# DETERMINANTS OF GROSS DOMESTIC SAVINGS IN SUB-SAHARAN AFRICA

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*ABSTRACT*

*In this study the major determinants of gross domestic savings are examined for twenty-five sub-Saharan African (SSA) countries over the period 2000 to 2017. The Fully Modified Ordinary Least Squares (FMOLS) methodology is employed in the empirical analysis. It is revealed that fiscal policy and financial variables, as well as demographic factors have significant impacts on the gross domestic savings in the SSA countries. The impacts of macroeconomic variables are found to be relatively weak. There is also evidence that regional membership groupings of SSA countries significantly explain the savings behaviour of the countries, although there are also country-specific effects. There are policy options to be considered on the basis of the findings: the need for the application of spending and tax options to smoothen critical variations in savings through measures to boost gross income; reforms in the financial sector to boost bank-stimulated savings; and policies to reduce debt vulnerability and encourage economic diversification. Regional economic blocs are also expected to intensify measures to strengthen savings among the member countries through integration.*

## INTRODUCTION

The role of domestic savings in stimulating and sustaining economic growth has continued to pose serious questions especially in developing countries. In particular, there is increased focus on the patterns and components of savings that can boost capital accumulation and long-term growth more efficiently. The clear evidence in this regard is the prevalence of low gross domestic savings and associated poor economic growth performance in sub-Saharan African (SSA) region (Ghura & Hadjimichael, 1996; Sachs & Warner, 1997; Aryeetey & Udry, 2000; Loayza,

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Schmidt-Hebbel & Servén, 2001; Steinert, Zenker, Filipiak, Movsisyan, Cluver & Shenderovich, 2018). Essentially, countries with impressive savings rate have been shown to grow faster than those with low savings rate, irrespective of initial conditions (Odhiambo, 2009; Thornton, 2009; Aghion, Comin, Howitt & Tecu, 2016). Apart from the generally low savings to Gross Domestic Product (GDP) rate in the SSA region, a more worrisome issue is the gradual decline in the rate which is accompanied by high levels of instability over time. For instance, gross savings as a percentage of GDP was 32.38 percent on average between 1980 and 1989, 24.47 percent between 1990 and 1999, and further dropped to 20.14 percent between 2000 and 2009. By 2016, the rate had dropped to 18.21 percent, although it increased slightly to 18.6 percent in 2018 on average. Although there were periods of sharp increases across the years, the general trend is that of sustained decline. This has further engendered attention on the structure of savings, especially as it relates to the main driving factors.

The growing interest to reinvigorate and sustain economic growth in sub-Saharan Africa has motivated a number of studies at investigating the various determinants of gross domestic saving rates in Africa. However, variations in gross saving rates across the SSA countries in terms of income and other groupings are essentially less understood. These classifications are however important in terms of the fixed effects of domestic macroeconomic conditions in relation to both savings and other outcomes. In the same vein, previous studies (for example, Aryeetey & Udry, 2000; Geda & Kibret, 2006; Balde, 2011; Elias & Worku, 2015; Boateng, Agbola & Mahmood, 2019) have paid little attention to the influence of the debt conditions (especially external debt servicing) on the aggregate saving behaviour in the SSA region. The debt question is important because savings acts as significant nexus between debt service ratios and the crowding out phenomenon on investment. In essence, savings play strong intermediary role between external debt servicing and investment. In particular, high debt service payment imposes constraints on foreign exchange availability (Montiel, 2005; Kumar, Bhutto, Mangrio & Kalhoro, 2019), directly reducing the capacity for public savings. For the private sector, the risk of debt overhang associated with rising debt servicing payment is likely to induce private agents to transfer funds abroad instead of saving domestically.

From the foregoing, there are two crucial explanations of the savings behaviour among SSA countries, namely, highlighting savings characteristics among different country groupings and the role of external debt on savings behaviour. This is a major gap which this study attempts to fill. Essentially, this study takes a broad view of the

determinants of savings in SSA, including the challenge of macroeconomic instability generated from recent debt situations faced by the countries. A long run estimation framework is employed, and social, demographic and macroeconomic variables are considered for 25 SSA countries. In achieving the objective, the study is organised into five sections, including this introductory section. A brief review of literature is the focus of section two, while the methodology of the study is discussed in section three. The empirical results and analysis are treated in section four, with conclusions and policy implications in section five.

## LITERATURE REVIEW
### Concept of Gross Domestic Savings
According to Agenor and Aizenman (2004), gross domestic saving is the difference between GDP and final consumption expenditure in an economy. It is expressed as a percentage of GDP. This implies that domestic saving can be considered as a choice between "consumption today and consumption tomorrow" since it connotes the accumulation of wealth over time and raises living standards in the future. More technically, gross domestic savings is made of three components: public savings, corporate savings, and household savings (Cerda, Fuentes, García & Llodrá, 2020).

