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Predictors of National Saving: A Time Series Analysis to the Economy of Ethiopia

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Abstracts
Being an important source of loanable funds, which in turn, are allocated for financing investment undertakings, national saving plays vital role in explaining the macroeconomic performance. No doubt, efficiently utilized savings have a large potency in building bases for strong and sustainable economic growth and the overall wellbeing of the nations. However, as the level of resources diverted to the saving account are subject to various shocks, both internal and external, most economies are still challenged in maintaining resources in the form of saving. As a result, investment decisions in particular and economic policy making at large are highly challenging especially in LDCs. Motivated by this scenario, the present study was principally intended to examine the potential predictors of national saving in the context of Ethiopian economy using the time series data set for the period serially ranging from 1970/71 to 2016/17. After confirming the stationarity among individual variables entered the saving model via ADF approach, the Johnson's cointegration test was employed to test the existence of long run relationship among them. Accordingly, the test procedure has detected the presence of one way in which the variables move together in the very long run. The short run issues were captured via ECM regression. CPI inflation, foreign aid, national income, financial development and deposit rate variables were found to be important in the long run. In the short run, however, only CPI inflation and national income variables were estimated to have significant impact in favor of national saving in the country. Hence, it could be wise to determine the optimum threshold for inflation to control its disfavored behavior with national saving variable. Besides, resources received in the form of aid should be diverted to investment activities rather than keeping them as reserves in the saving account of the government.
Keywords: Cointegration, ECM, Ethiopia, Gross Saving, Predictors, Unit Root

1. Background of the Study

Here, we deal with the notion of saving in its broader sense; gross national saving accounted for both private and public aspects. Saving is the argued channel through which resources are being transferred to development activities. That is, where there are strong resource bases in the form of savings, there could be much potency for capital accumulation. Yet, capital accumulation can be revealed only with efficiently utilized resources saved for investment activities. Hence, saving is an important predictor of the general economic, political as well as other performances of nations; given that they are being managed and utilized to their best. They in turn are also subject to many factors. These conditions may be structural, economic and in aspects political in particularly less developed economies. Recognized its role in explaining the overall economic performance of nations, it could be wise to deal with factors determining the level of saving so as to tackle those acting awkwardly. Saving can also serve as macroeconomic stabilizer. Adewuyi et al (2007) argued that a sufficiently strong saving performance is an important prerequisite for achieving sustainable economic growth, macroeconomic balance, and financial and price stability (Eric and Willy, 2015). Considerable difference in growth performance between countries is because of the difference in the rate of national saving of a nation. Higher savings leads to higher investment, which in turn leads to higher economic growth rate of an economy (Lewis, 1955).

According to recent literatures in Ethiopia, the country is experiencing well in savings both in terms of size and quality. Its quality can be measured by the extent to which it is being diverted to take part in the process of development activities. Yohannes (2004), for instance, evidenced that Ethiopian economy is appreciably registering improvements in the arena of savings. National saving as a percent of GDP in Ethiopia shows improvements compared with earlier periods. For instance, domestic saving to GDP in 1990's is 9.9 percent, registering about 11.2 percent in 2000's; it reaches 23.5 percent in 2015. Moreover, the country aims attaining macroeconomic stability more specifically sustaining the current double-digit economic growth so as to ensure economic development. From economic development theories, ensuring economic development requires the sustainable growth rates in saving usually falling between 22 to 25 percent of real gross domestic product. In Ethiopia, though improvements are being registered with time, the prevailing rates are still insufficient to meet the development requirements.

There are no concrete and standardized rules on the determination of how well nations should perform in any given year. Thus, in the question of how well savings are doing in any economy, the usual standard is to compare that economy to other economies of similar size and structure, to compare the same countries′ savings

