Savings, Net Foreign Assets and Current Accounts Dynamics in SubSaharan Africa

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Abstract

A profile of the current account balance in sub-Sahara Africa (SSA) shows that many countries in the region have consistently experienced current account deficits, dwindling savings and diminishing net foreign assets. These macroeconomic variables convey important information to economic agents about the health of a nation. The relationships among these three important variables in terms of short-run and long-run dynamics are cloudy in the literature. Therefore, this study examined the long-run and short-run dynamics of savings, net foreign assets and current account balance in sub-Saharan Africa. Utilising panel econometric techniques with annual data from 38 countries in SSA for the period 1980 to 2013, it was found that savings and net foreign assets impact positively on the current account balance, while foreign direct investment, population growth and dependency ratio had negative impact on current account balance. These findings implied that African governments, desirous of improving their current account balance, must institute policies aimed at increasing savings and net foreign assets and properly manage foreign direct investment, as well as population growth and dependency ratio.

I.   Introduction

A country's current account is the difference between its savings and its domestic investment. Equivalently, it is the difference between its exports of goods and services (including income receipts on assets held abroad) and its imports (Obstfeld, 2012). Strong current account surpluses may indicate heavy dependence of a country on its export revenues, resulting in a high savings rate, weak domestic demand and high net foreign asset base. Similarly, countries recording current account deficits may tend to have strong

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imports reliance, a low saving rates, weak net foreign asset base and high personal consumption rates, as a percentage of disposable income. Therefore, policy makers view the evolution of the current account balance as a key leading indicator of the health of a country's economy, with its dynamics conveying information about the actions and expectations of the domestic and foreign market participants.

Persistent current account deficits frequently signal disruptive economic trends. For instance, current account imbalances have preceded and accompanied by adverse economic and financial crises (Erauskin, 2015). Researchers and practitioners alike recognise the existence of strong correlation among financial, trade and economic crises across borders (Obstfeld, 2012). Changes in one country's current account balance can create negative spill-overs, via trade and financial channels. It has been shown within the European Union (EU) that countries with the highest current account disequilibria were the worst hit in terms of greater fall in the domestic demand and its negative spill-over during the 2007/2009 economic and financial crises (Lane, 2010).

Sub-Sahara Africa has been characterised by very large current account deficits in the past years recording the world's highest current account deficit of 5.9 per cent of the gross National Disposable income between 1975 and 1995. This trend persists even in recent times. For instance, sub-Sahara Africa recorded an average current account deficit of 1.33 per cent of GDP from the period 1980 to 2013. The average annual percentage change of the volume of imports from 1980 to 2013 was 5.17 per cent while that of exports was 3.14 per cent, clearly indicating an average of 40 per cent in excess of imports over exports. This implied consistent trade deficit, resulting in current account deficits (International Monetary Fund, World Economic Outlook Database, October 2015). These prolonged deficits in most of the countries have become unsustainable, crowding out domestic saving, and leading to economic instability (Opoku-Afari, 2005; Osakwe and Verik, 2007). Generally, a current account deficit exceeding 5 per cent of gross Domestic Product (GDP) threshold is regarded as unsustainable, and requires adjustment process of the current account (Freund, 2005). It is also quite common that government policies may lead to larger deficits and, in theory, different distortions could result in absolute current-account imbalances that are too small, rather than

too big, compared to an efficient benchmark (Obstfeld, 2012). It is well known that relatively large deficits are natural when a country begins its development process, strengthening domestic investment by importing capital (Obstfeld and Rogoff, 1995; Bussière et al., 2004; Chinn and Ito, 2007). Looking at the scale of development of countries within the sub-Saharan African, relatively large number of countries falls within the early development scale and, as such, prone to current account imbalances.

Nevertheless, when a growing number of countries run persistent current account deficits, it is crucial to understand what might have been driven these persistent deficits overtime to enable the formulation of effective policy interventions. Accordingly, these current account imbalances are a matter of concern for sub-Saharan countries, requiring an adequate policy prescription. The current study therefore sought to provide an in-depth account of the empirical linkage between savings, net foreign assets and current account balance, including a broad set of economic variables in sub-Saharan African countries.

Although sub-Sahara Africa has been facing turbulent current account dynamics in recent past, they have not been the subject of many empirical studies. The numerous empirical literature on the dynamics of current account balance as indicated above are based either on the experiences of a set of developed countries or based on large samples, consisting of a mixture of developed and developing countries, using cross section and panel data without much consideration to their time dimension. The corresponding results with this approach only provide a generalised picture for such economies. The empirical literature available also fails to ascertain the dynamics of the current account with respect to savings and net foreign assets, which are key procyclical, and countercyclical determinants of the current account balance. This paper therefore uses data from 1980 to 2013 and employs a panel data analysis to assess the dynamics of savings, net foreign assets and current account in sub-Sahara Africa to assist in policy formulation and implementation.

Following this introductory Section, the rest of the paper is presented in 5 sections. Section 2 discusses stylised facts on savings, net foreign assets and current account dynamics as well as trend analysis of selected

macroeconomic variables in the region. Section 3 reviews theoretical and empirical literature that focuses directly on the subject. Section 4 examines the methodology, while Section 5 presents the empirical results. Finally, Section 6 provides a conclusion and proffers policy recommendations.

