Determinants of sovereign borrowing choices in Sub-Saharan Africa

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Abstract

There is a growing and legitimate concern about sovereign debt increasing to unsustainable levels among the Sub-Saharan African (SSA) countries. Understanding the determinants of external debt to these countries influenced the direction of this study. The existing literature that was examined shed light mostly on the qualitative determinants of sovereign borrowing. In addition to existing empirical literature, there is a complimentary need to examine further the quantitative determinants of external debt. The researcher seeks to establish the extent to which the cost of borrowing (proxied by interest rate) explains the changes in the borrowing behaviour (proxied by external debt) among SSA countries. To achieve this objective, data from 36 SSA countries for the period 2009–2017 was used. The data were collected from International Debt Statistics compiled by the World Bank. External debt has been regressed against interest rate and other predictor variables. Hausman tests, robustness tests and collinearity tests were carried out to ascertain the validity of results. Interest rate is found to have a positive determining impact on external debt for all SSA countries aggregated: SSA countries excluding South Africa (SA); SSA excluding Nigeria; SSA excluding Nigeria and SA; SSA excluding debt-distressed countries, middle income and oil-exporting countries. It does not have predictive power over changes in external debt for SSA excluding countries at high risk of distress; countries with low to moderate risk of distress; heavily indebted poor countries (HIPC) initiative post-implementation recipient countries; low income, other resource intensive and non-resource-intensive countries. External debt is also found to respond to changes in: gross national income (GNI); exports-to-imports ratio; primary income on foreign direct investment (FDI); reserves-to-imports ratio; FDI-to-GNI ratio; debt service-to-GNI ratio; interest arrears on long-term debt; short-term-to-total-debt ratio; and reserves-to-debt ratio for different country groupings. Different country groupings are found to have unique combinations of external debt determinants.

Key words: sovereign debt, debt management, debt restructuring, sustainability, borrowing behaviour.

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List of abbreviations and accronyms

ADB	Asian Development Bank
AfDB	African Development Bank
AIIB	Asian Infrastructure Investment Bank
BNDES	Banco Nacional de Desenvolvimento Economico é Social – Brazil
BRICS	Brazil, Russia, India, China, South Africa
CAR	Central African Republic
CDB	China Development Bank
CIA	Central Intelligence Agency
CRA	Credit Rating Agency
DFI	Development Finance Institution
FDI	Foreign Direct Investment
FNO	First National Operator
GDP	Gross Domestic Product
GNI	Gross National Income
GNP	Gross National Product
HIPC	Heavily Indebted Poor Country
IADB	Inter-American Development Bank
IBRD	International Bank for Reconstruction and Development
IDB	Islamic Development Bank
IDS	International Debt Statistics
IEC	Interbank for Economic Coöperation
IMF	International Monetary Fund
KfW	Kreditanstalt für Wiederaufbau (Credit Institute for Reconstruction) – German
MDB	Multilateral Development Bank
MDR	Multilateral Debt Relief
MDRI	Multilateral Debt Relief Initiative
ODA	Official Development Assistance
OECD	Organisation for Economic Cooperation and Development
SOE	State-owned Enterprise
SSA	Sub-Saharan Africa
UNCTAD	United Nations Conference on Trade and Development
US	United States
WB	The World Bank
WW II	Second World War

1. Introduction

1.1 Study area

The Sub-Saharan Africa (SSA) region largely consists of emerging societies. The least developed region, it is experiencing development financing deficiency (especially infrastructure, health and education finance) (Alagidede, 2012; Rao, 2003). The gap can be filled by borrowing—domestically and from beyond national borders. Apart from the private sector's crowding it out, the former's adequacy is constrained by less-developed domestic capital markets (Kodongo, 2011). However, SSA countries' domestic debt markets are largely under-developed for sustainable development finance raising, making external debt an inevitable option. The study seeks to examine the existence of a relationship between external debt and the cost of borrowing, and to test for other determinants of debt across SSA, for the period 2009–2017.