Public savings is made up of all savings of government (at all tiers), including financial public like the Central Banks and the non-financial public like the state-owned enterprises. Corporate savings are made up of retained earnings and depreciation of private firms. Household savings, which is the difference between total private savings and corporate savings, can either be voluntary or mandatory (e.g., social security contributions). The ratio of the sum of these savings to total GDP is the gross domestic savings ratio in an economy. Moreover, gross domestic savings can be in form of physical asset or financial asset holdings (Cerda et al, 2020). Often, domestic savings is considered as a hedge against reliance on external financing. In this case, a large gross domestic savings to GDP ratio helps to enhance competitiveness through efficient valuation of currency (Organisation of Islamic Cooperation OIC, 2011). Savings and investment are also considered to move in the same direction over time. Essentially, the different composition of gross savings in a country explains why the determinants of domestic savings is examined within a wide spectrum.

### Theoretical Review
The fundamental factors that drive savings are well discussed in theoretical literature. Modigliani (1966) in his famous life-cycle hypothesis explains that increase in economic growth with a correspondingly undisturbed saving rate by age

structure, stir up gross saving because it would stimulate the aggregate income of the working age population as compared to those of the dependents who earn no labour income. The life – cycle hypothesis relates the aggregate saving behaviour to demographics – successive stages of schooling, increased earnings and retirement (Modigliani & Ando, 1957). Also, Shawa (2016) explains that in the life – cycle hypothesis, age structure of the total population has significant influence on saving.

This theoretical background on the evaluation of the leading factors that explain savings provide strong indications to the empirical evaluation of savings both at the household (micro) and national or cross-national (macro) levels. The proposition by Modigliani underscores the role of three strategic aspects of the socio-economic structure in explaining savings decisions. First, the model indicates the place of demographics in explaining how savings occur. Thus, there are prospects that demographic factors including age structure, dependencies or migration may matter for savings. Second, it highlights the role of income and related macroeconomic factors in explaining savings. The extension of the theory by Shawa (2016) also gives room for the place of policy changes in determining savings. These factors also form the basis for the empirical analysis that is conducted in this study.

The theoretical basis for explaining savings rate has been tested in literature. For instance, Barro (1990) demonstrated that economic growth and gross saving rates decline with a rising trend of utility-type expenditure, and that at initial stage the aggregate saving and economic growth rates increase with government spending but subsequently fall. This standpoint simply shows the immense influence of the variation in productive government spending on both saving and economic growth rates.

Moreover, Kebret (1999) indicated that savings has both direct and indirect relationships with other macroeconomic factors. In this relationship, savings and capital accumulation drive economic growth. The author identified frontline factors that influence economic growth via savings to include real GDP per capita, government consumption expenditure, foreign aid, financial and monetary policy variables (broad money supply as a ratio of GDP and domestic credit to private sector as a percentage of GDP), inflation (as a measure of macroeconomic instability and uncertainty) and demographic factors (age dependency ratios and degree of urbanization).

In addition to the factors highlighted in previous studies, Hadjimichael, Ghura, Muhleisen, Nord and Ucer (1995) showed that debt service payment crowd-out public investment and by extension private investment, and that upward review of

the external debt ratio makes agents to transfer funds abroad rather than saving domestically, and this will then have a deleterious effect on economic growth, because it will increase the domestic cost of capital that may, in turn, deter investment. The researchers also emphasized the influence of inflation on saving; that inflation as a measure of macroeconomic uncertainties plays important role in stimulating or deterring private investment and domestic saving.

**Empirical Review**

The empirical evaluations of the determinants of savings largely draw from the theoretical conclusions. In a seminal study, Singh (1972) investigated the determinants of aggregate saving of seventy countries (comprising 16 developed and 54 underdeveloped countries) for the period of 1960 through 1965 employing the ordinary least square estimation technique. The empirical findings of the study showed that capital inflow, per capita income, tax rate, share of imports in Gross National Product (GNP), exchange rate overvaluation and labour force participation rate exert significant effects on aggregate saving while share of wages, rate of price increase and mining share in GNP were not found to exert significant impact on aggregate saving. However, the study reveals that the classification of countries on the basis of the level of development is not important consideration in stimulating savings – and investment rates, but Niculescu-Aron and Mihaescu (2012) agreed that the level of development plays critical role in stimulating national savings.

Masson, Bayoumi and Samiei (1998) analyzed the determinants of private saving behaviour in industrialized and developing countries (comprising of 21 industrialized and 40 developing countries) for the periods of 1971 through 1993 employing the ordinary least squares and the first difference instrumental variable techniques. The empirical analysis revealed that demographic factors, per capita GDP, government consumption expenditure, interest rate, public investment and other control variables exert significant impacts on private savings. The study unveiled the undeniable influence of the variations in income across countries on aggregate saving, hence, the changes in the level of development could have separate impact on private savings.

At the micro-level, some other studies have investigated the determinants of household savings. These studies include: Callen and Thimann (1997) and Hufner and Koske (2010). The former investigated the determinants of household saving of twenty-one Organization for Economic Cooperation and Development (OECD) countries from 1975 to 1995 employing the pooled ordinary least square, and findings revealed that demographics and other macroeconomic factors have

significant influence on household saving. The latter's study focused on household saving rates of G-7 countries with emphasis on Germany in the 1970s employing the panel co-integration methodology, and revealed that financial liberalization effect, wealth effect, income development and other macroeconomic factors have significant impacts on household saving. Also, Schmidt-Hebbel, Web and Corsetti (1992) used household data to analyse the determinants of ten countries, and found a negative and significant effect of foreign saving and monetary assets on household saving. These studies have emphasized the relevance of the efficiency of the financial system on the saving behaviour of households.

