 0.122%, all other determinants of growth held constant. The findings concur with those reported by Loto (2011), Wadad and Kamel (2009), and Donald and Shuanglin (1993), but contrasting those reported by Devarajan et al (1993). The same results were also reported by Bleaney et al (2001), Nkiru & Izuchukwu (2013) and, Muduki and Masaviru (2012).

With regards public health spending, the results are statistically significant at 10% for equations 1 and 4, respectively with 2 and 3 having a 5% significance level. Controlling for other determinants of economic growth, the results for equation 3, for example, show that increasing health spending by 1% will result in economic growth of 0.0969%. The outcome is in line with empirical literature by Muthui et al (2013), Gisore et al (2014) and Bleaney et al

(2001) who also concluded that health public spending has positive impact on growth. We can, therefore, conclude that public spending in education has more impact on economic growth when compared to public spending in health. However, the study results buttress the fact that education and health public spending are important for economic growth and, therefore, should be highly prioritised.

Gross fixed capital formation is statistically significant at 5% for equations 1 and 4, and 1% significant for equation 2 and 3. Increasing capital investment by 1% has the effect of improving growth by 0.0937%. This stresses that domestic investment by both the public sector and private sector is vital for growth in SSA. FDI, though statistically significant at 5% significant level for equation 1, 2, 3 and 4, has a negative impact on economic growth. Equation 3 show that increasing FDI by 1% reduces growth by 0,131%. The negative impact of FDI is hinged on the fact that most SSA countries are dominated by extractive industries with beneficiation being conducted in developed countries, for example, Zambia is rich in copper deposits but is not enjoying sustained growth. This buttresses the importance of increasing domestic savings to provide cheap capital for local business people to borrow for domestic investment at low cost.

However, fixed effect results for external debt, inflation, rule of law, and political instability are not statistically significant and have a negative impact on growth. Current account, military expenditure and terms of trade are also not statistically significant but show some positive effect on growth. Positive terms of trade coefficient show the increase in incomes of SSA residents because of the increase in prices of minerals in the global market, even though the increase in relative prices of domestic products is insignificant to generate more output. Recent trends show that terms of trade for countries like Nigeria have decreased significantly due to the global slump in oil prices since mid-2014 (IMF, 2016).

Table 6: Regression results for panel data - Fixed effects model

VARIABLES	(1) R_gdp growth	(2) R_gdp growth	(3) R_gdp growth	(4) R_gdp growth
Education expenditure	0.116** (0.0554)	0.132** (0.0612)	0.122** (0.0575)	0.118** (0.0568)
Health expenditure	0.0891* (0.0495)	0.0932** (0.0449)	0.0969** (0.0419)	0.0857* (0.0480)
Gross capital formation	0.101** (0.0399)	0.0912*** (0.0304)	0.0937*** (0.0298)	0.0992** (0.0365)
Fdi gdp	-0.138** (0.0673)	-0.125** (0.0520)	-0.131** (0.0526)	-0.137** (0.0659)
External debt	-0.00549 (0.00865)	-0.00404 (0.00902)	-0.00583 (0.00853)	-0.00536 (0.00880)
Terms of trade	0.0125 (0.0103)	0.0133 (0.0105)	0.0117 (0.0103)	0.0113 (0.0104)
Current account	0.0323 (0.0220)	0.0323 (0.0207)	0.0307 (0.0208)	0.0335 (0.0226)
Inflation	-0.0187 (0.0231)			-0.0182 (0.0227)
Military expenditure	0.0117 (0.0778)	0.0210 (0.0607)	0.00743 (0.0657)	0.0137 (0.0769)
Government effectiveness	0.559 (1.630)	-0.0125 (1.639)	0.166 (1.557)	0.272 (1.606)
Political instability	-0.594 (0.579)		-0.709 (0.597)	-0.735 (0.582)
Rule of law	-0.921 (1.776)			
Constant	-0.477 (3.188)	-0.694 (3.179)	-0.370 (2.927)	-0.0855 (2.933)
Observations	235	239	239	235
R-squared	0.104	0.099	0.104	0.102
Number of countries	33	34	34	33

*Robust standard errors in parentheses *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$*

Overall, the results have shown that education and health public spending have a positive impact on economic growth when we apply the fixed effects estimation technique that caters for the unobserved characteristics among countries in the SSA region that also have an impact on economic growth and has the effect of reducing any possibility of endogeneity.