In SSA, external debt is vital, primarily for its long-term development project financing character, which addresses requirements and lending mismatches characteristic of commercial bank-dominated domestic markets (Senadza & Fiagbe, 2017; Kapoor, Kararach, Odour, Odero, Sennoga & Coulibaly, 2019). Conversely, external financing exposes sovereigns to exchange-rate volatility, among its shortcomings. However, increased access to capital markets propelled the popularity of external borrowing among the SSA countries, though with less investment efficiency relative to peers, namely emerging and developing Asia, Latin America and Caribbean (Barhoumi, Ha Vu & Towfighian, 2018). Overall, sovereign debt, being historically the first-ever asset traded, continues to enjoy the lion's share of global financial assets (Oosterlinck, 2013). The situation is not unique to SSA countries—they do not have the luxury of being able to raise enough funding elsewhere within their borders, and their access to capital markets continues to be limited by low creditworthiness.

Existing literature on economic determinants of external debt in SSA, particularly the nexus between external debt and cost of debt (debt burden), has gaps for research contributions. Currently, some literature with different geographical contexts, is emerging (Waheed, 2017), but the pointed effect of the cost of borrowing via external debt, among many other determinants, is still missing. There is also limited and less pointed research investigating the external debt and interest rates nexus in the sovereign borrowing context. In the absence of this understanding,

policy makers may be tempted to maintain the debt management practices status quo and fail to save the worrying debt situation in the SSA region (Mustapha & Prizzon, 2018).

This study sought to close this research gap by investigating the relationship between external debt and interest rates for SSA countries, using panel data of 36 countries for the period 2009–2017. This research also set out to examine the effect of other potential economic determinants, in addition to the cost of debt. Attention has also been given to the peculiarities of different countries' debt and economic characteristics, leading to the grouping of these countries. That served to account for particulars and nuances in SSA public finance, and the debt-management context in particular. Policy makers are expected to draw useful insights from the understanding of relevant debt and economic situations.

For this study, the cost of borrowing is represented by interest rates, and borrowing behaviour by the amounts of debt issued. Theoretically, demand for money decreases with increasing interest rate (Mishkin, 2016). Understanding the borrowing behaviour—cost of borrowing nexus among the SSA countries (aggregated and different clusters)—forms the objective of this study. Sovereign borrowing character has an important bearing on debt management and sustainability (Akanbi, 2016). Establishing it for SSA countries in their respective clusters is important for policy formulation and execution.

SSA region sovereign borrowing has had mixed successes since the 1970s, when debt crisis was rife (Oosterlinck, 2013). In later years, the situation was harnessed through debt relief programmes driven by the International Monetary Fund (IMF) and World Bank (WB). A debt-relief programme (which started in 1996 and expanded in 1999 and 2005), improved the countries' eligibility to borrow externally. Economic growth was realised in the region, until at least 2012, when levels of debt started showing signs of increasing unsustainability (Mustapha & Prizzon, 2018). Challenges related to investment efficiencies further fuelled worries about debt-management abilities matching the increasing indebtedness. SSA was also reportedly lagging in investment behind its peers (Barhoumi, Ha Vu & Towfighian, 2018).

Sovereign governments take on additional debt for various reasons, including developmental projects, often cited as important (Blankenburg & Kozul-Wright, 2016). Incurring debt, however, happens against the backdrop of a country's elevated balance sheet vulnerabilities (Eichengreen,

El-Ganainy, Esteves & Mitchener, 2019). These vulnerabilities emanate from uncontrollable, beyond-border, economic factors—for example interest rate and exchange rate volatilities. Another reason lies in the limited time taken to raise huge amounts for intended obligations, rendering amortised repayment borrowing the sound alternative. The amortised repayment instalments incentivise raising long-term debt, through the affordability of the amounts to be paid.

With national budgets constrained to service delivery and either maintaining or increasing domestic consumption, contracting loans for development financing becomes the viable option (Spilioti, 2015). Loans passing a cost-benefit analysis test, and yielding net positive gains, usually get the green light. This is often due to their feasibility, reflective of prudence-driven borrowing (United Nations Conference on Trade and Development [UNCTAD], 2012a). Specific benefits of sovereign debt have attracted the attention and discussion of scholars over time. For example, contracting loans helps in increasing or maintaining economic activity, and the overall socio-economic wellbeing.

Political reasons underpinning debt raising by policymakers are discussed in Adonia Chiminya (2012); Bittencourt (2019); Bowdler and Esteves (2013); Fatás, Ghosh, Panizza and Presbitero (2019). Raising external debt to unsustainable levels attracts the sentiment that political over economic reasons could be the determining factors in Sub-Saharan Africa (SSA). Inclination towards concessional loans is indicative of debt cost awareness on the part of the borrower. The sentiment that these loans are used partially as political currencies is, therefore, not far-fetched. Indeed, a number of political parties and leaders in the region remain in power for quite extended periods—regime changes in these democratic dispensations are very unlikely—with the exception of few countries.