II.   Stylised Facts on Savings, Net Foreign Assets and Current Accounts Dynamics in the sub-Sahara Africa

Sub-Saharan Africa has exhibited very large current account deficits in the past years. Available data indicate that from 1980 to 2013, sub-Sahara Africa recorded more current account deficits than surpluses. The highest current surplus of 3.97 per cent of GDP was recorded in 2006, when exports exceeded imports by 9.52 per cent. Between 2004 and 2008, there were favourable terms of trade with commodities prices witnessing upward trends. For example, oil exporters, in the region, including Angola, Congo, Nigeria and Gabon, recorded 63.47, 84.16, 43.11 and 61.60 per cent of GDP for exports, respectively. Figure 1 explained the trends in exports, imports and current account balances as a percentage of GDP in SSA spanning from 1980 to 2013.

**Figure 1: Trends in Imports, Exports and Current Account Balance in SSA from 1980-2013**
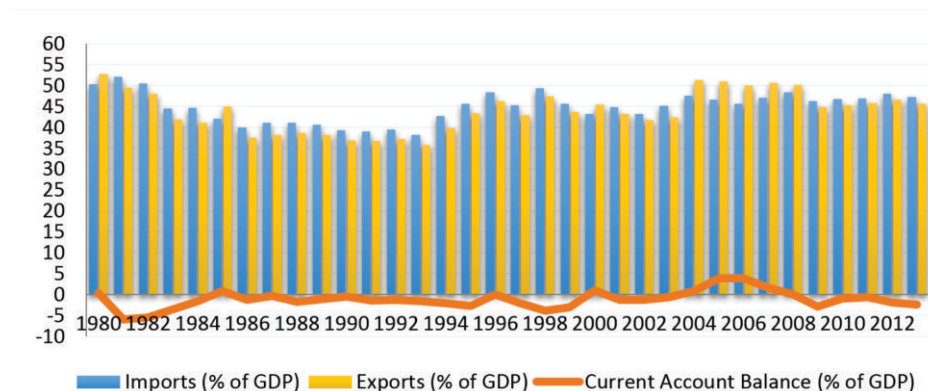
Source: World Development Indicators

Despite this impressive performance, current account deficits had dominated the period, from 2009 to 2013. As the global economy plunged into recession, crude oil prices dropped to US$41 a barrel, a more than 70 per cent decline from the peak in July, while non-energy prices, including food, had declined by

nearly 40 per cent at end-December 2008 (Global Economic Outlook, 2009). This resultant falling export demand, coupled with declining commodity prices, spread the impact of the crisis to other sub-Saharan African countries, thereby suppressing economic activity and causing fiscal and external balances to deteriorate significantly. Within this period, imports consistently exceeded exports.

Figure 2 showed the trend in annual GDP growth rate for some countries in SSA from 1980 to 2013. This region witnessed mixed and, most of the times, low annual growth during the review periods review. The annual GDP of sub-Saharan Africa grew, on the average, by 3.13 per cent from 1980 to 2013. The region recorded the highest growth of 5.64 per cent in 2004 and the lowest of negative 0.71 per cent in 1992. Drivers for the growth included: implementations of various structural reforms; solid global demand for commodities; greater flows of capital in the region; and debt relief. With the Global economic crises in 2008, however, economic growth faltered in many economies due to prolonged crisis in the world economy that caused the contraction in the global GDP first time after a long period of global stability. The GDP growth rate of the region thus reduced from an average of 4.05 per cent from 2000 - 2007 to 2.1 per cent in 2009.

**Figure 2: Trends in Annual GDP Growth Rate for Countries in SSA from 1980-2013**
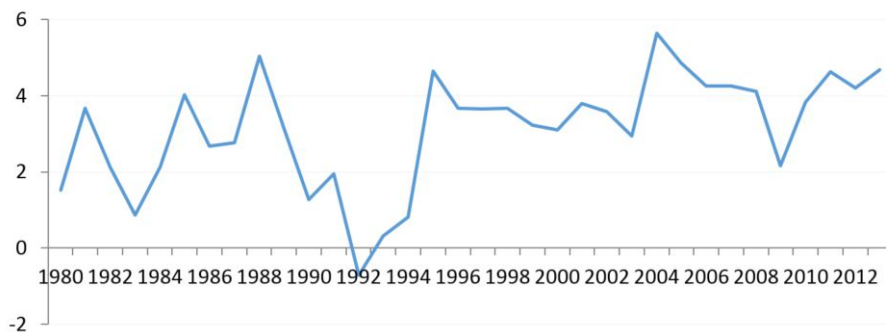
Source: World Development Indicators

Figure 3 showed the relationship between gross savings, NFA, and current account balance for the SSA from 1980 to 2013. The figure revealed weak current account positions, which consequently, resulted in weak net foreign

assets. The sub-Sahara Africa recorded negative net foreign asset positions throughout the period under review with the unprecedented least net foreign asset position of negative 1.87 per cent of GDP recorded in 1994 and the highest (negative 0.11 per cent of GDP) recorded in 2010. At the individual country levels, all countries recorded negative net foreign asset positions, with the exception of Algeria, Angola, Equatorial Guinea, Eritrea, Namibia, Nigeria, Rwanda and Swaziland, which recorded positive net foreign asset positions for some years in the period under review. All countries recorded negative Net Foreign Asset between 1980 and 2011 with the exception of Swaziland that recorded a positive average net foreign asset of 12.89 percent of GDP.