perforation over time, or even to compare actual performance to planned performance (Bosede, 2013). According to the report of WB (2011), a comparison of Ethiopia rate of saving with that of other sub Saharan African countries on average the saving rate as a percentage of GDP of Ethiopia was very low. For instance, taking the data between 1980/81 to 2010/2011 show that average national saving rate of Ethiopian economy was 8.6% of GDP. However, the average for Sub Saharan African countries was 17.2% GDP for the same period. For Ethiopia, ECA (2006) stressed issue that during the imperial era, gross domestic saving as a percent of GDP was 11% on average. After the socialist state took power in 1974, the Dergue regime was the ratio of gross domestic saving (GDS) as percent of GDP has declined from 11% to 4%. While further, show a very haphazard rate during the entire Dergue regime from high of 7% in1976 - 1986 to even less than 1% during the last period of the Dergue regime. Recent revisions in the national accounts of Ethiopia indicate a growing savings rate again over the past years. Investment financing has shifted gradually away from gross domestic savings towards net income transfers, foreign direct investment, and external borrowing. In the 1980s, gross domestic savings mostly financed investment. In the 2000s, an expansion of investment was made possible by an increase in net income transfers and a larger current account deficit financed, in turn, by FDI and external borrowing (World Bank,Ethiopia Economic update II, 2013). External borrowings are disfavored over domestic savings not only because they have adverse effect on the balance of payments but also because but also because it carries foreign exchange risks. Therefore, domestic savings are much more important in sustaining real growth as it is relatively free from some external shocks. Hence, saving plays multidimensional purpose and should be given due attention.

Ethiopia is confronted with a persistent and wide domestic saving-investment gap, which has been financed by external sources. The GOE has very ambitious public investment plans. Given the current levels of domestic and external savings, however, it may be difficult to finance this investment plan. The serious economic implication of the argument is in the near future Ethiopia faces a shortcoming of financial resources available to finance both private and public investments. World Bank (2013) stressed that, having such a gap, it might bring a challenge on the long view of middle income by 2025. Moreover, Kidane (2010) make the issue serious that if the country allowed the trend to continue and not reversed quickly, it has a significant negative effect on the future economic performance of the country.

Motivated principally by the inconsistent findings by previous researchers coupled with some statistical as well as model treatment limitations, the present study aimed to empirically examine the potential predictors explaining the performance of saving in Ethiopia using the time series data set for the period serially ranging from 1980/81 to 2016/17. The following specific objectives were considered towards addressing the set broad objective;

- Analyzing the behavior of saving variable in a relation to other macroeconomic variables both in the short and the long run;
- Examining the nature of causality between gross saving and economic growth of the country;
- Determining whether foreign aids are complements to, or substitute for domestic savings

2. Reviews of Literature

We begin by reviewing the Theory of Absolute Income Hypothesis first proposed by Keynes at around 1936. The theory uses current income to explain changes in savings and consumption behavior of economic agents. The income that is considered in this theory is the absolute/disposable income that is the main determinant of consumption and saving. Keynes postulates that consumption will increase at a decreasing rate as the income increases other things being constant; which means that average propensity to consume decreases as income rises. In other words, this indicates that a larger fraction of the income is saved as disposable income increases. Therefore, consumption and saving are functions of disposable income. However, other things being constant, it is assumed that households with higher incomes will consume more and save more than poor households save.

Generally, the Keynesian saving function takes the linear form with constant marginal propensity to save (MPS) expressed as; $S = a + bY$ Where; b is the constant MPS , this function assumes that $a \prec 0, 0 \prec b \prec 1$ implying that as the level of income rises, the average propensity to save also rises. However, with $Y = 0$, savings is negative or low-income-savings relationship is not proportional. Ceteris paribus, the theory concluded that rich people save more than poor people do (Keynes, 1936). Another important theory considered is the Milton Friedman's Permanent Income Hypothesis. In this theory, optimal consumption is constant over time, which implies that consumption is insensitive to the time distribution of income while savings are sensitive to changes in income implying that savings display variability over a person's lifetime compared with consumption. For instance, when we compare with Keynesian consumption Function a temporary increase in income increases consumption; however, in PIH, the same increase in income increases consumption in a certain amount. This shows that past behavior will determine the consumption spending in permanent income hypothesis. However, changes in transitory income leads to changes in savings, that is, the higher the transitory income, the higher the

saving rate (Mikeshell and Zinser, 1973). Yet, the Keynesian version seems to be the most realistic explanation when the real human behavior is called for. Of course, at a given point in time people consumption demand may saturate with raising wealth and then after every addition to income may only be saved.