Horioka and Terada-Hagiwara (2012) investigated the determinants of domestic saving rates in twelve developing Asian economies from 1966 to 2007 employing the fixed and random effect models, and found empirical supports for the significant impact of age structure of the population, income levels and the level of financial sector development of domestic saving. However, the study identified the positive influence of income level on saving rate as a better and dependable way of offsetting the negative and significant influence of aging population on domestic saving rate.

Grigoli, Herman and Schmidt-Hebbel (2014) examined the saving behaviours of one hundred and sixty-five countries from 1981 to 2012 employing different panel estimation techniques, and ascertained that income levels and income growth have persistent and positive impact on private saving rate. Also, the study revealed that higher old-age dependency ratio and urbanization reduce private saving rates. In a study on the determinants of household saving behaviour in Malta, Gatt (2014) found that banking sector variables as well as government fiscal activities are critical for explaining savings in the country. In particular, the study found that aggregate savings tended to decline following a deterioration in the government budget.

In the same vein, Ahmed (2015) analysed the determinants of savings behaviour in Pakistan over the period of 1972 to 2012 employing the long-run co-integration test, vector error correction model as well as other relevant estimation techniques. The estimation outcomes revealed that macroeconomic variables like gross domestic product per capita, inflation rate, dependency ratio and fiscal development exert significant influence on savings. The striking revelation was that broad money supply had negative and significant relationship with saving which implies the possibility of the existence of low interest rate in the economy which makes more funds available to the individuals for consumption thereby lowering savings.

Studies on savings behaviour in sub-Saharan Africa have largely focused on the macroeconomic determinants both at the macro and the micro levels. For instance, Elbawi and Mwega (2000) employed behavioural models in explaining the

relationships between private saving and macroeconomic variables in sub-Saharan Africa and other regions over the period of 1970 to 1995. The fixed effect estimation revealed that causality runs from economic growth to saving, and also that savings rate is a causal factor for increase in investment. The study reaffirmed the influence of economic factors on gross private savings and identified relevant policies to reverse the dismal performance of gross saving as a share of national income in the SSA region.

Also, Geda and Kebret (2006) combined both micro and macro data to examine the determinants of savings among African countries using theoretical evaluations. The study found that both the levels and growth in income, investment rate, and short-run terms of trade variations promote savings rate, while macroeconomic instability, foreign aid, and age-dependency ratio tended to reduce savings among African countries. In the same vein, Shawa (2016) examined the dynamic private savings function for 39 sub-Saharan African countries over the period of 1985 to 2008 employing the variants of the dynamic generalized method of moments (GMM). The study found that the various economic factors (such as, urbanization ratio, youth and elderly dependency ratios, general government consumption, broad money supply as a percentage of GDP, private credit to GDP ratio and others) exert significant influence on private saving rate. The study consistently showed a positive and significant relationship between inflation and private saving rate, suggesting that macroeconomic instability and expected prices dampen savings.

For the West African sub-region, Kudaisi (2013) examined the effects of demographic factors, fiscal policy variables and economic growth variables on domestic saving rates from 1980 to 2006 employing the panel data estimation methodology. Findings from the study show that dependency ratio, interest rate and income per capita had insignificant effect on domestic savings and so was the growth in GDP.

Abasimi and Martin (2018) investigated the determinants of national saving in four West African countries between 1997 and 2016, employing the auto regressive lag model. The findings revealed that gross domestic product, per capita income and interest rate had a statistically positive effect on gross saving while age dependency ratio exerted negative and statistically insignificant effect on gross domestic saving.

The theoretical and empirical literature reviewed indicate a striking issue in savings namely; that theory and empirics are highly related. This is because much of the factors that drive savings which have been conceptualized in the theory are easily observable. Moreover, the theory and empirical evaluations also indicate that, irrespective of the region being studied, social, macroeconomic and demographic

factors account for determining savings. A major area of divergence is that, for developing countries like the SSA, other more pressing factors that are micro-based tend to exert important effects on savings and these factors are not being fully captured in extant literature. In particular, this current study extends previous literature by including the roles of policy factors like external debt (which is a prevailing macroeconomic issue among SSA countries) as a determinant of savings rate.

**Model Specification and Estimation Techniques**
The model developed in this study is largely based on the theoretical underpinings of savings determination examined in the previous section. Essentially, the theory highlights factors of macroeconomic movements, demography, social, and policy as driving savings (Geda & Kebret, 2006; Shawa, 2016). On this basis, this study developed a model linking gross savings rate to its determinants within long-run framework (as also identified in Modigliani, 1966). The long-run or cointegrating structure of the analysis indicates that the Panel Fully Modified Ordinary Least Squares (FMOLS) methodology (which is robust to first difference stationary variables) is employed. As noted by Pedroni (2000), the FMOLS is adequate for analyzing long-run relationships and impacts in a panel data setting. The model estimated in this study is given as:

$$savrate_{it} = \alpha_{it} + \beta_i m2\_gdp_{it} + \delta_i crp\_gdp_{it} + \gamma_i tdsr\_exp_{it} + \phi_i rgdpcgr_{it} + \lambda_i con\_gdp_{it} + \theta_i nodar\_gni_{it} + \pi_i durban_{it} + \omega_i infl_{it} + \tau_i invtr_{it} + \eta_i dagdpr_{it} + \psi_i yagdpr_{it} + \varepsilon_{it}$$