Gross domestic savings was, however, in a sinusoidal trend with the highest savings of 18.60 per cent of GDP recorded in 2006. In that same year, the highest current account surplus of 3.97 percent of GDP was also recorded, indicating the fact that higher saving will result in a high current account surplus.   The lowest gross savings of 10.76 per cent of GDP and lowest net foreign asset of negative 186.86 per cent of GDP were recorded in 1994.

Figure 3: Trends in Gross Savings, Net Foreign Assets and Current Account Balance for Countries in SSA from 1980-2013
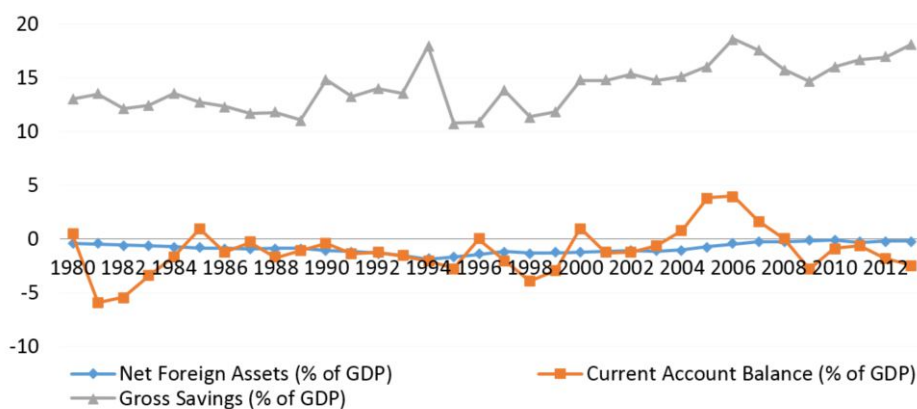
Source: World Development Indicators

III.   Literature Review
III.1   Theoretical Literature Review

A variety of theoretical models have been used to explain the determinants of the current account balance, with each model indicating varying economic

policy implications. The traditional analysis of the current account imbalances, and their adjustment was based on two approaches. These approaches (i.e. the elasticity and absorption), which are theoretically consistent, can be derived from each other in the framework of the national income and product accounts.

The elasticity approach, pioneered by Marshall (1923) and Lerner (1944), is concerned with the condition under which exchange rate changes can compensate for price distortions in international trade. It is based on the analysis of price elasticity of demand for imports and exports, with respect to changes in exchange rate. It makes it easy, therefore, to predict the partial-equilibrium impact of expected changes in the terms of trade and relative income growth on the trade deficit. Determinants of international expenditure levels and incomes are held constant while static price elasticities of demand and supply determine the net international flow of capital. The main weakness of this approach is that it is a partial equilibrium analysis that looks at the traded goods market and ignores the interaction of other markets in an economy (Alexander, 1959).

The absorption approach views the current account as the difference between income and absorption, or equivalently, the difference between savings and investment. It states that if an economy spends more than it produces (absorption exceeds income), it must import from other countries for its excess consumption and spending and such an economy thus runs a current account deficit. Conversely, if this economy spends less than it produces (income exceeds absorption), it runs a current account surplus. This approach provides a more-inclusive and less-misleading context to analyse and forecast the current account than the elasticity approach by making it easier to incorporate determinants of financial account transactions into modelling the current account balance. Several critics have, however pointed out various defects in this approach. They argued that, analytically, it appeared to be superior to the elasticity approach, but deficient in computing marginal propensities to consume, save and invest. More importantly, the approach is weak in that it relies too much on policies designed to influence domestic absorption and does not take into consideration the effects of devaluation on the absorption of other countries. This approach also fails as a corrective measure of balance of payment deficit under a fixed exchange rate system

and places more emphasis on the level of domestic consumption than on relative prices. It is argued that a mere reduction in the level of domestic consumption for reducing absorption does not mean that resources released will be redirected towards improving the balance of payment deficit.

Another approach to current account analysis is the inter-temporal approach, which extends the absorption approach by recognising that private saving, investment decisions, and sometimes government decisions, are as a result of forward-looking   expectations of future productivity growth, government spending demands and real interest rate, among several others. Obstfeld and Rogoff (1995, 1996) developed the inter-temporal approach to the current account and predicted four main inter-temporal perspectives. They indicated that a temporary rise of output above its permanent level would contribute to higher current account surpluses, due to consumption smoothing. Secondly, productivity growth and higher output growth rates would weaken the current account, since people borrow today against higher future income. Thirdly, increased investment needs would induce foreign borrowing and higher current account deficits, since representative agents would seek to cushion its consumption impact. Finally, government budget deficits, including lower taxes today and higher taxes in the future would have no impact on the current account, since representative agents smoothen their consumption over time. As a result, they would increase their savings whenever the public sector borrows against future tax income (Obstfeld and Rogoff 1995, 1996).

