

# The Relation between Capital Infrastructure Spending and Economic Growth

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**Abstract:** The Kenyan government has been spending massive amount of funds to the various Ministries in order to achieve economic development. The education, health, infrastructure and agriculture sectors have been receiving the largest amount of funds. Despite the increased government spending, there are conflicting results on the effects of government spending on economic growth. This paper presents a critical analysis on the effects of infrastructure capital expenditure on economic growth in Kenya. The specific objective of the study was to establishing the effects of public capital expenditure on infrastructure on economic growth in Kenya. The study adopted a causal relationship approach and relied on secondary data from the Ministry of National Treasury and Kenya Bureau of Statistics with the data straddling from 1980 to 2011 for all variables. It was hypothesized that increased expenditure will not increase GDP. The study employed Johansen cointegration test and the Error Correction Method (ECM) in the empirical analysis to evaluate the relationship among the variables. The data was subjected to stationarity test. The short run and long run relationship with three cointegrating equations revealed that the coefficient of expenditure on infrastructure was statistically significant and positively related to GDP at 5% level of significance. The government should therefore is justified increase the percentage capital amount allocated into this sector. It was also noted that the government programs like Lamu Port and New Transport Corridor Development to Southern Sudan and Ethiopia (LAPSSET) to foster increased investment in infrastructure and hasten delivery of goods and services is recommended.

**Keywords:** Capital Expenditure, Economic Growth and Economic Development.

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## 1. INTRODUCTION

In 1963, the government of Kenya (GoK) identified illiteracy, poverty and disease as the main problems to be addressed in order to obtain sustainable economic growth. The Government has tried to address the above problems through National Development Plans, Sessional Papers, Presidential Commissions, Task forces and various studies.

During 1964 and 1974 the economy grew by an average of 6.6% due to massive private investment. At that time Kenya competed favourably with some of the newly industrialized countries (NICs) of East Asia e.g. South Korea.

### **Composition of Government Expenditure:**

Public expenditure in Kenya classified in terms of capital expenditure that is all expenditures which promote economic growth and development and recurrent expenditure for the payment of salaries, and consumption purposes. The public expenditure in Kenya for the period 1963 to 2011 is summarized in percentage form as shown in fig 1.1.

From the above figure, the recurrent expenditure has been more than the developmental expenditure since 1963. This is due to the fact that in 1960s the government was guided by African socialism which dictated that there should be a deliberate effort to eradicate poverty, ignorance and disease. Government had to take over the mantle of providing for those needs and in the subsequent years, inefficiency, corruption, bloated government ministries and excessive members of parliament salaries can partly account for the trend (Republic of Kenya, 2008).

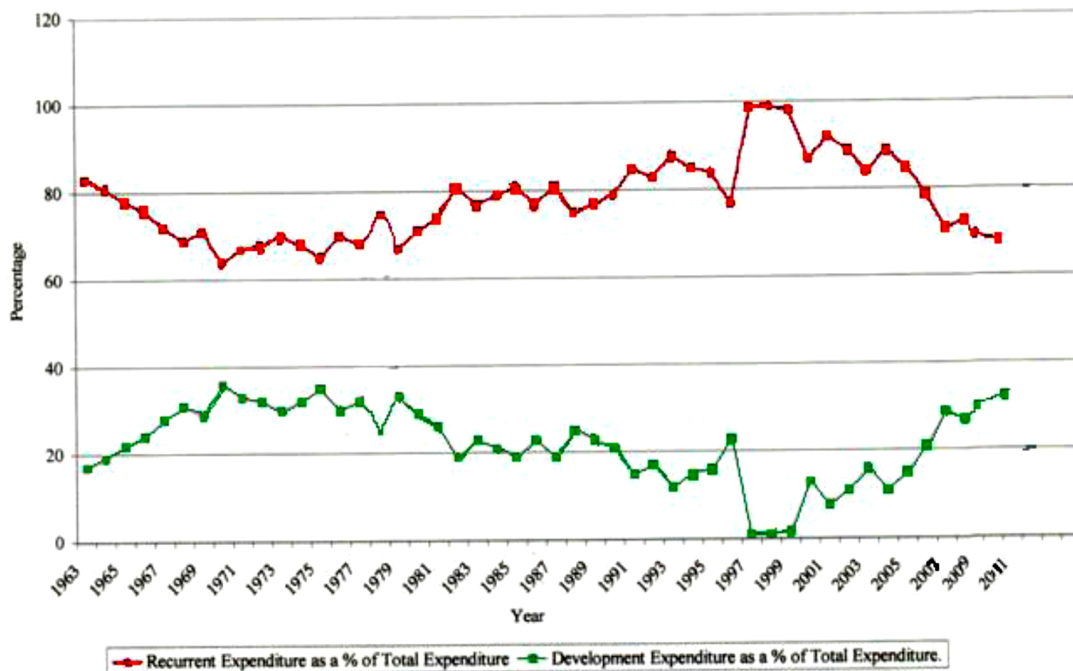


Figure 1.1 Composition of Government Expenditure

Source: Republic of Kenya, 2008

### General Objective of the Study:

The general objective of the study was to investigate the relation between capital infrastructure spending and economic growth.