The International Monetary Fund (IMF) assesses debt sustainability, often together with the World Bank, on both domestic and external public sector (Hakura, 2020). In the same manner, it further offers technical assistance and tools for the same. In countries where it extends loans, it enforces austerity measures with the aim of ensuring sustainability. It remains the countries' best interest that debt statistics are shared with lenders to encourage responsible lending (Hakura, 2020:61). Avoidance of IMF-induced sustainability scrutiny and approaching capital markets

despite high interest, due to low creditworthiness, are both indicative of caring less about debt sustainability.

In this study, attention is paid to borrowing behaviour—particularly whether the cost of debt, and other macroeconomic fundamentals, influence amounts of external debt incurred among SSA countries, in aggregate and cluster forms. Apart from the cost of borrowing, other determinants are examined for different country groupings. Sections following this introduction are: the background of the study; problem definition; statements of research objectives and hypotheses; literature review; methodology; and justification of the study—in that order. The document's final content comprises data analysis; discussion; findings; and conclusion.

1.2 Background of the study

When confronting budget deficit challenges, which potentially limit expenditure, and desired positive externalities, governments often tend to seek alternative funding sources. This situation inevitably culminates in resorting to borrowing—in addition to other borrowing to fund other projects. However, contracting debt comes at the cost of borrowing (interest) determining the eventual debt burden. This calls for sound debt-management practices, particularly on the borrower side, reflected in the negative relationship between debt and interest rate. Apart from cost of borrowing, prudently incurring debt calls for careful consideration of other service capacity determinants, such as reserves, exports, economic growth and national income.

Raising money outside the government's conventional revenue streams, in the form of debt to carry out developmental projects, is inevitable (Hunt, 2014). This is premised on the direct economic impetus that such financing brings, rendering debt for positive investments financially sensible. Developmental projects take a long time to pay off the debt (Annamalai, 2013), so patient loans are strategic for long-term projects with net positive impact—economic and social (Annamalai, 2013). The level of prudence at which external liabilities are contracted remains a debt-management imperative (Holler, 2012).

However, it is equally important to take note of salient impediments to sovereign debts. Debt is the future generations' liability and limits future fiscal expenditure, since revenue is allocated to debt service. Further, raising debt in hard currencies exposes the state to exchange-rate risk (Mpapalika & Malikane, 2019). Severe exchange-rate volatility may lead to financial distress

and, in the worst cases, to default. Debt restructuring is costly to both the borrower and the lender (Cruces & Trebesch, 2013), rendering high financial prudence non-negotiable.

It is against this background—the worst case of which sometimes leads to financial and economic crisis—that the United Nations Conference on Trade and Development (UNCTAD) pervasively advocates the adoption of Principles on Promoting Responsible Sovereign Lending and Borrowing. In 2009, the United Nations Conference on Trade and Development (UNCTAD) launched a project to promote responsible sovereign lending and borrowing. The set of principles is documented in the publication entitled Principles on Promoting Responsible Sovereign Lending and Borrowing (Gulati, 2010; UNCTAD, 2012). The publication deliberates on the responsibilities of lenders and borrowers. Issues of agency and immoral behaviour from both sides are highlighted. For sovereigns, public officials are agents, and their counterparts are lender employees.

In both state-owned entities and state governments, bureaucrats' fiduciary duty of loyalty is to serve the public as primary shareholders. The electorate entrusts its strategy to the elected public officials for execution. The extent to which this happens, as envisaged, has a potential to attract scrutiny. Sizable agency literature and scholarship suggest that agents do not always act in the best interest of the principals (Alagidede, 2012; Fabozzi, 2010; Rao, 2003). The analogy is carefully drawn for both public officers and taxpayers.

Research and a growing body of literature revealed substantial evidence of existing agency problems associated with public officers pursuing their own interests at the expense of taxpayers, (Mankiw, 2012). Manifestation of this has been realised in a myriad conduct issues—particularly related to state machinery funding. Often, bureaucrats desire to keep the government bloated, and hence maintain their budget at the same or increased level (McConnell & Brue, 2008; Campbell, McConnell, Stanley & Brue, 2012). Whether relevant financing decisions may fall within the ambit of good debt-management practices, this invites research.