Inter-temporal models of the current account suggest that temporary income shocks are fully reflected in a country's net foreign asset position; hence agents invest abroad any savings generated by a positive income shocks. The model treats the current account as an outcome of consumption and investment decisions made over a long-term horizon under forward-looking expectations, and predicts that the current account will absorb any temporary shocks to the net national cash flow. It, thus, allows domestic agents to smoothen their consumption over time, with an assumption of free capital movements. Limitations of the inter-temporal approach, however, include the fact that, although it is theoretically rigorous, the model exhibits a poor empirical fit. Secondly, with its focus on the long-run, the models have limited applicability for assessing current account sustainability over the short to medium-term. Bergin and Sheffrin (2000) opined that, to explain the current account

behaviour of small economies, it may be important not only to consider shocks to domestic output but also shocks, arising in the world in general. They indicated that these external shocks would generally affect the small economy through movements in the interest and exchange rates. Bergin and Sheffrin (2000), therefore, developed and constructed a model that incorporated precisely a moving interest rate and the real exchange rate. The idea was that an anticipated rise in the relative price of internationally-traded goods can raise the cost of borrowing from the rest of the world when interest is paid in units of these goods. As a result, changes in the real exchange rate could induce substitution in consumption and thus produce inter-temporal effects on a country's current account, similar to those of changes in the interest rate.

There is another view of the inter-temporal approach to analyse the dynamics of current accounts with the occurrence of transitory income shocks. The new rule states that the current account response is equal to the savings generated by a transitory income shock multiplied by the country's net foreign assets. In reference to a small open economy, it implies that the slope of the coefficient of regression of the current account balance on savings multiplied by the ratio of the net foreign assets position to domestic wealth should be equal to unity. This happens when risk associated with investment is high, compared with the effect of diminishing returns of capital (Kraay and Ventura, 2000). Favourable income shocks, therefore, lead to current account surpluses in creditor countries. compared with current account deficits in debtor countries. Some studies have, however, doubted the validity of the new rule to analyse the behaviour of current accounts. For example, Tille and Van Wincoop (2010) asserted that the new rule would not hold in a two-country dynamic general equilibrium, since it did not distinguish between gross and net foreign assets positions and, as such, only holds in a one-way capital flow. Other critics argued that the empirical evidence by Kraay and Ventura (2000), in favour of the new rule, had nothing to do with the new rule (Guo and Jin, 2009). Erauskin (2015), on the other hand, revealed that the two main critiques of the new rule were flawed, stressing that the new rule was adapted to distinguish between gross and net foreign asset positions. The new rule would apply when the growth rates in the domestic and foreign economies were equal or when foreign holdings of domestic capital were negligible. It is seen that neither the traditional rule nor the new rule can explain completely the dynamics of

current account, independently. Therefore the size of the net foreign asset position, either as a share of domestic wealth or as a share of GDP, has been introduced as a key variable to reconcile both rules.

III.2   Review of Empirical Literature

Earlier studies on the current accounts dynamics focused on developed economies, rather than developing economies. Current account behaviour in sub-Saharan African in influenced by diverse factors, while most of the empirical studies carried out have been largely country-specific, using different estimation approaches and giving different findings. This section attempts to survey the empirical literature from both the developed and developing countries.

Some studies that focused on short-term current account variations were based on the assumption that current account served as a buffer against temporary shocks to income, to smoothen consumption and to maximise welfare. Studies in this direction, which were conducted by Ghosh and Ostry (1995) and Kraay and Ventura (2000), revealed that, for a sample of industrial countries, country-specific shocks, rather than global shocks were important for current account fluctuations and also that the degree of persistence of a productivity shock affects significantly the response of current account.

Debelle and Faruqee (1996) explained the short-run dynamics and long-term variations of the current account, specifying cross-section and panel data models. Their results indicated that relative income, government debt and demographic factors played significant roles in the long-term variation of the current account in the cross section, whereas fiscal surpluses, terms of trade and capital controls did not. They also estimated partial-adjustment and error-correction models, using panel data, which also revealed that fiscal policy had both short-run and long-run effects on the current account using the time series data; whereas real exchange rate, business cycle and the terms of trade had short-run effects on the current account.

Chinn and Prasad (2003) investigated the medium-term determinants of current accounts, by adopting a structural approach that highlighted the roles of the fundamental macroeconomic determinants of saving and investment.

They employed an annual data for 18 industrial and 71 developing countries for the period 1971 to 1995. Cross-section and panel regression techniques were used to examine the properties of current account variations over time and across countries. Their findings indicated that current account balances were positively correlated with government budget balances and initial stocks of net foreign assets. They also found that measures of financial deepening were positively correlated with current account balances, while indicators of openness to international trade were negatively correlated with current account balances, among developing countries.

Calderon et al., (2002) extended the work of Debelle and Faruqee (1996) by applying more advanced econometric techniques to control for joint endogeneity and distinguished between within-economy and cross-economy effects. They used a panel data of 44 developing countries for the period 1966-1995 to examine the empirical links between current account deficits and a broad set of macro-economic variables.   Adopted a reduced-form approach, they found out that current account deficits in developing countries were persistent moderately. Additionally, they revealed that higher domestic output growth, increase in the terms of trade and the real exchange rate appreciation intensified the current account deficit. Conversely, increases in the public and private savings, higher growth rates in industrial countries and higher international interest rates had favourable impacts on the current account balance.

