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IMPACT OF ECONOMIC GROWTH ON PRIVATE INVESTMENT IN KENYA

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Abstract

This study explored the impact of the relative impact of economic growth on private investment over the period of 1970-2007.The variables were first tested for unit root using the Dickey-Fuller (1979) and Philips-Perron (1988) techniques. The study employed the Multivariate Cointegration Technique developed in Johansen (1988) to test the long run relationship of the variables and the Error correction model was used to determine the short run relationship of the variables. A long-run model stability test was undertaken using CUSUM test and CUSUM of squares test (Brown et al. 1975). The unit root test revealed that all the variables under investigation are cointegrated of order one, that is I(1), in the short- run and are also cointegrated in the long run. The long-run model was found to be stable. The major hypothesis of this paper is that there is a positive and significant relationship between economic growth and private investment. The result from the study was that economic growth positively influences Private Investment.

Keywords: Private Investment, Economic Growth, Gross Domestic Product, Vision 2030

INTRODUCTION

Under Vision 2030, Kenya aims to increase annual GDP growth rates to 10% and to maintain that average till 2030. This is an ambitious goal and the Government is aware of that. But it has the confidence that Kenyans will rise to the challenge as they have done often before. Kenya in fact will be only the 5th country in the world to achieve such a high level of sustained economic growth. Considering that the 2007 economic growth of 6.1 % was primarily through rapid utilization of existing capacity rather than efficiency gains or much new investments, achieving the 10% growth will require a dedicated campaign to alleviate existing constraints to future growth, and in particular to use our resources more efficiently.

Kenya faces inter-related development challenges that are key both to welfare improvements for the general population and to increase private investment in particular. First, it has to establish a viable and stable macroeconomic framework and to streamline the incentive regime. Second, it needs to downsize the public sector and establish an enabling environment with accountability and transparency. Third, and most importantly, it really must adopt sectoral policies and rearrange priorities in public expenditures to promote efficient economic growth, increase product and target poverty reduction through increasing private investments. These challenges point out to the need for Kenya to make a fundamental shift away from policies and institutional arrangements that promote rent-seeking and towards policies, programmes and institutions that promote efficiency, sustainable and broad-based growth and job creation.

The findings of this study are important especially at the moment when the government is implementing the VISION 2030 goal which is intended to transform Kenya into a middle-income country by 2030. With growth expected to be around 10% per annum for the next 20 years, the growth of private investment will be a key driver. Policy makers will gain from the knowledge obtained and be able to prepare alternative policies which will aid in increasing private investments, GDP growth rate and alleviate poverty in Kenya.

THEORETICAL LITERATURE REVIEW

The theories of investment date back to Keynes (1936), who first called attention to the existence of an independent investment function in the economy. A central feature of the Keynesian analysis is the observation that although savings and investment must be identical ex-post, savings and investment decisions are, in general, taken by different decision makers and there is no reason why ex-ante savings should equal ex-ante investment. The next phase in the evolution of investment theory gave rise to the accelerator theory, which makes investment a linear proportion of changes in output. In the accelerator model, expectations, profitability and capital costs play no role. Keynesians have traditionally favored the accelerator theory of investment while disregarding the role of factor costs.

A more general form of the accelerator model is the flexible accelerator model. The basic notion behind this model is that the larger the gap between the existing capital stock and the desired capital stock, the greater a firm's rate of investment. The hypothesis is that firms plan to close a fraction, of the gap between the desired capital stock, K*, and the actual capital stock, K, in each period. This gives rise to a net investment equation of the form of:

$$It = \alpha (Kt^* - Kt\text{-}1) \qquad (1)$$

Where: It = net investment, Kt* = desired capital stock, Kt-1 = last period's capital stock, and α = partial adjustment coefficient.

Within the framework of the flexible accelerator model, output, internal funds, cost of external financing and other variables may be included as determinants of Kt*. The flexible accelerator mechanism may be transformed into a theory of investment behavior by adding a specification of Kt* and a theory of replacement investment. Alternative econometric models of investment behavior differ in the determinants of Kt*, the characterization of the time structure of the investment process and the treatment of replacement investment. In the flexible accelerator model, Kt* is proportional to output, but in alternative models, Kt* depends on capacity utilization, internal funds, the cost of external finance and other variables.

According to the neo-classical investment theory (also known as the .accelerator effect.), private investment is influenced by the growth rate of real GDP and user cost of capital (Jorgensen, 1967). The growth rate could be construed as a proxy for expectations about future demand and returns from the output of investments (Jayaraman 1996).