SSA countries' increasingly unsustainable debt levels in Sub-Saharan Africa grabbed the attention of this study, particularly because some of them received debt-burden reprieves from relief programmes, Highly Indebted Poor Countries (HIPC) and Multilateral Debt Relief Initiative (MDRI), in 1995 and 2005 respectively. While HIPC was championed and

implemented by the IMF and WB, the duo was joined by multilateral agencies in MDRI. Indeed, beneficiary countries' balance sheets became worthy of extended credit, albeit at prudent levels, to manage the risk of unsustainability and distress. Because not all countries benefitted from the programmes separate analyses of recipient countries are conducted after the completion of the HIPC initiative. While countries in the region continued taking on external debt, concerns emerged after 2012 when the debt levels were becoming seemingly unsustainable (Eichengreen, El-Ganainy, Esteves & Mitchener, 2019) . Evidence of this is the growing number of countries in debt crisis and in high risk of debt distress (Akanbi, 2016; Eichengreen et al., (2012)

Against the background that shed light on these situations, interest developed in investigating the extent to which raising external credit reflects sound debt-management practices, mainly by showing how the changing cost of debt influences borrowing behaviour. And, this is important when following the principles of responsible borrowing and lending, advocated by UNCTAD (Gulati, 2010a). In the light of debt management practices, the study's focus is on the extent to which cost of debt can explain borrowing behaviour. The borrowing behaviour is observed on the debt levels from one period to another.

Sovereign choice of lenders may be limited by a number of factors related to creditors' different mandates, in addition to many other reasons pertinent to risks inherent in the project or the debtor country. Creditworthiness is critical for access to capital markets, and consequently bears the interest-cost-limiting factor. Sovereign relationships play a central role in bilateral loans. Global development agendas and good governance are both instrumental in multilateral lending and grants (UNEP Finance Initiative & United Nations Global Compact, 2017).

1.3 Problem definition

Investigating the explanatory power of interest rate on external debt, and not the other way around, for Sub-Saharan Africa created a research gap. This study seeks to fill the identified gap, focusing on the external debt–cost of borrowing nexus, in the presence of other control variables. The region has a history of indebtedness prior to the relief initiatives, which improved the economic status of affected countries. However, there are looming debt sustainability concerns arising from the heavy indebtedness of some countries in the region from 2012. This has the potential to reverse gains from relief efforts (Mustapha & Prizzon, 2018). Apart from other select

control variables, the study seeks to establish the relationship between sovereign borrowing (also external debt) and cost of borrowing in SSA for 2009–2017.

1.4 Research question and scope

Is there a relationship between external sovereign debt and the cost of borrowing to Sub-Saharan African (SSA) countries? Can the control variables also explain the behaviour of external debt? What differences if any exists between various country groups? The main research question attempts to establish the relationship between external debt and the cost of borrowing. The nature of this relationship is particularly important as it sheds light on the direction of the relationship if there is any.

The second sub-question aims to establish whether, apart from the variable of interest (cost of borrowing), other variables can explain the dependent variable (debt). This is established from regressing external debt against other economic variables with predictive potential. The third question attempts to unearth any similarities and dissimilarities between different country groupings. Countries are grouped according to their debt situation and economic characteristics. Identified categories comprise: all SSA countries; SSA countries excluding South Africa (SA); SSA excluding Nigeria; SSA excluding Nigeria and SA; SSA excluding debt-distressed countries; SSA excluding countries at high risk of distress; countries with low to moderate risk of distress; Heavily Indebted Poor Country (HIPC) Initiative post-completion point recipient countries; low-income countries; middle-income countries; oil-exporting countries; other resource-intensive countries and non-resource-intensive countries.

SSA countries' debt situations caught the attention of this study particularly, given the increasing unsustainability concerns. This has been due to the indebtedness of a plethora of countries after the debt relief initiatives (Mustapha & Prizzon, 2018). Coupled with investment inefficiency, relative to peers, the situation calls for competent levels of sovereign debt-management and complementing prudence. It is worthwhile to investigate the extent to which the cost of sovereign debt influences borrowing behaviour. The findings were expected to reveal whether cost of debt can influence external borrowing. The findings were expected to inform a deduction of the effect of the cost of borrowing on the debt appetite of SSA countries.