Where *savrate* is the savings rate which is measured as gross domestic savings as a percentage of GDP, *m2_gdp* is broad money as a percentage of GDP, and it is the proxy for financial depth. Moreover, *crp_gdp* denotes domestic credit to private sector by banks as a percentage of GDP and is the proxy for the degree of financial constraint. *tdsr_exp* represents total debt service as a percentage of exports of goods, services and primary income, while *rgdpcgr* is real GDP per capita growth (in annual percentages). Consumption expenditure of government is also included as a determinant of the savings rate, hence *con_gdp* represents general government final consumption expenditure as a percentage of GDP. Also, *nodar_gni* represents net Official Development Assistance (ODA) received as a percentage of gross national income. *durban* denotes urban population as a percentage of total population, and it is a proxy for the degree of urbanization. *infl* represents annual consumer prices. *invtr* represents gross capital formation as a percentage of GDP, and it is the proxy for investment rate – this was included in the model because in the event of capital

mobility, investment rate and savings rate are independent of one another. *dagdpr* denotes age dependency ratio and *yagdpr* denotes age dependency ratio, young, as a percentage of working age population. From the theoretical formulation by Modigliani (1966), age dependencies are expected to have negative impact on savings.

This study finds the Panel FMOLS suitable to examining long run relationship of savings rate and its determinants because of its ability to address issues of serial correlation and endogeneity that may be present in the model, and it allows for country-specific effects to be heterogeneous while estimating a long run relationship (Pedroni, 2000). This method has also been previously employed by Gatt (2014) to analyze the determinants of household saving behaviour in Malta. Apart from the FMOLS, the homogeneous (Lin, Levin and Chu, Breitung) and heterogeneous (Im, Pesaran and Shin, Augmented Dickey Fuller and Phillip Perron Fisher) approaches are adopted to conduct the unit root test while the Kao (homogeneous) and Pedroni (heterogenous) panel co-integration approaches are used to examine the long run relationship among the variables. The dataset for the study were sourced from the World Bank Development Indicators dataset of 2019. However, there are no or incomplete data for the year 2018 and 2019, respectively.

## EMPIRICAL RESULTS AND ANALYSES
### Panel Unit Root and Co-Integration Tests Results

The unit root test was conducted using both the homogeneous (Levin, Lin and Chu, and Breitung) and the heterogeneous (Im, Pesaran and Shin, augmented Dickey-Fuller and Phillip-Perron-Fisher) approaches. The results in Table 1 show that all the variables are non-stationary at levels. However, the unit root coefficients of the variables were found to be stationary at 1% and 5% significance levels after their first difference.

**Table 1: Panel Unit Root and Co-integration Test**

| Variables | Levels | | | | |
| --- | --- | --- | --- | --- | --- |
| | Homogeneous | | Heterogeneous | | |
| | Llc | Brt | ips | Adf | pp-f |
| Gross Domestic Savings (%GDP) | -0.47 | -0.47 | -0.39 | 7.92 | 13.14 |
| Money Supply (%GDP) | -0.17 | -0.19 | -0.66 | 6.23 | 6.23 |
| Domestic Credit to Private Sector (%GDP) | 0.41 | 0.92 | 1.61 | 3.34 | 3.84 |
| Total external debt service (%Export) | -0.46 | 4.1 | 1.61 | 3.82 | 8.83 |
| Real GDP per capital growth | -0.43 | -0.92 | -0.67 | 4.67 | 8.64 |
| General consumption expenditure (%GDP) | -1.11 | 0.72 | -0.27 | 5.76 | 9.75 |
| Net ODA received (%GNI) | -0.75 | -0.71 | -0.32 | 3.27 | 10.02 |
| Urban population (% total population) | -0.58 | 2.47 | 1.57 | 2.80 | 7.48 |
| Inflation | -0.80 | -0.36 | -1.59 | 1.55 | 2.66 |
| Gross capital formation (% GDP) | -0.83 | 0.65 | 1.39 | 3.91 | 4.3 |
| Old age dependency ratio | -0.48 | 0.7 | 0.56 | 4.17 | 1.54 |
| Young age dependency ratio | -0.34 | 0.61 | 1.91 | 1.97 | 4.46 |
| Variables | First difference | | | | |
| | Homogeneous | | Heterogeneous | | |
| | Llc | brt | ips | Adf | pp-f |
| Gross Domestic Savings (%GDP) | -6.81* | -4.26* | -6.87* | 134.26* | 322.76* |
| Money Supply (%GDP) | -7.14* | -2.49* | -5.32* | 111.08* | 239.66* |
| Domestic Credit to Private Sector (%GDP) | -4.85* | -2.22* | -5.23* | 112.12* | 222.26* |
| Total external debt service (%Export) | -7.20* | -5.74* | -11.10* | 200.12* | 415.87* |
| Real GDP per capital growth | -13.27* | -8.97* | -12.34* | 215.35* | 464.06* |
| General consumption expenditure (%GDP) | -6.98* | -3.67* | -5.44* | 117.04* | 262.40* |
| Net ODA received (%GNI) | -8.24* | -6.82* | -7.72* | 148.16* | 360.18* |
| Urban population (% total population) | -28.62* | 4.91* | -16.99* | 88.22* | 58.95 |
| Inflation | -14.09* | -7.91* | -13.78* | 242.53* | 451.90* |
| Gross capital formation (% GDP) | -7.35* | -4.56* | -5.82* | 120.03* | 289.14* |
| Old age dependency ratio | -2.06* | 1.15 | -2.96* | 59.04 | 72.08** |
| Young age dependency ratio | 0.13 | 2.29 | -2.85* | 37.99 | 79.01** |