Bussière et al., (2004) examined the excessive deficits of the current account in the most of new member states of the European Union. Based on panel data estimations, deficits in these countries were determined mainly by the relative income per capita and high capital investments. The differences of incomes between new and old member states was really shrinking, while the effect of budget deficits was quite small, since they were mainly financed by private savings. Based on the work of Chinn and Prasad (2003), Gruber and Kamin (2007) used a panel data of 61 countries over the period 1982-2003 to assess the explanations for the global pattern of current account imbalances that had emerged in recent years, particularly in the U.S. Their findings showed that the Asian surpluses could be explained by a model that incorporated the impact of financial crises on current accounts. However, their model failed to explain the large U.S. current account deficit, even when the model was augmented by measures of institutional quality.

In developing and emerging market economies, Chinn and Ito (2007, 2008) examined the upsurge from current account deficit to surplus in Asian countries since 1997 by using a framework of the work by Chinn and Prasad (2003). They found that the standard determinants, such as demographics and income variables, used in the work of Chinn and Prasad (2003) alone could not explain this upsurge. Hence, they augmented the Chinn and Prasad (2003) specification with indicators of financial development and legal environment that were likely to affect saving and investment behaviour and economic growth. On the contrary, their study revealed that it was the lack of investment opportunities rather than excess saving that helped in explaining current account improvement in the Asian countries over the last decade. Aristovnik (2007) employed a dynamic panel-regression technique to characterise the properties of current account variations across selected Middle East and North African countries for the period 1971 to 2005. The results indicated that higher domestic and foreign investment, government expenditure and foreign interest rates had a negative effect on the current account balance. Medina, Pratt and Thomas (2010) studied the determinants of current account balance for developing countries, and found that the fiscal balance affected the current account significantly, and also that an increase of net foreign assets improved the current account balance.

In the West Africa sub-region, Oshota and Badejo (2015) investigated the determinants of current account balance within the panel auto regressive distributive lag in West African countries, by applying the methodology of Pooled Mean Group and Dynamic Fixed Effect estimation. Gross domestic product per capita, domestic investment, financial deepening and dependency ratios, in the pooled mean group model, were found to affect current account balance, positively, while real effective exchange rate was found to have a negative but statistically significant long-term effect. The result of the dynamic fixed effect model suggested that an increase in gross domestic product per capita and financial deepening would raise current account balance in the long-run. In the short-run, domestic investment exerted a positive impact on current account balance in the two models, while an increase in real effective exchange rate had a significant but negative impact on current account balance. They indicated that the presence of a long-run relationship between the current account balance and its determinants supported effectiveness of targeting one of the variables in influencing the long run behaviour of other variables by policy makers.

IV.   Methodology

IV.1   Model Specification

An attempt was made to explain the interactions among savings, net foreign assets and current account balance dynamics in sub-Sahara African countries by modifying the model estimated by Erauskin (2015) and Gnimassoun (2015). It covered a sample of 38 SSA countries[1] (see Appendix 1A) for the period 1980–2013. Sources of each variable and their definition were detailed in Appendix 1B. Thus, the equation to be estimated in this study is as:

$$CAB_{it} = \alpha_i + \beta_1 SAV_{it} + \beta_2 NFA_{it} + \beta_3 REER_{it} + \beta_4 GDPGR_{it} + \beta_5 POPGR_{it} + \beta_6 CPI_{it} + \beta_7 FDI_{it} + \beta_8 OPEN_{it} + \beta_9 INTEXD_{it} + \beta_{10} RIR_{it} + \beta_{11} DEPR_{it} + \varepsilon_{it} \quad (1)$$

Where:

α_i = Country specific fixed effects, which is assumed to be time invariant

β_i = the coefficients of each variable to be estimated

CAB_{it} = Current account to GDP ratio for country i in the year t

SAV_{it} = Saving to GDP ratio for country i in the year t

NFA_{it} = Net foreign assets to GDP ratio for country i in the year t

$REER_{it}$ = Real effective exchange rate for country i in the year t

$GDPGR_{it}$ = GDP growth rate for country i in the year t

$POPGR_{it}$ = Population growth rate for country i in the year t

CPI_{it} = Consumer price index for country i in the year t

FDI_{it} = Foreign direct investment to GDP ratio for country i in the year t

$OPEN_{it}$ = Openness index[2] for country i in the year t

$INTEXD_{it}$ = Log of interest payment on external debt for country i in the year t

RIR_{it} = Real interest rate for country i in the year t

$DEPR_{it}$ = Dependency Ratio for country i in the year t

ε_{it} = classical disturbance error component

In terms of apriori expectations, SAV and NFA are expected to be positively related to current account balance (CAB). As expansion in savings tends to have the positive effect on the current account to the extent that private savings complements public savings in improving current account balance. On the NFA, a positive sign is assumed, as improvement in the NFA position has the tendency to improve net foreign income flows, which expands the current account. On the other hand, GDPGR, POPGR, REER, FDI, INTEXD, RIR and DEPR

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[1] These countries are selected based on availability of data

[2] Openness is measured as the addition of imports and exports of goods and services as a percentage of GDP

are expected to be negatively-related. These assumptions are premised on the reasoning that if households expect increase in their income, due to economic growth or increasing dependency ratio, they are likely to increase present consumption, thereby reducing savings and current account. Additionally, huge FDI may reduce precautionary savings by households, as well as create the Dutch disease syndrome; thus reducing the current account deficit, although this outcome depends on the level of governance in the country (Adeleke, 2014; Gnimassoun, 2015).