### Significance of the Study:

The purpose of this study was to develop a framework for determining differential effects of government capital expenditure on economic growth. This was with a view to assist the policy makers have an empirical way of allocation of public funds to various sectors of the economy. This study will also contribute to the body of knowledge which exists now by providing empirical evidence specifically on impact of government capital expenditure components on economic growth in Kenya.

### The Scope of the Study:

The paper used time series data for the period 1980-2011.

## 2. EMPIRICAL LITERATURE

Devarajan *et al.* (1996) used functional categories of public expenditure in their economic growth regressions. The study established that public expenditure had a negative impact in developing countries but had a positive impact in developed countries.

Albala and Mamatzak (2004) used time series data covering 1960-1995 to estimate a Cobb-Douglas production function that includes public infrastructure for Chile, found a positive and significant correlation between public infrastructure and economic growth. The study reported that public investment crowds out private investment.

Were (2001) found out that current investment in human capital development to be growth supporting. But lagged public investment in human capital was found to adversely affect growth.

Dar and Amirkhalkali (2002) set out to determine how government size affected the economic growth by looking at OECD countries in the period 1970 – 1999. The study alluded to the fact that the government size had a negative and statistically significant impact on economic growth.

Chih Hung Liu, *et al.* (2008) studied the causal relationship between GDP and public expenditures for US federal government covering the time series data 1974-2002, they found in this study that total expenditures does cause the growth of GDP, which is consistent with the Keynesian theory.

Liu *et al.*, (2008) examined the causal relationship between GDP and public expenditure for the US data during the period 1947-2002 the results indicated that public expenditure raises the US economic growth.

**Critique:**

While majority of the studies made use of regression analysis, unfortunately diagnostic tests, stationarity test, and cointegration which are very crucial in modeling were glaringly missing. This could put to question reliability of the models so developed. This study employed stationarity test to ensure that the relationship established from the regression analysis were not spurious. In addition co- integration test was done to verify if the relationship hold in the long run. Various diagnostic tests namely autocorrelation, heteroscedasticity, and multicollinearity were done to ensure that the model conforms to the rules of regression analysis.

From the various studies that have been conducted, there are conflicting results on the impacts of government expenditure on GDP growth, in some studies it has prompted the increase in GDP while in other studies there has been a negative relationship. Most of these studies have been done on the western countries and few African countries; the countries have got different government structures and even political administrations. Few studies have been conducted in Kenya and have reported contradicting results. Therefore one becomes curious to study the Kenya case.

**Research Design:**

Building on the existing theoretical and empirical literature, this study perceived a causal relationship between government capital expenditure and economic growth in Kenya. Therefore, the exploratory causal study design was adopted to investigate the impact of government expenditure on economic growth within the context of Kenya economy

**3. DATA ANALYSIS TECHNIQUES**

The study employed both descriptive and inferential statistics in analysis. E-views was used since it time series data analysis was done. The standard deviation was used to show the extent to which the above variables differed. Darling normality test or A<sup>2</sup> statistic was used to test normality of the data. Multiple regression and analysis Johansen tests were used to show the relationship of variables on the impacts of capital expenditure on GDP growth. The p value of each variable was calculated to establish the significance in the model in which threshold for rejecting null hypothesis was set.

**Models of Data Analysis:**

The modified model that facilitated estimation of the variable coefficients is given below.

The government expenditure GEXP is defined by onecomponents in the study;

$$GEXP_t = f [EXPF_t), U_t]..... (3.3)$$

Since,

$$GDP_t = f (GEXP_t) \text{ according to the Keynesian,}$$

Hence the model under study was derived as:

$$GDP_t = C_t + \beta_0 EXPF_t + U_t..... (3.4)$$

Where;

C<sub>t</sub> = Intercept of the regression line. It depicts any level of economic growth that exists at zero government expenditure level

EXPF<sub>t</sub> = Capital expenditure on infrastructure in shillings

U<sub>t</sub> = Error term (causes of economic growth not explained by variables in the model)

β<sub>0</sub> is the are regression coefficient

#### 4. EMPIRICAL RESULTS AND DISCUSSIONS

##### Unit Root Tests Results

Augmented Dickey Fuller (ADF) was used to test for unit roots. The unit roots results of the variables in the model are reported in table1.