Note: *indicates significance at the 5 percent level

The panel co-integration results in Table 2 show evidence of co-integration among the variables in the Kao test at a 1 percent significance level, thus, rejecting the hypothesis of no co-integration in a homogeneous panel data setting. To allow for more robust long run conditions, the Pedroni co-integration tests were conducted. Due to the large variables used in the analysis, the variables were grouped under various sub-headings. The Pedroni co-integration tests show evidence of co-integrating relationship among the variables at 1% (critical value = 2.89) and 5% (critical value = 2.12) significance levels in the 'between' and 'within' dimensions.

**Table 2: Pedroni Panel Co-integration Test**

| *Macroeconomic and external factors* | | | | |
|---|---|---|---|---|
| *within-dimension* | | | *between-dimension* | |
| | Statistic | Weighted Statistic | | |
| Panel v-Statistic | -3.74 | -3.94 | Group rho-Statistic | 5.43 |
| Panel rho-Statistic | 4.05 | 3.65 | Group PP-Statistic | -3.78* |
| Panel PP-Statistic | -3.21* | -3.53 | Group ADF-Statistic | -0.7 |
| Panel ADF-Statistic | -3.27* | -2.7 | | |
| *Fiscal Policy and Financial Factors* | | | | |
| *within-dimension* | | | *between-dimension* | |
| | Statistic | Weighted Statistic | | |
| Panel v-Statistic | -1.08 | -3.48 | Group rho-Statistic | 5.3 |
| Panel rho-Statistic | 2.61 | 3.66 | Group PP-Statistic | -7.28* |
| Panel PP-Statistic | -3.76* | -5.17 | Group ADF-Statistic | -1.91** |
| Panel ADF-Statistic | -0.48* | -4 | | |
| *Demographic factors* | | | | |
| *within-dimension* | | | *between-dimension* | |
| | Statistic | Weighted Statistic | | Statistic |
| Panel v-Statistic | -2.7 | -5.85 | Group rho-Statistic | 4.33 |
| Panel rho-Statistic | 1.98 | 2.82 | Group PP-Statistic | -14.86* |
| Panel PP-Statistic | -8.48* | -10.37 | Group ADF-Statistic | -7.13* |
| Panel ADF-Statistic | -5.95* | -8.61 | | |
| Kao Panel residual cointegration test (Complete Variables) | | | | |
| *ADF (t-stat) = -3.06\** | | | | |

Note: */**/*** = 1 %/5%/10% significance levels. Source: Author's Computation

## Check for Cross-Section Dependence in Panel Dataset

This study checked for the cross–sectional dependence in order to ascertain the spatial effects on the various residuals employing the Breuch-Pegan, Pesaran Scaled and Pesaran CD estimators. The three tests in Table 3 provide evidence for the absence of cross-sectional dependence in the panel data structure at the 5 percent significance level. Note that the Peseran CD coefficient of 0.89 is less than the critical value of 1.98 at the 5 percent level. This implies that there are no cross-sectional interactions among the errors of the estimates.

**Table 3: Residual Cross-Section Dependence Test**

| *Test* | *Statistics* | *Critical val (95%)* |
|---|---|---|
| Breauch-Pegan LM | 6.32 | 12.86 |
| Pesaran scaled LM | 1.83 | 4.41 |
| Pesaran CD | 0.89 | 1.98 |

*Source: Author's computation*

**Model Estimation Results and Analysis**

This study estimated the FMOLS model relating savings rate to its determinants, and the results produced are reported in Tables 4 and 5. This study considered the levels of income (low income and middle income) and resource intensiveness or non-intensiveness as likely explanations for the behaviour of gross domestic savings in the SSA. The study further conducted a number of robustness and sensitivity checks, to ascertain if savings rates could be responsive to country-specific factors such as resource availability and income levels. In addition, it included non-SSA countries (like Egypt, Morocco and Tunisia) into the sample to ascertain if the results obtained from the baseline estimates may be susceptible to the non-SSA countries' inclusion.