The OPEN and CPI can take diverse signs, depending on the nature of the economies. This is because the higher the degree of openness of an economy the more vulnerable it is to external shocks, although this depends on the ability of the economy to diversify its trade. On the influence of CPI on current account, the impact is not clear from the literature, as investors require some level of inflation to invest; likewise, higher inflation tends to reduce real income and discourage savings, thereby reducing current account balance. In sum, the influence of these macroeconomic variables on the current account is largely an empirical question.

IV.2   Estimation Procedure

The study utilised panel econometrics technique by modifying the work of Erauskin (2015). This methodology was based on the notion that the individual country relationships would have the same parameters; sometimes known as the pooling assumption. This static panel method of fixed effects and random effects were formulated to assist in achieving the objective of the study, as against the traditional pooled OLS regression. The Hausman test was utilised to make choice between the two competing models (fixed and random effects). Hausman (1978) test is based on the idea that under the hypothesis of no correlation, both Ordinary Least Squares (OLS) and Generalised Least Squares (GLS) are consistent, but OLS is inefficient; while under the alternative, OLS is consistent but GLS is not. The appropriate choice between the fixed effects and the random effects is premised on whether the regressors are correlated with the individual (unobserved in most cases) effect or not. The advantage of the use of the fixed effects estimator is that it is consistent even when the estimators are correlated with the individual effect.

V.   Estimation Results and Discussions

This Section presents the results of the models estimated to understand the interrelationship among savings, net foreign assets and current account balance dynamics in SSA. The summary statistics were presented in Table 1. It was observed that the mean value of the REER was the highest at 382.11, followed by the mean values of CPI, INTEXD, RIR and SAV, which were 52.70, 16.57 15.89 and 14.28 per cent, respectively. The mean values of NFA and CAB were, however, negatives at 62.57 and 5.45 per cent, respectively.

Table 1: Summary Statistics of the Variables

	CAB	SAV	NFA	CPI	GDPGR	POPGR	REER	FDI	OPEN	INTEXD	RIR	DEPR
Mean	-5.4549	14.2758	-62.5658	52.7041	3.7753	2.6146	382.1112	2.6442	0.1441	16.5671	15.8862	6.1862
Median	-5.1200	13.3100	-59.1000	50.2600	4.0100	2.7100	208.3000	1.2200	0.1200	17.0100	8.6600	5.7700
Maximum	49.9800	77.3400	1720.7000	237.4200	35.2200	7.9900	785.7800	54.0600	0.9600	22.3200	145.4100	12.6800
Minimum	-84.1100	-36.6600	-541.0000	-52.6000	-50.2500	-6.3400	0.0000	-28.6200	0.0100	0.0000	-94.7500	3.8200
Obs	1325	1325	1325	1325	1325	1325	1325	1325	1325	1325	1325	1325

Source: Authors Estimation Results

Table 2 showed the correlation matrix. It was observed that SAV, NFA, GDPGR and INTEXD were positively-correlated, with current account, while CPI, POPGR, REER, FDI, OPEN, RIR and DEPR indicated a negative correlation. The signs in the correlation matrix were largely in line with the apriori expectations. It must also be noted that all the variables were not largely correlated with the dependent variable, indicating the presence of multi-collinearity among the variables.

Table 2: Correlation Matrix

	CAB	SAV	NFA	CPI	GDPGR	POPGR	REER	FDI	OPEN	INTEXD	RIR	DEPR
CAB	1.0000											
SAV	0.2377	1.0000										
NFA	0.1184	0.1528	1.0000									
CPI	-0.0233	0.1695	0.1375	1.0000								
GDPGR	0.0198	0.1583	0.0764	0.1203	1.0000							
POPGR	-0.0365	-0.0803	-0.1657	-0.0984	0.1730	1.0000						
REER	-0.1812	-0.1232	-0.0482	0.3525	0.0520	0.1060	1.0000					
FDI	-0.3712	0.0121	-0.0560	0.2387	0.1202	-0.0398	0.0960	1.0000				
OPEN	-0.2492	-0.0862	-0.2241	-0.2409	-0.0911	0.0948	0.0192	0.0426	1.0000			
INTEXD	0.1718	0.2312	0.0930	0.0614	0.0766	0.2233	0.0239	-0.1949	-0.0167	1.0000		
RIR	-0.1448	0.2905	-0.0233	0.1625	0.0537	-0.0437	-0.0090	-0.0233	-0.0234	0.0285	1.0000	
DEPR	-0.0005	0.0848	0.1528	0.0586	-0.0715	-0.3607	-0.1122	0.1047	-0.1590	-0.4285	-0.0354	1.0000

Source: Authors Estimation Results

Table 3 summarised the estimated results obtained from the panel regressions estimated under three different assumptions.