The postulate of Life Cycle Hypothesis has also been another important concern when the issue of consumption and income is called for. The life cycle hypothesis (LHC) initiated by two economists Ando and Modigliani in 1963 argue for saving explicitly as being a positive function of income. Income here is captured by the aggregate income of active working group. As a result, GDP growth brings an increase in aggregate savings, because it increases the lifetime earnings and savings of young age groups relative to older age groups (Authukoral and Sen, 2004). Thus, nations with higher economic growth rate have higher savings than those with lower growth rates. However, the effect is not the same throughout their growth track. Hence, the size of the effect is likely to decline as economic growth rises and even become negative for rich countries where investment opportunities and growth rate are relatively lower (Masson et al, 1998). On the other hand, the McKinnon and Show Hypotheses postulates that the development of financial sector is important in the smooth functioning of the economy with primary responsibility of financial resource mobilization and intermediation as an input in the form of capital for producers even for final consumers. However, the effectiveness of the financial sector to perform its funds allocation intermediary role rest on deposit interest rate as one of financial market indicator. The early hypothesis of McKinnon and Show assumed that liberalization, which would be associated with higher real interest rate and stimulate saving, the underlying assumption of the hypothesis is saving is responsive to interest rate. Following the financial liberalization, it is expected to see higher saving rates as well as higher levels of investment and growth (Mckinnon R, 1973).

Chenery and Strout (1966) proposed another saving-investment model called The Two-Gap Model; which is also popular in income-consumption analysis. The Rostow's hypothesis of the take-off in to self-sustaining growth makes the external capital flow part of the standard argument of foreign aid policy and development economics in the 1950 and 1960s."Take-off" as a unique stage in development, which requires three related conditions of a rise productive investment; the development of one or more manufacturing sectors with a high rate of growth; and the existence of institutional framework. Moreover, the approach followed that the poor countries need to increase their investment from 5 to 10 percent of their national income in order to "take-off" in to self-sustaining growth due to the saving rate. Financing investments in poor countries require foreign assistance, and such investments would lead to automatic increase in the rate of national saving at the same time. The Two-Gap Model offers a theoretical justification for provision of foreign assistance to developing countries; based on the premise that developing economies are seldom in equilibrium with savings often falling short of investment. Alternatively, the economies of developing countries are operating under trade deficit, which gives rise to foreign exchange shortage called foreign exchange gap. However, to realize the required level of domestic investment, external finance such as aid, credit and foreign investment must be sufficient to fill the larger of the two gaps and the model concluded that aid supplements savings by poor economies (Chenery and Strout, 1966).

Now it is a turn to look at some of the important empirical literatures to evidence the theoretical postulates above in a relation to the current analysis. Imran (2014) examined the determinants of national saving in Pakistan using the annual time series data set for the periods running from 1972-2008. He has used the Johansson co-integration technique and vector error correction model (VECM) for the long and short run issues, respectively. However, he failed considering important variables; like, the foreign aid and financial development indices. Including them in the saving model is theoretically justified because of their direct relation to the saving variable. Additionally, Charles (2011) analyzed the determinants of saving rate over twelve economies in developing Asia for the time span of 1966-2007 by controlling the age dependency ratio, national income, and the level of financial development variables. Except the age dependency ratio, all others were estimated to have a positive and significant contribution towards the saving level of the countries considered. Yet, the analysis has included only three variables in the model estimated thereby ignoring another important variables having strong relationship to the saving rate. Bosede (2013) investigated the determinant of domestic saving taking a sample of West African countries on panel basis. His findings show that, the dependency ratio and interest rate variables impose insignificant effect while the inflation and financial were important determinants of saving in the region. His analysis is, however, limited only to these four variables by ignoring more other important variables with high potency to explain the dynamics of saving model in the region.

Khalil and Haider (2010) explained macroeconomic determinants of national saving using ARDL model bound testing approach and ECM from the 1974-2010.the study estimated per capita income inversely related with national saving both in the long run and short run significantly. The exchange rate and inflation rate have a negative impact on national saving but lagged exchange rate has significant impact. Both trade openness and money supply positively linked with national saving but the growth of the income level negative related with national saving. Girish et al (2014) examined the determinant of saving and investment. It is found that the saving rate rises with both the level and rate of growth of disposable income. The real interest rate on bank deposit has a significant positive impact. The spread of banking facilities in the economy and the rate of inflation