The broad money to GDP ratio variable had a negative and significant relationship with saving rate at one percent significance level except in the case of low income – and non-resource intensive SSA countries where it exerted positive and significant effect on gross domestic savings. The credit to private sector as a ratio of GDP exerted negative and significant effect on savings rate regardless of the countries' groupings, and this demonstrates the relevance of liquidity and borrowing constraints in the consideration of savings level of the SSA. The negative effect of monetary base on gross domestic savings is supported by the findings of Ahmed (2015) and Shawa (2016) and the observation of the life-cycle models that financial depth may provide increased opportunities for consumption at the detriment of savings. The result however shows that financial development had positive effect on gross domestic savings, which is in line with the empirical evidence of Abasimi and Martin (2018) and Prabhakar (2022).

The debt service ratio variable exerted negative and significant influence on gross savings rate in the SSA at one percent significance level except in the case of the low income SSA countries where it revealed a positive and significant effect (with period –fixed effect), indicating that debt service ratios grow in sync with savings rate. However, it was observed that debt service ratio had negative but insignificant relationship with savings rate in non-resource intensive SSA countries. The negative impact of debt service ratio on gross domestic savings is in agreement with the findings of Hadjimichael et al (1995), Aryeetey and Udry (2000). In particular, high debt service payment imposes constraints on foreign exchange availability, directly reducing the capacity for public savings. Moreover, the risk of debt overhang associated with rising debt servicing payment is likely to induce private agents to

transfer funds abroad instead of saving domestically. This finding is also corroborated by country case studies in Africa like those of Aliyu and Musa (2013) Oageng and Boitumelo (2017).

Real gross domestic product per capita growth had a positive and significant effect on savings rate at one percent significance level except in the case of non-resource intensive SSA countries where a negative, though insignificant relationship existed with savings rate. Essentially, these results show that, in line with the Keynesian postulation, rising personal income tends to stimulate savings. Indeed, many studies (e.g., Drechsel-Grau & Schmid, 2014; Kong & Dickinson, 2016; Abasimi & Martin, 2018) have confirmed that a major dividing line in terms of savings performance among countries is the level of per capita income. The general government final consumption expenditure variable exerts a negative and significant impact on savings rate in the baseline model and across the various countries' groupings in the SSA. This suggests that government consumption tends to push fiscal deficits more rapidly, thereby limiting the capacity to save (Traum & Yang, 2015; Singh, 2017).

The coefficient of the foreign aid variable is negative and significant for the full sample, indicating that foreign aid tends to drive down savings among the SSA countries. It is argued that the availability of free foreign capital in the form of foreign aid in developing countries tends to reduce saving effort, thereby crowding out, instead of complementing, savings (Basnet, 2013; Nowak-Lehmann & Gross, 2021). The results for the middle-income (or resource intensive) SSA countries however indicated that foreign aid significantly improved savings. This result provides some information about a cascading impact of aid on macroeconomic performance which has been generally demonstrated (Rajan & Subramanian, 2008; Addison, Morrissey & Tarp, 2017).

Inflation as a proxy for macroeconomic instability exerted negative and significant impact on savings rate in the baseline estimates and the non-resource intensive SSA countries but exhibited mixed results for the other countries' groupings. In general, there is evidence from the study that macroeconomic instability reduces savings among SSA countries. It is also seen in the result that investment rate positively affects savings rate.

Among the demographic variables, the degree of urbanization variable (with control for fixed effect) and the young age dependency ratio exerted negative and significant effect on savings rate while the old age dependency ratio had positive and significant effect on savings rate. This outcome tends to support the life-cycle theory of savings, which suggests that savings may be larger in societies with more aged population. Besides, the result poses strong policy and social dilemma for SSA countries given that the young population has increased dramatically and is expected to dominate the population structure in the next few years. The divergent impacts of age-dependency structure of the population appears to conform with extant empirical studies like those of Kudaisi (2013), Grigoli et al (2014), Uddin, Alam and Gow (2016) and Abasimi and Martin (2018). They show that expenditure financing by the younger population tends to deplete savings more rapidly.

To ensure robustness of the estimated results, demographic factors; macroeconomic and external factors; fiscal policy and financial factors were controlled in the estimates and the results are reported in Table 5. The results are essentially similar irrespective of the factors that were controlled for. Thus, the results are robust to changes to demographic factors, macroeconomic variables, fiscal policy and financial factors in the SSA countries.

The results of the estimators with period fixed effects have better outcomes. This shows that country-specific factors play essential role in explaining the behaviour of savings in SSA countries. The various specifications have high explanatory powers, the coefficients of determination show that the determinants of savings adopted in this study explain over eighty percent of the behaviour of gross domestic savings rate in SSA countries.