EMPIRICAL LITERATURE REVIEW

Serven and Solimano (1993) assert that there are a wide range of factors that affect investment in developing countries, crucial ones being output growth, real exchange rates, public investment, foreign debt, real interest rates and uncertainties.

Bwire (1992) estimated a private investment function for Kenya which revealed that private investment was influenced by the rate of growth of the GDP, the rate of inflation and the external debt service.

Matwang'a (2000) found positive influence of savings, GDP growth and public investment on the behaviour of private investors in Kenya. Debt service ratio and inflationary uncertainty negatively influence private investment.

Three variations of equations were estimated by Blejer and Khan (1994) to capture alternative policy variables. The first equation relates to private investment (PI) as measured by capital formation by the private sector to growth of income (GDP), credit flow to the private sector from investment banks (CRD), public sector investment (PSI), and foreign exchange availability proxied by import capacity (IMPC):

$$PI = \beta_0 + \beta_1 GDP + \beta_2 CRD + \beta_3 PASI + \beta_4 IMPC \quad (2)$$

The second equation estimated by Blejer and Khan (1994)separates public investment into central government investment (CGI) and parastatal sector investment (PASI). The other explanatory variables are the same as for Equation (2).

$$PI = \beta_0 + \beta_1 GDP + \beta_2 CRD + \beta_3 PASI + \beta_4 CGI + \beta_5 IMPC \quad (3)$$

Coefficient ***(β_1)*** would be expected to be positive as GDP increase would normally result in private sector investment increase.

The third equation also estimated by Blejer and Khan (1994) separates government investment into infrastructural and non-infrastructural.

$$PI = \beta_0 + \beta_1 GDP + \beta_2 CRD + \beta_3 PASI + \beta_4 INFI + \beta_5 NINFI + \beta_6 IMPC \quad (4)$$

In studies like that by Blejer and Khan (1994) it was recognized that it would be meaningful to isolate the infrastructural component of public investment from the other and then estimate the independent effects of the categories. In their study the data did not make it possible to make such functional distinction.

METHODOLOGY

The third equation developed by Blejer and Khan (1994) and applied by Moshi and Kilindo (1989) in their research entitled "The impact of policy on macroeconomic variables: A case study of private investment in Tanzania", the model was adapted to be used in this study. The model was modified by making it log-linear, introducing a dummy for political stability (D) and a subscript 't' for time series. It is therefore specified as,

$$LPI_t = \beta_0 + \beta_1 LGDP_t + \beta_2 LCRD_t + \beta_3 LPASI_t + \beta_4 LINFI_t + \beta_5 LNINFI_t + \beta_6 LIMPC_t + D_t + \varepsilon_t \quad (5)$$

Where:

LPI = Private Investment, LGDP = Gross Domestic Product, LCRD = Credit available to private sector, LPASI = parastatal infrastructural investment, LINFI = central government infrastructural investment, LNINFI = central government non-infrastructural investment, LIMPC = import capacity: Foreign exchange availability proxied by import capacity; measured as log of the ratio of reserves over total import bill, D = dummy for political instability : D = 1 for post-election violence, tribal clashes, attempted coup and D = 0 otherwise and ε = the random term. t = time period, which modifies equation to be a time series model

In this study, there was no need to use proxies for economic growth and private investment. National accounts data provide the functional distinction required for the analysis. The major sources of data used in the study were National Accounts (GDP); KNBS Economic Surveys and Statistical Abstracts (investment as measured by capital formation with breakdown by type and between private and public).

Annual data for the period 1970-2007 were used in the study. The period was determined by the KNBS Economic Surveys and Statistical Abstracts available at the Amagoro, Teso North District Headquarters in 2009.

EMPIRICAL RESULTS

Unit Roots Results

Unit root tests of the variables in the analysis are shown in Table 1 below. Two unit root tests have been used, i.e. ADF and PP tests.

Table 1: Unit Roots Test Results

Unit root tests for residuals

Based on OLS regression of LPI on:

C LGDP LCRD LPASI LNINFI LIMPC

38 observations used for estimation from 1970 to 2007

	Test Statistic	LL	AIC	SBC	HQC
DF	-4.2908	39.2553	38.2553	37.6458	38.0862
ADF(1)	-2.6947	39.6777	37.6777	36.4589	37.3397
ADF(2)	-1.7922	40.4341	37.4341	35.6058	36.9270
ADF(3)	-1.8762	40.6678	36.6678	34.2300	35.9917
ADF(4)	-2.1462	41.5626	36.5626	33.5155	35.7175
ADF(5)	-2.3389	42.1367	36.1367	32.4801	35.1225
ADF(6)	-2.3249	42.4046	35.4046	31.1385	34.2213
ADF(7)	-1.8956	42.4281	34.4281	29.5526	33.0759
ADF(8)	-1.4110	42.7647	33.7647	28.2798	32.2435
ADF(9)	-2.2711	46.5590	36.5590	30.4646	34.8686
ADF(10)	-2.9272	48.8637	37.8637	31.1599	36.0043
ADF(11)	-2.1457	48.8748	36.8748	29.5615	34.8464
ADF(12)	-2.2722	49.7359	36.7359	28.8132	34.5385