seem to have a positive impact and changes in the external terms of trade migrant remittances to have a negative impact on private saving. Dilek (2016) analyzed the determinants of saving in Turkey over a period of 1975-2014 by examining the empirical relationship among Gross Domestic Saving, deposit interest rate, inflation, urban population growth and GDP per capita growth have positive relationship with Gross Domestic Saving but only deposit interest rate was significant and inflation rate has negative relationship and insignificant relationship. Bankole and Fatai (2013) examined the cause and effect relationship between domestic savings and economic growth in Nigeria for the period 1980-2010.the researchers employed the Granger–causality and Engle-Granger co-integration techniques to analyze the relationship between savings and economic growth. The test revealed that causality moves from savings to economic growth in Nigeria. Thus, the researcher accept the Solow's hypothesis that savings precedes economic growth but fail to accept the Keynesian growth theory that is economic growth leads to higher savings. Kibiru (2008) studied on the effect of foreign aid on domestic saving in Kenya; using ODA as a proxy variable for foreign and the result revealed that there is negative relationship between foreign aid and domestic saving for the case of Kenya economy. The World Bank (1998) report "assessing aid' examined the relationship between aid and growth in a large selection of developing countries and found no systematic association between the two. The report also analyzed the relationship between aid and growth in countries with good monetary, fiscal and trade policies and found a strong positive association indicating that aid is indeed effective where economies are supportive of growth.

Domestically, the work of Haile (2013) has also been considered. His ARDL model estimation results on time series data set show that, the national income, government fiscal gap and inflation variables were important in explaining the level of saving in Ethiopia both in the long and short run. However, in the short run, financial depth and deposit interest rate were found to have statistically significant role towards explaining the dynamics of domestic saving in Ethiopian economy. However, the study periods covered as well as the number of observations were small; unable to undertake meaningful impact analysis. The study of Yohannes (2014) on the macroeconomic determinants of gross national saving in Ethiopia revels that financial development and current account deficit are significant determinants of national saving in the long run; while, gross national disposable income, dependency ratio, and budget deficit and inflation variables were not important in the long run. Moreover, gross national disposable income, financial development, current account deficit, and budget deficit are important in the short run. On the other hand, Getnet (2017) has examined the trend and major determinants of gross domestic saving in Ethiopia using the time series data set for the period serially ranging from 1980-2014.The researcher used macroeconomic variables such as economic growth rate, deposit interest rate, money supply, foreign aid, inflation rate and age dependency. The result of the study showed that inflation rate, age dependency ratio and broad money to GDP ratio play a significant role in determining the gross domestic savings. The transmission mechanism of each explanatory variable to the saving variable was not precisely addressed in his study, even though, the regressors considered were both sufficient and theoretically expected to have meaningful relation to the saving variable.

3. Methodology

Type and Source of Data

We employed the time series secondary data for the purpose of this analysis. They are all sourced from Ethiopian Economic Association (EEA), Ministry of Finance, and Economic cooperation (MoFEC), National Bank of Ethiopia (NBE), and World Bank (WB) database. The study covers the periods ranging from 1980/81 to 2016/17. The specification was mainly because values for some of the explanatory variables considered are unavailable for the periods preceding 1980/81. Yet, our observations are reasonably sufficient to achieve our objectives.

Model Specification:

The guideline to the current study is life cycle-permanent income Hypothesis. Previous studies by Adelakun (2014) for the study of Nigeria, Abu (2004), Getnet (2017) and Yohannes (2014) have also based on this theory. By extending the number of variables as well as also considering some more important variables, the functional form of the variables entered the estimated model of this particular study is given by;

$$GNS = f\,(FA, EG, DR, DIR, FD, INF) \quad \ldots\ldots\ldots\ldots (1)$$

GNS is gross national saving; FA is foreign aid; DR is dependency ratio; DIR is deposit interest rate; FD is financial development; and INF represents inflation variable. Accounting for the effect of stochastic factors, we specify the econometric model using variables in equation (1) as follows;

$$lnGNS_t = \beta_0 + \beta_1 ln\mathrm{FA}_t + \beta_2 ln\mathrm{EG}_t + \beta_3 ln\mathrm{DR}_t + \beta_4 ln\mathrm{DIR}_t + \beta_5 \mathrm{FD}_t + \beta_6 ln\mathrm{INF}_t + \varepsilon_t \ \ldots\ldots (2)$$

ε is the white noise error term; *ln* is logarithmic operator; β_0 is an intercept term and β_i s are slope parameters of the corresponding variables; and *t* is the time variable.