4.2. Discussion

The objective of this study was to determine the impact of public expenditure components, that is, health and education spending on economic growth in SSA. It was based on the

hypothesis that public spending in education and health has positive impact on economic growth. The above results for fixed effects model seem to concur with economic theory implying that spending in education and health are important government expenditure components that must be prioritised by SSA countries. To achieve growth, SSA governments must spend more in the provision of public education and health. According to this study, the impact of education spending on economic growth is more pronounced as compared to that of health implying that education spending should be given more priority by SSA member countries.

SSA countries must also reduce the high reliance on FDI and begin to increase domestic gross capital formation as FDI is mainly extractive and also tend to crowd out opportunities for domestic companies. FDI, however, can enhance growth of the region if governments become more active by way of guiding investments to productive sectors that also have technological and spill-over effects. Increased domestic investment can be attained through increased domestic savings. This also reduces the prevalence of shocks to the economy and hence ensures sustained economic growth.

Whilst Eggoh et al (2015) concluded that public spending in health and education does not impact positively on economic growth for African countries, this study has proved statistically that both education and health public spending have a positive impact on economic growth for SSA. This, however, depend on other growth determining variables as gross capital formation. Thus, the empirical results for this study are in support of the hypothesis that was stated at the beginning of this study that: education and health public spending have positive impact on economic growth in SSA.

4.3 Limitations of the study

Whilst the study has managed to produce results that are in line with economic theory, it failed to disaggregate education and health expenditures into recurrent and capital to be able to determine whether recurrent, capital or both components have impact on economic growth. The study also faced the challenge of unavailable data for years prior to 1995 further reducing the time frame of the study to 16 years.

5. CONCLUSION AND RECOMMENDATIONS

5.1. Conclusion

The overall objective of this study was to determine the impact of public spending in health and education on economic growth in SSA with the view to contributing to policy debate in the public sector. This was driven by the need to enhance efficiency and effectiveness in the use of scarcely available public resources against the unmatched increase in demand for public goods and services by the citizenry. The results of the fixed effects estimation have shown that public spending in health and education have positive impact on economic growth in SSA. These results seem to concur with economic theory implying that governments should spend more in education and health in order to boost economic growth in the region.

5.2. Policy Recommendations

Based on the above conclusion, it is recommended that developing countries spend more on education and health in order to encourage economic growth. More priority should be given to education spending as the education coefficient showed some strong growth effects as compared to health. It is also recommended that SSA governments tap into the existing efficiencies of the private sector by opening up the health and education supply to the private sector to increase coverage and delivery of the services to the citizenry through Public Private Partnerships arrangement. In addition, SSA governments can improve on their effectiveness in the delivery of public services, including effective education and health funding and delivery coupled with enhanced results based monitoring and evaluation frameworks. A clearly defined public expenditure framework should also be strengthened among member countries so as to ensure value for money as well as reducing resources leakages.

5.3. Areas for further research

There is need in the future to examine the impact of disaggregated health and education public expenditures to determine their impact on economic growth, especially in conflict ridden countries of SSA.

APPENDIX 1: List of Sub-Saharan Africa countries included in the study

Benin	Mauritius
Botswana	Mozambique
Burkina Faso	Niger
Burundi	Nigeria
Cape Verde	Rwanda
Chad	Senegal
Congo, Rep.	Sierra Leone
Cote d'Ivoire	South Africa
CRA	Sudan
Eritrea	Swaziland
Gabon	Tanzania
Gambia, The	Togo
Ghana	Uganda
Guinea-Bissau	Zambia
Kenya	
Lesotho	
Madagascar	
Malawi	
Mali	
Mauritania	

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