95% critical value for the Dickey-Fuller statistic = -5.4075

LL = Maximized log-likelihood AIC = Akaike Information Criterion

SBC = Schwarz Bayesian Criterion HQC = Hannan-Quinn Criterion

The ADF and the Phillips-Perron tests were carried out with a constant and no trend whose critical value of -5.4075 at 5% significance level.

The tests indicate that the value of the statistic is less than the critical value in absolute terms, hence the null hypothesis is rejected and the series are cointegrated. That is, all the variables are integrated of order one (*I(1)*) and become stationary after differencing once.

Cointegration Results

The cointegration test results obtained using Johansen (1988) and Johansen and Juselius(1990) are reported in Table 2 below.

Table 2: Cointegration Test Results

Cointegration with unrestricted intercepts and unrestricted trends in the VAR

Cointegration LR Test Based on Maximal Eigenvalue of the Stochastic Matrix

38 observations from 1970 to 2007. Order of VAR = 3.

List of variables included in the cointegrating vector:

LPI LGDP LCRD LPASI LINFI

LNINFI LIMPC D

List of eigenvalues in descending order:

.98373 .87042 .79664 .66717 .50550 .38225 .25629 .029276

Null	Alternative	Statistic	95% Critical Value	90% Critical Value
r = 0	r = 1	144.1489	54.1700	51.2600
r<= 1	r = 2	71.5203	48.5700	45.7500
r<= 2	r = 3	55.7464	42.6700	39.9000
r<= 3	r = 4	38.5045	37.0700	34.1600
r<= 4	r = 5	24.6474	31.0000	28.3200
r<= 5	r = 6	16.8583	24.3500	22.2600
r<= 6	r = 7	10.3635	18.3300	16.2800
r<= 7	r = 8	1.0399	11.5400	9.7500

Use the above table to determine r (the number of cointegrating vectors)

Cointegration with unrestricted intercepts and unrestricted trends in the VAR

Cointegration LR Test Based on Trace of the Stochastic Matrices

The trace statistic rejects the null hypothesis of the existence of zero or one cointegrating relationships in the private investment logarithmic equation, but accepts the alternative existence of five cointegrating relationships at least at the 5% significance level. The long run relationship is guaranteed by the existence of at least one cointegrating vector.

The Long-Run Equilibrium

below, we report the estimates of the cointegrating vectors normalized on the velocities and which gives the long-run equilibrium condition.

The long-run responses are hypothetically satisfactory for real GDP growth rates (LGDP), central government infrastructural investment (LINFI), and import capacity (IMPC). However, the t statistics for credit available from commercial banks (LCRD) and for dummy on political instability (DU) are not significant. Parastatal infrastructural investment (LPASI) and central government non-infrastructural investment in Kenya do not favour private investment. Central government infrastructural investment (LINFI) significantly crowds-in private investments in the long-run.

Table 3: The Over-Parameterized Estimation of the Error Correction Model

Error Correction Representation for the Selected ARDL Model
ARDL(0) selected based on Akaike Information Criterion

Dependent variable is dLPI
37 observations used for estimation from 1971 to 2007

Regressor	Coefficient	Standard Error	T-Ratio[Prob]
dC	1.5855	.020395	77.7387[.000]
dLPII	.078941	.0010696	73.8030[.000]
dLGDP	.0024378	.0013861	1.7587[.090]
dLCRD	-.5739E-3	.9341E-3	-.61436[.544]
dLPASI	-.0076314	.0025976	-2.9379[.007]
dLINFI	.011337	.0055932	2.0269[.053]
dLNINFI	-.0036851	.9878E-3	-3.7305[.001]
dLIMPC	.0068685	.0028652	2.3972[.024]
dD	-.3567E-4	.0020858	-.017102[.986]
ecm(-1)	-.997341	.3657231	-2.727[000]

ecm = LPI -1.5855*C -.078941*LPII -.0024378*LGDP + .5739E-3*LCRD + .007631 4*LPASI -.011337*LINFI + .0036851*LNINFI -.0068685*LIMPC + .3567E-4*D

R-Squared	.69751	R-Bar-Squared	.63679
S.E. of Regression	.0056969	F-stat. F(9, 27)	1243.9[.000]
Mean of Dependent Variable	-.0038494	S.D. of Dependent Variable	.10059
Residual Sum of Squares	.9087E-3	Equation Log-likelihood	143.8656
Akaike Info. Criterion	134.8656	Schwarz Bayesian Criterion	127.6164
DW-statistic	2.1328		

R-Squared and R-Bar-Squared measures refer to the dependent variable dLPI and in cases where the error correction model is highly restricted, these measures could become negative.