Unit Root and Cointegration Tests

All of the series involved were subjected to the Augmented Dickey Fuller (ADF) stationarity tests in an attempt to avoid the possibility of spurious regression with time series analysis. Regressing a nonstationary variable on other nonstationary variable produces only false estimates and the results could be no longer valid for prediction

purpose. The ADF methodology is based on a parametric auto regression of approximating the ARMA structure of residuals (Gujarati, 2004). ADF is conducted by extending equations just by adding the various lagged terms of dependent variables as an explanatory variable; and, estimates the equation;

$$\Delta y_t = \beta_0 + \lambda_1 t + \delta y_{t-1} + \sum_{i=1}^{n} \pi_i \Delta y_{t-i} + \varepsilon_t \quad \text{..... (3)}$$

Where $\delta = \phi - 1$ and $\Delta y_t = (y_{t-1} - y_{t-2})$; β_0 is the constant term; λ_1 is trend coefficient while t is the time or trend variable and n measures for the size of suggested lag length using any appropriate criterion. Δ is the difference operator. Finally, ADF tests the following hypothesis;

Null Hypothesis: H_0: $\delta = 0 \rightarrow$ there is unit root problem

Alternative Hypothesis: H_1: $\delta < 0 \rightarrow$ there is no unit root problem

As much of the policy concern is on long run, rather than the short run dynamics, we also had concerned with addressing the long run behavior of saving variable in a relation to all of the concerned explanatory variables. But, before we directly carry on the issue we first examined whether they move alongside in very long time horizon. The Johnson's approach for Cointegration has been employed to deal with the long run issue. Johansen derived the maximum likelihood estimation using sequential tests for determining the number of cointegrating vectors (Maddala, 1983). Thus, the unrestricted VAR considered estimating the long run relationship among jointly endogenous variables is:

$$Y_t = A_1 Y_{t-1} + A_2 Y_{t-2} + \ldots + A_p Y_{t-p} + BX_t + \varepsilon_t \quad \text{..... (4)}$$

Where Y_t is a k -vector of non-stationary I(1) endogenous variables; X_t is a d -vector of exogenous deterministic variables; $A_1 \ldots A_p$ and B are matrices of coefficients to be estimated and ε_t is a vector of innovations that may be contemporaneously correlated but are uncorrelated with their own lagged values and uncorrelated with all of the right hand side variables. Since most economic time series are non-stationary, the above stated VAR model is generally estimated in its first-difference form as:

$$\Delta Y_t = \Pi Y_{t-1} + \sum_{i=1}^{p-1} \Gamma_i \Delta Y_{t-i} + BX_t + \varepsilon_t \quad \text{..... (5)}$$

Where, $\Pi = \sum_{i=1}^{p} A_i$ and $\Gamma_i = -\sum_{j=i+1}^{k} A_j$

In the Johansen procedure, determining the rank of Π (i.e., the maximum number of linearly independent stationery columns in Π) provides the number of cointegrating vector between the elements in z. In this connection, there are three cases worth mentioning. (i) If the rank of Π is zero, it points that the matrix is null which means that the variables are not cointegrated. In such case, the above equation is used in first difference, void of long run information. (ii) If the rank of Π equals the number of variables in the system (say n) then Π has full rank which implies that the vector process is stationary. Therefore, the VAR can be tested in levels. (iii) If Π has a reduced rank (i.e., $1 < r(\Pi) < n$) it suggests that there exists $r \leq (n-1)$ cointegrating vector where r is the number of Cointegration (or the co-integrating rank) in the system.

Error Correction Model

To capture the short run evolution of the variables in the model, we specified and estimated a variant of VAR called vector error correction model (VECM). Although it may be possible to estimate the long-run or cointegrating relationship, $y_t = \beta x_t + \varepsilon_t$ economic systems are rarely in equilibrium, as they are affected by institutional and/or structural changes that might be temporary or permanent. Since equilibrium is rarely observed, the short-run evolution of variables (short-run dynamic adjustment) is important. A simple dynamic model of a short-run adjustment model is given by:

$$y_t = \alpha_0 + \delta_0 x_t + \delta_1 x_{t-1} + \alpha_1 y_{t-1} + \varepsilon_t \quad \text{..... (6)}$$