Table 3: Estimated Results from Panel Data Analysis

Dependent Variable: CAB

Variable	Model 1 (Pooled Regression)	Model 2 (Fixed Effects)	Model 3 (Random Effects)
Constant	-3.123	8.3097**	4.5736
SAV	0.1823***	0.1444***	0.1550***
NFA	-0.0008	0.0004	0.0001
CPI	0.0127**	0.0139**	0.0133**
GDPGR	0.0268	0.0423	0.0352
POPGR	-0.2498	-0.7889***	-0.7245**
REER	-0.0017***	-0.0018***	-0.0018***
FDI	-0.6465***	-0.6469***	-0.6487***
OPEN	-0.1654***	-0.1111***	-0.1234***
INTEXD	0.0885	-0.2900**	-0.1457
RIR	-0.0265***	-0.0230***	-0.0235***
DEPR	-0.2251	-0.8804**	-0.6805**
R-squared	0.3141	0.4463	0.2539
Adjusted R-squared	0.3083	0.4255	0.2476
p-value	0.0000	0.0000	0.0000
Obs	1325	1325	1325

Notes: ***, ** and * denote 1%, 5% and 10% level of significant respectively.
Source: Authors estimation results

The results of the pooled regression (Model 1) showed that many of the variables included were significant at conventional levels of significance. 1 per cent increase in the savings level led to about 0.18 percentage increase in the level of current account balance (CAB) in SSA. Similarly, 1 per cent increase in inflation led to about 0.03 percentage increases in the level of current account. These findings were in line with a priori expectation and corroborated the work of Chinn and Prasad (2003), among others. However, the relationship between the current account and net foreign assets was found to be negative and insignificant at all levels. It is also instructive to note that the size of the economy, measured by GDP, appeared not significant in all the models. This buttressed the fact that size of an economy may not really influence the current account balance in the region. The co-efficient of determination (R^2) showed that about 31 per cent of the variations in current account balance were explained by the independent variables in the pooled panel regression.

This clearly point to the limitations of the pooled panel regression results, where individual country's peculiarities were not taken care of in the estimation process.

Although, the nature of the relationship among each of the independent and the dependent variables appears largely similar across the three models estimated, they   however, made different assumptions. We, therefore, subjected the models to the Hausman test to compare the fixed and random effects estimates of the coefficients. The Hausman test, as reported in Table 4, showed an insignificant probability value hence the null hypothesis of the fixed effects estimates being better than the random effects estimates could not be rejected. This implied that fitting a random effects model to the data would amount to misspecification and could generate bias and inconsistent estimates. Hence, the appropriate model for the data was a fixed effects model (Model 2). Besides the Hausman test, a comparison of the R-squared coefficients in Table 3 showed preference for the fixed effects model. Therefore, Model 2 was selected as the preferred model.

Table 4: Correlated Random Effects - Hausman Test

| Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	13.8616	11	0.2407

Source: Authors Estimation Results

Based on the Hausman test, which preferred the fixed effect model to random effect, all other explanatory variables with the exception of net foreign assets and size of the economy (GDPGR) were found to be significant in determining current account balance in sub-Sahara Africa. In terms of co-efficient of determination (R2), the effect model showed that about 43 per cent of the variations in current account balance are accounted for by the explanatory variables. This indicated the improvement of the fixed effect results over both the pooled and random effect models.

The result showed that 1 per cent increase in levels of savings would lead to about 0.14 per cent increase in the level of current account. This is in conformity with the apriori expectations where growth in the level of savings is expected to have positive impact on the current account balance. Also, 1 per cent increase in the net foreign assets of these countries would lead to positive but insignificant effect on the level of current account.   When proxied, consumer

price index as a measure of inflation, it was clear that 1 per cent increase in CPI would increase current account balance by 0.01 per cent in SSA. This result indicated that some level of inflation might be required for investors in SSA to invest in exportable goods and services that would improve the level of current account balance. As in the results of the pooled panel estimate, the size of each country appeared to be insignificant in the models.

In the same vein, 1 per cent decrease in levels of population growth (POPGR), real effective exchange rate (REER), foreign direct investment (FDI), openness (OPEN), Interest payment on external debt (INTEXD), real interest rate (RIR) and dependency ratio (DEPR) generated about 0.79, 0.002, 0.65, 0.11, 0.29, 0.02 and 0.88 per cent increase, respectively, in the level of current account balance in SSA. This implied that all these variables impacted negatively on the current account balance in SSA and were in line with the apriori expectations. This outcome depicted the reality in SSA countries, where expectation of higher income, because of increased FDI, may encourage both households and governments to raise current consumption, hence, reducing savings and the current account balance. More importantly, the coefficient of POPGR and DEPR were negative and significant, as expected apriori, implying increase in population and dependency ratio would increase households and national spending, thereby reducing average national income, savings, and the current account balance.

The results of the cross section fixed effects obtained to understand peculiarities of the countries under study were presented in Figure 4. The outcome revealed that only 15 out of the 38 countries, including Angola, Botswana, Cameroon, Central Africa Republic, DR Congo, Cote D'Ivoire, Gabon, Guinea, Malawi, Nigeria, South Africa, Swaziland, Sudan, Uganda and Zambia, were above the regional average, in terms of the level of current account balance, during the period under consideration. This buttressed the fact that larger SSA countries had their current account balance in the negative region; and thus, required urgent individual country attention, as well as collaborative regional organisational support.

