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The Egg or the Chicken; Causality between Income and Savings in Kenya

Mr. Ochieng Otieno Benjack[1], Dr. Alphonce Odondo[2], Prof. Mohamed Mukras[3]

[1,2,3] Department of Economics, Maseno University, Kenya

Email: [1]benjackochieng@gmail.com, [2]alphonceodondo@gmail.com, [3]msmukras6791@yahoo.com

ABSTRACT: - *Kenya's growth target was set to be sustained at 10% from the year 2012 to 2030 .This growth was to be achieved through savings mobilization from 15.6% in 2006 to 30% in 2030. However, the Country's growth is currently characterized by rising GDP and falling savings which raises the question as to whether there exists any perceptible relationship between the two. On this basis, the study sought to determine the causality between gross national income (GNI) and gross domestic savings (GDS) in Kenya. The study was anchored on Life Cycle Hypothesis and adopted correlation research design. Unit root tests were conducted using ADF and an automatic selection of Schwartz info criterion with a maximum lag of 7. Vector error correction mechanism was used to characterize the joint dynamic behavior of the variables. Granger causality test was used to show the causality linkage between income and savings. The study utilized World Bank Time series data since 1980 to 2013 and revealed that GNI granger causes GDS at p = 0.0343, meaning that savings emanated from the incomes. VAR indicated a negative significant error correction term, suggesting existence of a long run causality tending from GNI to GDS (B = -1.341668; p = 0.0000). It was concluded that a significant long run relationship existed between income and savings. Thus, more savings to be mobilized through income generation to ensure economic growth.*

KeyWords*: - Causality, Income, Savings, Kenya*

INTRODUCTION

For a country to transition from underdevelopment to development, one of the principal strategies is the mobilization of domestic and foreign savings in order to generate sufficient investment to accelerate economic growth, (Rostow, 1960). In Kenya, the importance of savings is anchored on Vision 2030 and has three pillars namely the political, social and economic pillars upon which the strategies to achieve the established goals are anchored. Specifically on the economic pillar, one of the objectives was to increase the annual GDP growth rate to an average of 10% over the Vision's horizon. This was to be realized by increasing savings from 15.6% of the GDP in the year 2006 to 30% in the year 2012 and sustaining it at the same rate from 2012 to the year 2030, a scenario that would put Kenya the 7th African country with a high level of sustained growth after Algerian (53.23%), Equatorial Guinea (43.15%), Gabon (37.69%), Botswana (37.63%) and Lesotho (34.85%), (GOK, 2007). However, the Country's growth is currently characterized by rising GDP and falling savings which raises the question as to whether there exists any relationship between the two.

LITERATURE REVIEW

Generally, Economic theories postulate a positive relationship between savings growth rate and the growth rate of a country's GDP. Studies on the relationship between GDP and savings have remained unresolved in many countries. Carroll and Weil (1994), in their study of 38 fast-growing East Asian countries, using granger causality test, pointed out that as GDP increases, savings also increase assuming that expenses decrease or remain constant. Schmidt, Hebbel and Serven (2000), using different measures of income inequality in their study on the links between distribution of personal income and aggregate savings, found no significant relationship between percentage value of

aggregate savings of the GDP and the incomes. On the other hand, Anderson (1999) while performing a causality test between savings and economic growth, using bivariate vector autoregressive or vector error-correction models for USA (1950 - 1997), UK (1952 - 1996), and Sweden (1950 - 1996), showed that the causal chains linking saving and output differ across the countries. The differences could be attributed to differences in their economic status.

Unlike in UK, the study revealed no evidence of co integrating relationship between saving and output in Sweden. However, insignificant short-term linkage from saving to output was established in either direction for investment. Rasmidatta (2011) while looking at the relationship between domestic saving and economic growth and convergence hypothesis in Thailand using time series annual data from 1960 to 2010, reported that economic growth rate Granger causes growth rate of domestic savings in Thailand. However, the data used were collected from different sources such as International Monetary fund (IMF), Bank of Thailand, Office of national economic and social development board. Because of differences in base years, the decision to use such data could pose parameterization concerns. Such findings should thus, be treated with a lot of caution.

Agwaral (2001) while looking at the relationship between savings and growth in seven Asian countries i.e. Indonesia, Thailand, Singapore, Malaysia, Korea, Taiwan and India, acknowledged that the direction of causality between savings and growth is still unclear. He found that in India and Singapore, the direction of causality runs primarily from growth of GDP to savings. In Indonesia, Malaysia and Taiwan, evidence of a feedback effect from savings to GDP growth was established while in Korea there was no causality. In Agwaral (2001) study, all the variables that affect savings were ignored except growth. This omission had the potential of violating the reliability of Granger causality tests, thereby raising concerns on the applicability of the study findings in policy formulation.