## Table 4: Gross Domestic Savings Performance in Sub-Saharan Africa Countries Across Member Countries of Groupings

| Variables | Sub-Saharan Africa (SSA) countries | | Middle Income SSA countries | | Low Income SSA countries | | Resource Intensive SSA countries | | Non-Resource Intensive SSA countries | | African Countries | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Coefficients (t-statistics) | Coefficients (t-statistics) | Coefficients (t-statistics) | Coefficients (t-statistics) | Coefficients (t-statistics) | Coefficients (t-statistics) | Coefficients (t-statistics) | Coefficients (t-statistics) | Coefficients (t-statistics) | Coefficients (t-statistics) | Coefficients (t-statistics) | Coefficients (t-statistics) |
| Money Supply (%GDP) | -0.01 (-1.02) | -0.10* (-7.57) | -0.21* (-11.44) | -0.26* (-15.06) | 0.11* (6.45) | 0.18* (9.20) | -0.05* (-2.41) | -0.01 (-0.45) | 0.06* (4.53) | 0.06* (4.59) | -0.08* (-8.14) | -0.04 (-1.45) |
| Domestic Credit to Private Sector (%GDP) | -0.31* (-22.41) | -0.23* (-12.42) | -0.54* (-27.62) | -0.25* (-11.68) | -0.05 (-1.63) | -0.07*** (-2.17) | -0.42* (-17.35) | -0.55* (-14.71) | -0.19* (-11.14) | 0.04 (0.23) | -0.13* (-14.11) | -0.20* (-13.51) |
| Total external debt service (%Export) | -0.05* (-7.55) | -0.01 (-0.26) | -0.16* (-15.07) | -0.05* (-3.71) | 0.01 (1.57) | 0.02* (3.40) | -0.36* (-22.48) | -0.03 (1.56) | -0.02 (-0.34) | 0.01 (1.48) | -0.07* (-11.69) | 0.02 (0.29) |
| Real GDP per capital growth | 0.23* (15.78) | 0.08* (6.27) | 0.24* (10.25) | 0.04*** (1.73) | 0.01 (0.30) | 0.07* (4.69) | 0.18* (7.69) | 0.03 (1.39) | -0.02 (-1.11) | -0.12 (-0.94) | 0.27* (19.00) | 0.10* (8.63) |
| General consumption expenditure (%GDP) | -0.48* (-24.30) | -0.50* (-20.13) | -0.41* (-9.96) | -0.87* (-20.99) | -0.44* (-19.86) | -0.17* (-5.08) | -0.83* (-22.12) | -0.83* (-21.12) | -0.21* (-9.70) | -0.14* (-4.72) | -0.51* (-26.73) | -0.56* (-23.44) |
| Net ODA received (%GNI) | -0.12* (-6.58) | -0.01 (-0.84) | 0.20* (4.88) | 0.14* (4.50) | -0.26* (-16.17) | -0.12* (-8.40) | 0.15* (2.78) | 0.15* (4.70) | -0.21* (-12.97) | -0.08* (-6.11) | -0.09* (-5.40) | -0.02 (-1.33) |
| Urban population (% total population) | -0.15 (-0.74) | -0.18* (-16.16) | -0.17 (-1.51) | -0.62* (-16.80) | 0.08* (3.05) | -1.45* (-3.76) | 0.22*** (1.71) | -0.38* (-11.92) | 0.31* (6.87) | -1.72* (-5.69) | 0.29* (12.74) | -0.22* (-15.55) |
| Inflation | -0.04* (-8.27) | -0.01** (-2.11) | -0.13* (-22.84) | 0.02* (2.69) | 0.19* (16.28) | -0.02 (-0.24) | -0.04* (-7.56) | 0.05* (5.49) | -0.05* (-4.12) | -0.09* (-9.16) | -0.03* (-7.25) | -0.03** (-2.00) |
| Gross capital formation (% GDP) | 0.25* (23.81) | 0.09* (7.05) | 0.29* (12.78) | 0.11* (5.23) | 0.22* (21.57) | 0.22* (12.00) | 0.32* (21.62) | 0.02 (1.25) | 0.22* (15.29) | 0.38* (21.52) | 0.23* (23.02) | 0.09* (7.32) |
| Old age dependency ratio | 0.02 (0.29) | 5.95* (8.91) | 1.26* (11.33) | 13.74* (15.02) | 2.74* (12.56) | 4.74* (3.91) | 2.50* (11.43) | 15.66* (6.83) | -1.19* (-12.59) | 3.53* (5.60) | -0.61* (-9.93) | 3.35* (11.26) |
| Young age dependency ratio | -0.26* (-16.24) | -0.84* (-8.80) | -0.53* (-20.45) | -0.61* (-5.28) | -0.28* (-13.19) | -1.48* (-8.35) | -0.19* (-7.67) | -0.52* (-2.59) | 0.01 (0.31) | -1.65* (-14.01) | -0.10* (-7.72) | -0.94* (-11.62) |
| **Period fixed effect included** | No | yes | No | Yes | no | Yes | No | Yes | No | yes | no | yes |
| R-squared | 0.85 | 0.93 | 0.87 | 0.93 | 0.79 | 0.86 | 0.82 | 0.93 | 0.84 | 0.87 | 0.85 | 0.93 |
| Adjusted R-squared | 0.84 | 0.91 | 0.86 | 0.91 | 0.76 | 0.82 | 0.80 | 0.91 | 0.82 | 0.84 | 0.83 | 0.91 |

SSA countries: 25, Middle income: 12, Low income: 13, Resource intensive: 13, NonResource intensive:12 and Africa: 25 SSA countries + Egypt, Morroco and Tunisia (for sensitivity checks) FMOLS: Fully Modified Ordinary Least Square.1% / 5% / 10% significance levels: */ **/ ***:Source: Author's estimation based on data in World Bank Development Indicators database