Figure 4: Cross Section Fixed Effects
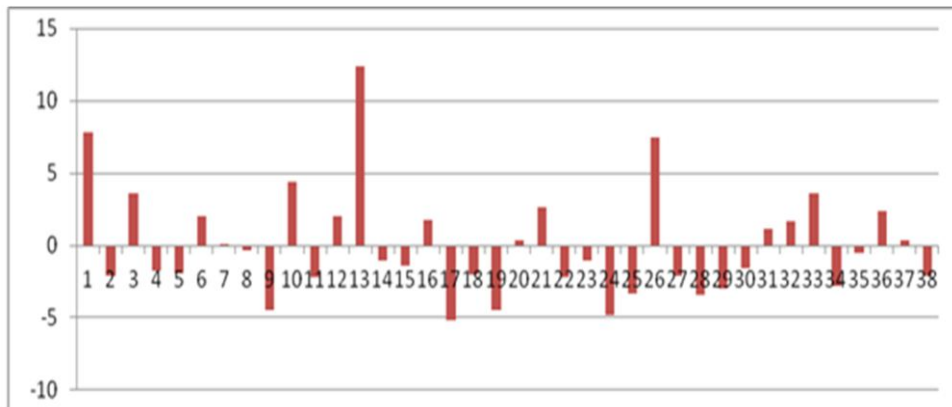
Source: Authors estimation Results

VI.   Conclusions and Policy Implications

This study examined the interactions between savings, net foreign assets and current account balance in sub-Saharan Africa from 1980 to 2013. The effects of intervening variables, such as, real effective exchange rate, size of the economy (proxy by GDP), and real interest rate, among others, were considered in estimating the interrelationship. This study was motivated by the fact that most studies carried out on this issue were either country-specific or largely focused more on developed countries and other regions of the world. It then utilised panel regression technique in establishing the statistical relationship among the variables. Based on the Hausman test, the fixed effect model was preferred to the random effect model. The results from the study showed that savings and net foreign assets impacted positively on the current account balance, while foreign direct investment, population growth and dependency ratio had negative influence. This implies that African governments, desirous of improving their current account balance must institute policies aimed at increasing savings and net foreign assets. Also, they must properly managing foreign direct investment, as well as population growth and dependency ratio.

Therefore, policies that are aimed at improving current account balance should be harnessed, by advancing intiatives that would encourage exports, particularly non-resource-based exports, which in turn may increase the net foreign asset base. Also, there should be continuous encouragement of

intiatives aimed at increasing both public and private domestic savings, while discouraging high population growth and dependency ratio. This should be complemented by institutionalising strategies to better manage resources, particularly those relating to foreign direct investment.

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APPENDICES

Appendix 1A: List of Countries

CROSSID	Country	CROSSID	Country	CROSSID	Country	CROSSID	Country
1	ANGOLA	11	CONGO	21	MALAWI	31	SOUTH AFRICA
2	BENIN	12	COTE D'IVOIRE	22	MALI	32	SWAZILAND
3	BOTSWANA	13	GABON	23	MAURITIUS	33	SUDAN
4	BURKINA FASO	14	THE GAMBIA	24	MOZAMBIQUE	34	TANZANIA
5	BURUNDI	15	GHANA	25	NIGER	35	TOGO
6	CAMEROON	16	GUINEA	26	NIGERIA	36	UGANDA
7	CENTRAL AFRICA REPUBLIC	17	GUINEA BISSAU	27	RWANDA	37	ZAMBIA
8	CHAD	18	KENYA	28	SENEGAL	38	ZIMBABWE
9	COMOROS	19	LESOTHO	29	SYCHELLES		
10	DR CONGO	20	MADAGASCAR	30	SIERRA LEONE		

Source: Authors' Compilation

Appendix 1B: Data sources and Definition of the variables

	Data sources and Definition of the variables			
S/N	Variable Name	Sources	Notation	Comments
1	Gross savings	World Development Indicators	SAV	(% of GDP)
2	Current Account Balance	IMF World Economic Outlook	CAB	(% of GDP)
3	GDP Growth Rate	World Development Indicators	GDPGR	GDP (annual %)
4	GDP per Capita	World Development Indicators	GDPPC	(current US$)
5	Gross Domestic Product	World Development Indicators	GDP	(Current USD)
6	Imports of Goods and Services (% of GDP)	World Development Indicators	IMPT	% of GDP
7	Exports of Goods and Services (% of GDP)	World Development Indicators	EXPT	% of GDP
8	External Debt	World Development Indicators	EXTDEB	(Current USD)
9	Interest Payment On External Debt	World Development Indicators	INTEXD	(Current USD)

10	Real Effective Exchange Rate	IMF World Economic Outlook	REER	Real effective exchange rate is the nominal effective exchange rate (a measure of the value of a currency against a weighted average of several foreign currencies) divided by a price deflator or index of costs.
11	Population, Total	IMF World Economic Outlook	POP	Millions
12	Population Growth Rate	World Development Indicators	POPGR	Annual population growth rate
13	Age Dependency Ratio	World Development Indicators	DEPR	Age dependency ratio, old (% of working-age population)
14	Net Foreign Assets	External Wealth of Nations Database	NFA	% of GDP
25	Foreign Direct Investment	World Development Indicators	FDI	net inflows (% of GDP)
16	Real Interest Rate	World Development Indicators	RIR	Real interest rate is the lending interest rate adjusted for inflation as measured by the GDP deflator.
17	Consumer Price Index	World Development Indicators	CPI	Consumer price index reflects changes in the cost to the average consumer of acquiring a basket of goods and services that may be fixed or changed at specified intervals, such as yearly.

Source: Authors' Compilation