Where y_t is the dependent variable, x_t is the independent variable, y_{t-1} and x_{t-1} are lagged values of y_t and x_t respectively, $\alpha_0, \alpha_1, \delta_0, \& \delta_1$ are parameters, and ε_t is the error term assumed to be $\varepsilon_t \sim iN(0, \sigma^2)$. Once the equilibrium conditions are imposed, the ECM describes how the examined model is adjusting in each period towards its long - run equilibrium state. The dynamic specification of the model allows the deletion of the insignificant variables, while the error correction term is retained. The size of the error correction term indicates the speed of adjustment of any disequilibrium towards a long-run equilibrium state (Engle and Granger, 1987). Using our variables, we specified ECM and presented only the principal model as;

$$\Delta \ln GNS = \alpha_0 + \sum_{i=1}^{k} \beta_1 \Delta \ln GNS_{t-i} + \sum_{i=1}^{k} \beta_2 \Delta \ln FA_t + \sum_{i=1}^{k} \beta_3 \Delta \ln EG_t + \sum_{i=1}^{k} \beta_4 \Delta \ln DR_t + \sum_{i=1}^{k} \beta_5 \Delta \ln DIR_t +$$

$$\sum_{i=1}^{k}\beta_6\Delta\ln FD_t+\sum_{i=1}^{k}\beta_7\Delta\ln INF_t+\gamma ECT_{t-1}+\varepsilon_t \quad \text{..... (7)}$$

Where Δ is the first difference operator, ECT_{t-1} is the error correction term lagged one period, γ is the short-run coefficient of the error correction term $(-1<\gamma<0)$, ε_t and v_t are the white noise terms of respective models.

4. Results and Discussion

4.1. Stationarity Test Results

Table 1: Unit Root Properties of Individual Series

Variables	*ADF test statistic (Constant & Trend)*	*Order of Integration*
$lnGNS_t$	*-7.911451***	*I(1)*
$lnFA_t$	*-3.374836***	*I(1)*
$lnEG_t$	*-4.826958***	*I(1)*
$lnDR_t$	*-5.793471***	*I(1)*
$lnDIR_t$	*-5.571511***	*I(1)*
$lnINF_t$	*-6.084472***	*I(1)*
FD_t	*-4.869145***	*I(1)*

Source: Own Computation based on NBE, EEA &MoFEC, 2018

** *Indicates the rejection of the null hypothesis at 1% critical level*

Evident in table (1) is that all of the series entered the saving model of this particular analysis are all stationary at their first differences. In other words, the variables are all integrated of order one and hence satisfy the statistical property of stationarity. Therefore, spurious regression couldn't be revealed in our analysis so that the model we specified can reasonably be used for prediction purpose.

4.2. Optimum Lag Size Determination

Table 2: AIC Suggested Lag Length

Optimum Lags	AIC
0	-9.4860
1	-17.6558*
2	-16.7298

Note: denotes rejection of the hypothesis at 0.05 level. Lag length* 1*is selected based on AIC.*

4.3. Cointegration Analysis Results

Table 3: Johnson's Cointegration Test Results

Hypothesized No. of CE(s)	Trace Test Stat Statistic	0.05 Critical Value	Max. Eigen	Critical (0.05)
None *	145.3523	125.6154	49.74798	46.23142
At most 1	95.60436	95.75366	32.86141	40.07757
At most 2	62.74295	69.81889	23.93029	33.87687
At most 3	38.81265	47.85613	15.07553	27.58434
At most 4	23.73713	29.79707	12.27611	21.13162
At most 5	11.46102	15.49471	11.25127	14.26460
At most 6	0.209744	3.841466	0.209744	3.841466

Source: Own Manipulation, 2018

Trace test indicates 1 *cointegrating eqn(s) at the 0.05 level; * denotes rejection of the hypothesis at the 0.05 level; **MacKinnon-Haug Michelis (1999) p-values*

Evident from table (3) above is that the variables in the saving model have been suggested to have cointegrated. Both the trace and maximum eigenvalue test statistics confirm the existence of one cointegrating equation among the series of interest. Therefore, we established ground for addressing the long run issue we are just currently concerned with.

4.4. Long Run Elasticities

Table 4: Long Run Model Estimation Results

Dependent variable: *ln*GNS							
	Constant	*lnFA*	*lnEG*	*lnDR*	*lnDIR*	*FD*	*lnINF*
Coefficient	-0.3413	0.3699	0.9786	-0.1027	0.3755	0.2194	0.2410
SE		0.0409	0.1036	0.3702	0.05391	0.0577	0.1073
t- Stat.		9.0324*	9.44502*	-0.2775	6.9658*	3.79805*	2.2451**
Diagnosis Test:							
Autocorrelation : DW Stat: 1.913042 [0.1658]					***Residual Normality Condition:***		
Heteroscedasticity: 1.436541[0.2337]					***Jarque-Bera: 2.9495 [0.2288]***		
					Skewness: 0.6887 [0.2288]		