Diagnostic Tests:

Serial Correlation (Breusch-Godfrey LM Test, F-Statistic)	0.512[0.645]
ARCH Test (F-Statistic)	0.008[0.893]
Normality (JarqueBera, *X2* statistic)	1.449[0.539]
RESET F (Ramsey Test, F-Statistic)	0.179[0.686]

Note: diagnostic test probability values are shown in the parenthesis.
No terms were significant at 1% or 5% levels.

The lagged error correction term is negative, significant and the coefficient is less than unity. This means that the error correction model is well specified and also confirms our earlier findings on the cointegration of the variables.

A one period lagged over-parameterized version of the results shown in table 3. A one period lagged equation is reasonable for a study using annual data in contrast to a study utilizing monthly or quarterly data where lags can be many. The inclusion of the lagged values of the dependent and explanatory variables is to ensure that lagged effects on the private investment are captured.

The model was tested for normality, serial correlation, autoregressive conditional heteroscedasticity and specification error.

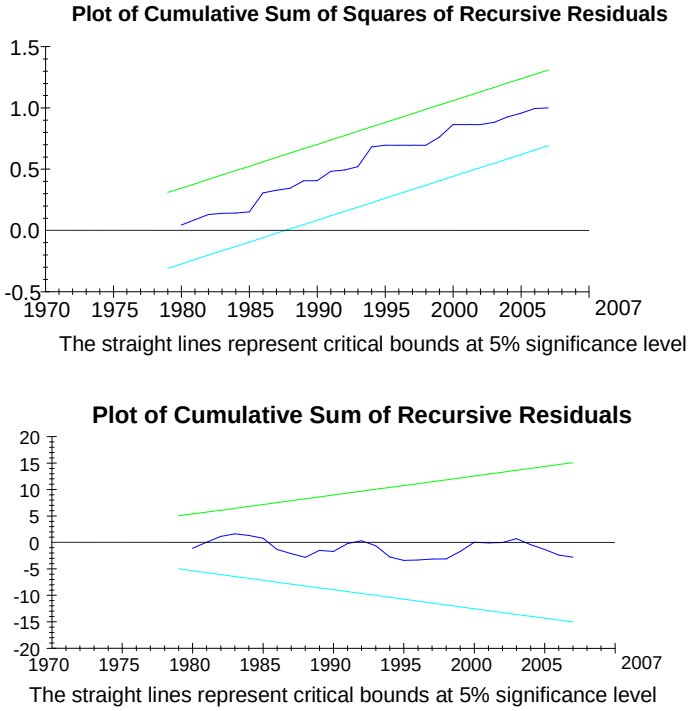
The Stability Test

In interpreting the foregoing long-run model it was implicitly assumed that the sample coefficients remained stable throughout the period. Inference drawn on the strength of the full sample estimate might be invalid if it happens that the coefficients were indeed not stable. The plot of the CUSUM test and CUSUM of Squares test (Brown *et al*, 1975) show that no errors were statistically significant over the study period.

Instability would have been shown by movement of the residue plot outside the critical lines in any of the two tests. The results are shown in Figure 2 below CUSUM 5% level of Significance.

From the stability test, we conclude that the stability of the long-run model is remarkable considering the large number of important reforms undertaken during the 1980s and 1990s. This also indicates that the model is well specified.

Figure 1: Stability Test



The Short-Run Model

After the confirmation of the existence of the long-run relationship, the short run dynamics of the relationship were examined. The Engle and Granger (1987) procedure was used where an error correction model was developed. The error correction model involved estimating the model in stationary form of variables and adding an error correction term as another explanatory variable. The residual from the cointegrating regression was taken as valid error correction term, *ecm*, which was then built into the error correction model in lagged form. The error correction model is in differenced form to ensure stationarity of variables, and is as follows:

$$\Delta RPI_t = \beta_0 + \sum_{i=1}^{7} \beta_{it} \Delta X_{it} + \sum_{i=1}^{7} \alpha_{it} X_{it-1} + \delta \Delta RPI_{t-1} + \phi ecm_{t-1} + \varepsilon_t \quad \text{.....(6)}$$

Where, the endogenous variable is the real private investment and exogenous variables $x_1$to x_7 are real gross domestic product, real credit available, real parastatal sector infrastructural investment, real central government infrastructural investment, real central government non-infrastructural investment, real import capacity and dummy for political risk. The endogenous variable's lagged stationary value was included as an exogenous variable. *ECM* is the error correction component while ε_t is the random error term. All variables are in log form.