**Table 5: Gross Domestic Savings Performance in Sub-Saharan Africa Countries: Robustness and Sensitivity Checks, 2000-2017**

| Variables | demographic variables excluded | | macroeconomic and external factors | | Fiscal Policy and financial factors | | demographic factors | |
|---|---|---|---|---|---|---|---|---|
| | Coefficients (t-statistics) | | Coefficients (t-statistics) | | Coefficients (t-statistics) | | Coefficients (t-statistics) | |
| Money Supply (%GDP) | -0.01 (-0.49) | -0.12* (-4.63) | | | -0.02 (-0.01) | -0.08 (-1.48) | | |
| Domestic Credit to Private Sector (%GDP) | -0.25* (-13.67) | -0.22* (-7.59) | | | -0.18* (-5.06) | -0.22* (-4.20) | | |
| Total external debt service (%Export) | -0.08* (-7.36) | -0.02 (-1.52) | | | -0.11* (-4.95) | -0.02 (-1.08) | | |
| Real GDP per capital growth | 0.28* (-10.417) | 0.08* (-3.28) | 0.38* (-5.81) | 0.18* (-3.23) | | | | |
| General consumption expenditure (%GDP) | -0.47* (-12.89) | -0.48* (-9.56) | | | -0.47* (-5.67) | -0.43* (-3.77) | | |
| Net ODA received (%GNI) | -0.14* (-3.98) | 0.01 (-0.24) | -0.11*** (-1.87) | 0.02 (-0.31) | | | | |
| Urban population (% total population) | | | | | | | 0.26 (-0.42) | -0.45 (-1.08) |
| Inflation | -0.03* (-3.27) | -0.01 (-0.53) | 0.02 (-0.81) | -0.02 (-0.75) | | | | |
| Gross capital formation (% GDP) | 0.23* (-13.15) | 0.09* (-3.46) | 0.15* (-3.83) | 0.03 (-0.49) | | | | |
| Old age dependency ratio | | | | | | | -1.82* (-9.01) | 7.53* (-2.65) |
| Young age dependency ratio | | | | | | | -0.06 (-1.32) | -1.51* (-3.41) |
| **Period fixed effect included** | No | Yes | No | yes | No | yes | no | Yes |
| R-squared | 0.85 | 0.93 | 0.83 | 0.92 | 0.84 | 0.93 | 0.83 | 0.92 |
| Adjusted R-squared | 0.84 | 0.91 | 0.82 | 0.9 | 0.83 | 0.91 | 0.81 | 0.9 |

FMOLS: Fully Modified Ordinary Least Square. 1% / 5% / 10% significance levels: */ **/ ***. Source: Author's estimation based on data in World Bank Development Indicators database

## CONCLUSION AND POLICY IMPLICATIONS

This study set out to establish the link between gross domestic savings rate and its determinants for 25 sub-Saharan Africa (SSA) countries within the period 2000 and 2017 employing the panel FMOLS estimation technique. The results from this study suggest that macroeconomic – and external factors, fiscal policy – and financial variables and demographic variables played significant roles in explaining the variations in savings rate across SSA countries taking into account the income and resource effects. The results of the study demonstrate that the level of income and resource availability are important considerations in explaining the savings behaviour of SSA countries and that country-specific factors also play important roles. Moreover, financial depth and constraints imposed in the financial markets were found to have adverse implications on gross savings. Another constraint on savings that was found in the study is the debt service ratio, which was shown to be more severe in non-resource intensive SSA countries. In general, the study has demonstrated that it is the financial, fiscal and demographic factors that play more significant roles in explaining savings among SSA countries, while the effects of macroeconomic factors were found to be minimal.

A number of policy options have been obtained from the study in regard to boosting savings in SSA. First, given the strong role of policy-based factors in determining savings, there is the need for policy institutions to upscale measures to strengthen confidence. For instance, fiscal policy rules need to be more stringent in ensuring that external conditions do not limit savings capacity. In particular, there is need for the application of spending and tax options to smoothen critical variations in savings through measures to boost gross income. Such institutional framework could also help in maintaining the gains from growth, especially during periods of poor economic performance. Moreover, the role of external debt on savings needs to be limited by ensuring that domestic capital market is strengthened so that exchange rate effects of debt servicing can be reduced.

In the same vein, financial sector reform policies that broaden and deepen the financial system are also required. These reforms need to also target public debt vulnerability and capacity to raise domestic finance which are capable of increasing the share of banking sector savings among SSA countries. The results also show that the current demographic trends in SSA countries are unsustainable in terms of driving long term savings. Thus, there is need to ensure that there are demographic dividends in terms of increased savings from the youthful population of many SSA

countries. This can only be done by boosting human capital development through appropriate educational and health investment from the public sector. Moreover, regional economic blocs are also expected to intensify measures to strengthen savings among the member countries through integration.

Finally, the findings of this study are in perspective with previous researches in economic variables and gross domestic savings nexus. Indeed, what some country cases seem to show is that concentrating solely on policies to promote economic growth is not enough to stimulate the desired gross domestic savings. Thus, there is the need for emphasis on macroeconomic and regulatory frameworks which are crucial for stirring up domestic savings of the SSA countries.

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