** Significant at 1%, **significant at 5%*

Source: Own Manipulation, 2018

Table (4) reports the dominant impact of economic growth on saving. The estimated coefficient is strongly significant and positive as expected. A unit improvement in the economic growth rate of the country adds to the level of saving by about 0.98 units. This finding is consistent to most growth theories as well as other internal and external empirical evidences. Moreover, foreign aid has been found to be important in explaining the long run dynamics of gross national saving in the country with estimated coefficient being 0.37 (0.0008). The positive sign is also expected; because, any additional incomes in the form of gifts and aids are expected to relax the government just by reducing public expenditures. Hence, reduced public expenditures can be diverted to saving accounts of the government while up scaling the national saving.

Another important variable is the domestic interest rate with estimated coefficient of about 0.38 which is significant too and positive as expected. The sign of interest rate is straightforward. Moreover, the financial development and inflation variables were important in explaining the long run dynamics of national saving in the country. Yet, the estimated positive coefficient of inflation variable is not as expected. It may be because, higher inflation increases the cost of holding money and induce a portfolio shift from money and other financial asset to physical capital by leading to increase investment in the long run. Inflation therefore appears to play a role in rising the gross national saving.

4.5. Short – Run Estimates of the Saving Model

Table 5: Short Run Regression Results

	Coefficient	Std. Error	t-Statistic	Prob.
ECT	-1.277719	0.378123	-3.379113***	0.0023
D(lnFA-1)	-0.129276	0.210621	-0.613786	0.5447
D(lnEG-1)	1.917574	0.561065	3.417740***	0.0021
D(lnDR-1)	1.211113	1.105521	1.095513	0.2833
D(lnDIR-1)	-0.030673	0.231632	-0.132422	0.8957
D(lnFD-1)	-0.061007	0.087621	-0.696268	0.4924
D(lnINF-1)	-1.878291	0.582890	-3.222378***	0.0034
Constant	-0.036585	0.031426	-1.164156	0.2549
R-squared	0.590322	Mean dependent var		0.044804
Adjusted R-squared	0.385344	S.D. dependent var		0.138970
S.E. of regression	0.111320	Akaike info criterion		-1.335789
Sum squared residuals	0.322193	Schwarz criterion		-0.935842
Log likelihood	32.37631	Hannan-Quinn criter.		-1.197728
F-statistic	3.373482	Durbin-Watson stat		1.960783
Prob (F-statistic)	0.008730			

Note: *** indicates significant at 1%

Source: Own Manipulation, 2018

A negative and statistically significant coefficient of the error correction term assures for any short run deviations to restore back to long run equilibrium point. The estimated coefficient reveals that these short run deviations can diverge back to their long run equilibrium point with a yearly speed of about 127 percent; therefore, it takes a model about 11 months to reach the long run equilibrium point. Furthermore, the economic growth and inflation variables were the only variables important in explaining the level of national saving in the short run. The signs are also consistently estimated with both assuming positive coefficients.

Table 6: Results of Pairwise Granger Causality Analysis

Null Hypothesis:	Obs.	F-Statistic	Probability
***ln*EG does not Granger Cause lnGNS**	34	2.71362	0.0646
***ln*GNS does not Granger Cause lnEG**		2.71362	0.0462

Source: Own Manipulation, 2018

Evident from table 6 is the unidirectional causal relation running from gross national saving to economic growth; and, no causality runs in reverse. The implication may be that surpluses from growth are either invested directly or absorbed by other components of the system.

5. Conclusions and Recommendations

The principal concern of this particular study was examining the potential predictors of national saving using variables at macro level. After confirming stationarity via ADF and the existence of long run relationships among the variables entered the saving model via Johnson's approach for cointegration, we estimated error correction model to capture both the short and long run dynamics simultaneously. All of the diagnosis as well as model validity tests were examined and allowed the estimation of the model specified. Therefore, the results estimated and inferences based on them are reliable. Accordingly, the economic growth has been found to be the dominant determinant of national saving both in the short and the long run. Moreover, the financial development variable is important in explaining national saving in the short and the long run periods. Foreign aid, domestic interest rate and inflation variables are important only in the long run. It could be wise to determine the optimum level of inflation to control its disfavored behavior with national saving variable. Besides, resources received in the form of aid should be diverted to investment rather than keeping them as reserves in the saving account of the government.

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