Table 4: The Parsimonious Model

Error Correction Representation for the Selected ARDL Model
ARDL(0) selected based on Akaike Information Criterion

Dependent variable is dLPI
37 observations used for estimation from 1971 to 2007

Regressor	Coefficient	Standard Error	T-Ratio[Prob]
dC	1.5760	.011991	131.4362[.000]
dLPII	.079144	.9677E-3	81.7887[.000]
dLGDP	.0024552	.0013328	1.8421[.076]
dLPASI	-.0079153	.0024882	-3.1812[.003]
dLINFI	.012958	.0047037	2.7549[.010]
dLNINFI	-.0034194	.8592E-3	-3.9799[.000]
dLIMPC	.0072944	.0026218	2.7821[.009]
ecm(-1)	-.68135	0.1726	-3.9476[000]

ecm = LPI -1.5760*C -.079144*LPII -.0024552*LGDP + .0079153*LPASI -.01295 8*LINFI + .0034194*LNINFI -.0072944*LIMPC

R-Squared	.68747	R-Bar-Squared	.62696
S.E. of Regression	.0055433	F-stat. F(7, 29)	1689.0[.000]
Mean of Dependent Variable	-.0038494	S.D. of Dependent Variable	.10059
Residual Sum of Squares	.9218E-3	Equation Log-likelihood	143.6001
Akaike Info. Criterion	136.6001	Schwarz Bayesian Criterion	130.9619
DW-statistic	2.0945		

R-Squared and R-Bar-Squared measures refer to the dependent variable dLPI and in cases where the error correction model is highly restricted, these measures could become negative.

Diagnostic Tests:

Serial Correlation (Breusch-Godfrey LM Test, F-Statistic)	0.320[0.833]
ARCH Test (F-Statistic)	1.659[0.326]
Normality (JarqueBera, X^2statistic)	1.874[0.446]
White Heteroskedasticity Test (F-Statistic)	0.989[0.512]
RESET F (Ramsey Test)	5.42[0.242]

Note: diagnostic test probability values are shown in the parenthesis.
No terms were significant at 1% or 5% levels.

The test statistics are satisfactory. The goodness-of-fit variable (R^2) show that the exogenous variables account for 68.7% of the variations in private investment in the short run. The DW statistic is slightly greater than two and larger than R^2, meaning that the regression is not spurious.

As the variables are expressed in logarithmic form, the coefficients are interpreted as elasticities. The error-correction term (*ecm*) is negative as expected, and significant (high absolute *t*-statistic). The strong significance reinforces the argument of the model variables being cointegrated. The adjustment of the model to the previous year's disequilibrium is 68.7%.
In the short-run, gross domestic product, central government infrastructural investment and import capacity rates positively influence private investments. Credit available, parastatal sector investment, central government non- infrastructural investment and political instability negatively influence private investments in Kenya.

INTERPRETATION AND CONCLUSION

An increase of 1% in GDP causes a 0.24% increase in private investment both in the long-run and short-run. Under Vision 2030, Kenya aims to increase annual GDP growth rates to 10% and to maintain that average till 2030. If this target is achieved, private investment will increase to 2.4% annually on average until 2030.

The government may increase economic growth by increasing aggregate demand (demand side policies) or increasing aggregate supply/productivity (supply side policies). Demand side policies include: - fiscal policy such as cutting taxes and increasing government spending, monetary policy such as cutting interest rates. Supply side policies include: privatization, deregulation, tax cuts, free trade agreements (free market supply side policies) and improved education and training, improved infrastructure. (Interventionist supply side policies).

Demand side policies are important during a recession or period of economic stagnation. Supply side policies are relevant for improving the long run growth in productivity.

In addition, initiatives should be undertaken to sustain peace, political stability and efficient legal system and prevent wastage of public funds, civil unrests and armed conflicts. Civil unrests and armed conflicts destroy human lives and physical infrastructure; disrupt the working of institutions, and increase government expenditure on avoidable spending such as strengthening of military and civil defense forces. Such expenditures crowd-out private investment and result in the reduction of expenditures on physical and social infrastructures including health and education. Political stability provides a conducive environment for economic growth and increase in private investment.

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