Nwachukwu and Odigie (2011) examined the determinants of private savings in Nigeria during the period 1970-2007 using the ECM procedure. The study showed that the savings rate rises with both the growth rate of disposable income and the real interest rate on bank deposits. However, the use of ECM validates the existence of a long run relationship through significance of the error term. Coefficients of the variables contained in the ECM represent the short run relationship. To this end, the probabilities of the coefficients may be significant while others may not, as a result ECM may not be the correct model to show which independent variables clearly determine the given dependent variable.

Goda, Manchester and Sojouner (2013), conducted an experiment and tested the effect of retirement income projections on savings decisions of 17,000 University of Minnesota employees in USA, the results showed that the "income treatment" had statistical significant effect on the likelihood that workers would change their contribution as the level of their incomes change. On the other hand, Ireri (2011), in a survey conducted by Ipsos synovate on a sample of 2000 adults countrywide, showed that only half of Kenyans put money aside as savings. The study observed that Kenya will not attain its ambitious growth targets going forward if its people do not live within their means and save regularly. The primary nature of this report has the potency of being biased, hence the need to establish the relationship using time series data that takes into consideration the dynamics in the Kenyan economy.

METHODOLOGY

The study adopted correlation research design, which according to Odondo and Mukras (2013), paves way for the understanding of relationships among study variables. Vector error correction mechanism was used to characterize the joint dynamic behavior of the study variables. Unit root tests were carried out using ADF and an automatic selection of Schwartz info criterion with a maximum lag of 7. Granger causality test was conducted to determine the causality linkage between income and savings in Kenya from 1980 to

2013, a period when Kenya experienced structural adjustments that would impact on the macro economic variables. The study adapted Singhal (2008) model specified as shown in equation 1.

$$Y_t = \beta_0 + \beta_1 X_{1t} + \beta_2 X_{2t} + \mu_t \quad \ldots\ldots(1)$$

Where;

β_0 = Constant and is the intercept,

Y_t = Gross domestic savings,

X_{1t} = GDP,

X_{2t} = Rate of interest,

β_1 & β_2 = The coefficients of

X_{2t} & X_{3t} respectively

μ_t = The disturbance term

The model in this study was modified to take into account real interest rate, inflation savings and the. The functional model was as given as shown in equation 2.

$$GDS_t = f(RIR_t, GNI_t, IR_t, \varepsilon_t) \quad \ldots\ldots(2)$$

Where;

GDS_t = The gross domestic savings at time t

RIR_t = The rate of interest at time t

GNI_t = The gross national domestic income at time t

IR_t = The rate of inflation at time t

ε_t = The error term at time t

On the basis of the above variables, the following linear model was specified:-

$$GDS_t = \beta_o + \beta_1 GNI_t + \beta_2 RIR_t + \beta_3 IR_t + \varepsilon_t \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (3)$$

$$\varepsilon_t \sim IID(0, \sigma^2)$$

RESULTS AND DISCUSSIONS

The unit root tests revealed that only RIR and IR were stationary at level I(0) while GDS and GNI became stationary after first difference I(1) as shown in Table 1. Due to stationary of some of the variables, Johansen test of Cointegration was carried out and the results captured in Table 2. On overall, trace test revealed one cointegrating equation and the Maximum Eigen statistics also gave one cointegrating value. The results point to the existence of causality although it is not clear the direction of causality. Table 3 gives a unidirectional causality from GNI to GDS at P < 0.05, this implies that in Kenya, income determines the savings and not vice versa. The findings were consistent with those of Rasmidatta (2011) whose Granger Causality results reported that economic growth rate does lead to growth rate of domestic savings. It also corroborates Agwaral (2001) study which established that in most cases, the direction of causality runs primarily from growth in income to savings as was in the case of India and Singapore.

The VECM in Table 4 shows a coefficient C (1) = -1.341688 at P = 0.0000, which implies that there was a long run causality running from RIR, IR, GNI to GDS. The IR and RIR had significant positive relationship with the GDS. The model's explanatory power was 0.804810, which means that the exogenous variables could explain up to 80.481% variations in the endogenous variable. The estimated F- statistic of 8.704550 at P =0.000, suggests that the variables jointly explained changes in the GDS. Wald Statistics in Table 5 on the other hand, based on a null hypothesis that C (4) =C (5) =0, revealed Chi-square value = 3.616975 at p = 0.1639 > 0.05. This suggests that there was no short run causality running from GNI to GDS. From the results, the study concludes that there was a long run relationship between the Gross Domestic Savings and the Gross National income. Therefore, focus should be on strategies of raising more of the National income to improve on the domestic savings in the long run, a situation that may promote growth in the Kenyan Economy.