**Table 1: Stationarity Test at Level Results**

INFRASTRUCTURE	INTERCEPT	6.084	-3.670	-2.964	-2.621	0.000
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As shown in the Table 1 above, infrastructure spending was stationary at level as indicated.

##### Cointegration Analysis

The numbers of integrating vectors are presented in table 4.8 below.

##### VAR Lag Order Selection Criteria

Endogenous variable EXF

**TABLE2: VAR Lag Order Selection Criteria**

LAG	LOGL	LR	FPE	AIC	SC	HQ
0	-1452.885	NA	1.16e+39	104.1346	104.3725	104.2074
1	-1322.557	204.8001	6.46e+35	96.61125	96.61125	97.04761
2	-1272.985	60.19457*	1.35e+35*	94.85611*	97.47294*	95.65610*

\* indicates lag order selected by the criterion

LR: Sequential modified LR test statistic (each at 5% level)

FPE: Final prediction error

AIC: Akaike information criterion

SC: Schwarz information criterion

The decision rule is to choose the model with the lowest value of the information criteria. This ensures that the error term is not misspecified (Enders, 1995). The results of the Aikaike Information Criteria, Hannan-Quinn information criterion, Sequential modified LR test statistic, Final prediction error and Schwarz information criterion lag selection in table 3 point to the use of 2 lags as the most appropriate lag length that would minimize the value of the selection criteria.

##### Johansen Long Run Cointegration Test:

**Table 3: Normalized cointegrating coefficients**

	GDP	C	EXPF
Cointegrating Eq:	Coefficients	40498.15	4.471450
	Std. Error	3372.03	1.73815
	T-Statistic	12.0100	2.57253

$$GDP = 40498.15 + 4.471450EXPF^*_t$$

As seen from the above equation the explanatory variable sufficiently influence the GDP, This was achieved by use Johansen's multivariate approach and the vector error correction.

##### Discussion of the Empirical Results:

The main objective was to investigate the impact of capital government expenditure on economic growth in Kenya. The specific objectives were to investigate the impact of government capital expenditure on education, infrastructure, health and agriculture on economic growth in Kenya.

##### The impact of capital public expenditure allocation to infrastructure on economic growth:

Johansen test showed a 1 unit increase in capital expenditure will lead to 4.47 units increase in the GDP at 5% level of significance.

The results corroborates the findings of Maingi (2010), Were (2001), but contrasted with the findings of Devarajan *et al.*, (1996). The positive relationship was because intensive infrastructure reduces transportation cost and hence the prices of commodities, it also saves manpower time, fuel loss and reduction of the number of accidents.

## 5. CONCLUSIONS

The study submits that there is a relationship between government expenditure and capital infrastructure spending. Based on the fact that Kenya is a developing country any investment in infrastructure will bring in many economic benefits to the country.

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## REFERENCES

- [1] Aibala-Betrand, M. and Emmuel Mamatzak, C. (2004). "The impoact of public infrastructure on Productivity of Chillian Economy." *Review of Development Economics, Wiley Blakwell*, vol. 8(2), Pages 266-278,05.
- [2] Dar and Atul Amir Khalkhali (2002). "Government size, factor accumulation, and economic growth: Evidence from OECD countries." *Journal of Policy Modeling*, Elsevier.
- [3] Devarajan, S., Swaroop, V., and Heng-fu. Z. (1996). "The Composition of Public Expenditure and Economic Growth." *Journal of Monetary Economics*, 31, 33, 37, 44,112-122.
- [4] Enders, W. (1995). *Applied Econometric Time Series*. John Wiley & Sons, Inc., New York.
- [5] Economic Survey. ( 2012). Kenya economic Survey Highlights: government printers.
- [6] Liu Chih, H.L., Hsu, C. and Younis, M. (2008). "The association between government expenditure and economic growth: The granger causality test of the US Data, 1974-2002." *Journal of Public Budgeting, Accounting and Financial Management*.
- [7] Maingi, J. (2010). The impact of public expenditure on economic growth in Kenya. D.phil Thesis. Kenyatta University, Nairobi 2010.
- [8] Were, M. (2001). "The impact of External Debt on Economic Growth and Private Investment in Kenya: An Empirical Assessment", A Paper Presented at the Wider Development Conference on Debt Relief, Helsinki.