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Table 1: Unit root test (ADF- Schwartz criterion)

	At level			At First difference		
Variables	5% level	Probability	ADF test	5% level	Probability	ADF test
GDS	-3.5684	0.2553	-2.6691	-3.5684	0.0002	-6.0002
GNI	-3.5629	0.0978	-3.2272	-3.622	0.0007	-5.6892
IR	-3.5629	0.025	-3.8902	-3.5742	0.0001	-6.2889
RIR	-3.5629	0.0277	-3.8378	-3.5742	0	-7.5023

Key: GDS = gross domestic savings; GNI is the gross national income; IR = inflation rate; RIR= real interest rate.

Table 2: Cointegration test results

Hypothesized No. of CE(s)	Eigen Value	Trace Statistic	0.05 Critical Value	Prob.**	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None	0.630978	55.63918	47.85613	0.0078*	29.907	27.58434	0.0247*
At most 1	0.417453	25.73218	29.79707	0.1369	16.21036	21.13162	0.2128
At most 2	0.207125	9.521827	15.49471	0.3193	6.96269	14.2646	0.4936
At most 3	0.081767	2.559137	3.841466	0.1097	2.559137	3.841466	0.1097

Trace test indicates 1 cointegrating equation(s) at the 0.05 level

Max-eigen value test indicates 1 cointegrating equation(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Table 3: Pair wise Granger Causality Tests

Null Hypothesis:	Obs	F-Statistic	Prob.
GNI does not Granger Cause GDS	30	3.87060	0.0343
GDS does not Granger Cause GNI		1.11746	0.3429
IR does not Granger Cause GDS	30	0.31805	0.7305
GDS does not Granger Cause IR		1.16511	0.3283
RIR does not Granger Cause GDS	30	0.78145	0.4686
GDS does not Granger Cause RIR		1.26067	0.3009
IR does not Granger Cause GNI	30	0.14391	0.8667
GNI does not Granger Cause IR		2.16464	0.1358
RIR does not Granger Cause GNI	30	0.12446	0.8835
GNI does not Granger Cause RIR		2.11270	0.1420
RIR does not Granger Cause IR	30	1.67349	0.2079
IR does not Granger Cause RIR		4.96731	0.0153

Table 4: VECM RESULTS

Dependent Variable: D(GDS)				
Included $_{observations}$: 29 after adjustments				
D(GDS) = C(1)*(GDS(-1) + 0.496094676756*GNI(-1) + 0.275977077763				
*IR(-1) + 0.453287353939*RIR(-1) + 0.203906905108) + C(2)*D(GDS(				
-1)) + C(3)*D(GDS(-2)) + C(4)*D(GNI(-1)) + C(5)*D(GNI(-2)) + C(6)				
*D(IR(-1)) + C(7)*D(IR(-2)) + C(8)*D(RIR(-1)) + C(9)*D(RIR(-2)) + C(10)				
	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	-1.341688	0.252181	-5.320328	0.0000
C(2)	0.100992	0.200423	0.503892	0.6201
C(3)	-0.006496	0.143399	-0.045297	0.9643
C(4)	0.345833	0.184640	1.873012	0.0765
C(5)	0.146272	0.154718	0.945412	0.3563
C(6)	0.476589	0.133034	3.582466	0.0020
C(7)	0.306736	0.138120	2.220784	0.0387
C(8)	0.658317	0.172861	3.808363	0.0012
C(9)	0.434379	0.173075	2.509780	0.0213
C(10)	-0.293535	0.392485	-0.747889	0.4637
R-squared	0.804810	Mean dependent var		-0.230641
Adjusted R-squared	0.712351	S.D. dependent var		3.930496
S.E. of regression	2.108039	Akaike info criterion		4.596191
Sum squared resid	84.43271	Schwarz criterion		5.067673
Log likelihood	-56.64477	Hannan-Quinn criter.		4.743853
F-statistic	8.704550	Durbin-Watson stat		2.107049
Prob(F-statistic)	0.000044			

Table 5: Wald Test: short run causality

Equation: Untitled			
Test Statistic	Value	df	Probability
F-statistic	1.808487	(2, 19)	0.1910
Chi-square	3.616975	2	0.1639
Null Hypothesis: C(4)=C(5)=0			
Null Hypothesis Summary:			
Normalized Restriction (= 0)		Value	Std. Err.
C(4)		0.345833	0.184640
C(5)		0.146272	0.154718