Understanding the external debt-cost of borrowing serves to inform sovereign borrowing framework policy formulation and guidance. The trade-off between the cost of borrowing and debt appetite can well be regulated in the light of known behaviour across the region. In particular, policymakers' conflicts of interest and other agency issues may comprehensively be covered in the laws and regulations. Debt-management policy frameworks should also benefit from information regarding the association between external debt and select macroeconomic variables. Inevitably, debt management can also draw lessons about possible antecedents of unsustainable debt burdens and apply them in the development of external borrowing policies.

1.5 Research assumptions and limitations

The sub-section starts with set of assumptions. The cost of borrowing is proxied by the World Bank's documented interest rate in the data, labelled "interest rate to all creditors". Another assumption is that data quality is the same across all countries in the sample, in spite of their self-reported nature and the institutional deficiencies in some countries. Furthermore, countries had equal access to external debt and costs of transactions. And, any undocumented differences are not substantial enough to affect the results of analysis.

Both quantitative and qualitative variables could have influenced the borrowing behaviour, but the interest is on the former, with focus on the cost of borrowing. Similarly, while a quantitative approach is adopted for this study, a qualitative approach can also be used. All countries had an equal chance of being picked, though data limitation constrained inclusion. Ordinary least squares (OLS) is used without discrediting or limiting the adoption of other quantitative techniques. The age of a country's independence does not substantially limit external credit access; and outcomes of analysis may not exhaust all possibilities but give an indication of the situation.

Study scope has been limited to quantitative method, due to relative advantage in the panel data. Other qualitative methods—observation, interviews, surveys—using panel data approach could face futility challenges. Some countries had substantial data missing, and had to be dropped out of the data set, inevitably limiting the population of analysis. Not all countries benefitted from HIPC and MDRI programmes, reducing clustering to disaggregate analyses of recipients against

non-recipients. Furthermore, some of the beneficiaries have not yet reached completion point and had to be left out of the data set.

The scope of the research might have been extended to examining the impact of colonial masters on official credit access and amounts, had extension of scope and resources been possible. Official loans may have been influenced by other factors, such as international politics, mineral resources and oil, regional relations and domestic politics, among others. However, investigating these was beyond the scope of this study. The study was also deliberately limited to panel- instead of time-series, and cross-sectional for individual countries. That is because the latter was limited by time and document level scope, in addition to panel data relative advantages. Insufficient data points further limited the ability to conduct meaningful country level analysis and hence the need for aggregation.

1.6 Rationale and justification of the study

The study contributes to the body of knowledge in the development finance field and public finance in particular, by enhancing the understanding of the external-debt to cost-of- borrowing nexus in the Sub-Saharan African (SSA) region. It is extended by grouping countries in various clusters to observe significant differences in the relationship. The approach has not been used before, and control variables are introduced to observe their influence on the model. To the best of my knowledge, among the known publications this is the only study investigating the relationship of sovereign external debt to cost of borrowing in the SSA context. Panel data regression has been used to establish the relationship, capturing both time-series and cross-sectional aspects of data.

The cost of borrowing is instrumental in determining debt service payments—ultimately affecting cash flow. It is, therefore, imperative that policy makers comprehend the kind of association between external debt and cost of borrowing. The issue of competence has, over time, called for the attention of international credit providers. Increased debt burden hinders provision of services to poor masses, leaving a legacy of unacceptable levels of socio-economic development. For policy makers, the situation leading to high, unsustainable debt burdens should never be left to chance.

In the absence of a clear policy guiding the optimal exploitation of development funding options, officials may be tempted to act in ways not in the best interest of the public. If the existing policy lacks completeness and contains loopholes, then there may be rampant cases of officials pursuing their own ends at the expense of taxpayers. In this case, securing a loan may not necessarily reflect the broader national interest, with respect to cost effectiveness. This is one key manifestation of the agency problem. It is not explicit if individual sovereign finance policy guidelines subscribe to lower cost of borrowing as a key determinant to contracting debt. It is one of the aims of this study to establish whether that can be extrapolated from borrower actions.

Some SSA countries experienced debt crises in the 1970s. In the 1990s, the debt distress in the region triggered the Heavily Indebted Poor Country (HIPC) Initiative and the Multilateral Debt Relief Initiative (MDRI) in 1995 and 2005 respectively. The repeat of the debt relief initiatives may be unlikely or extremely complicated, given the increased creditor mix and access to international capital markets. Repeat of debt distress and crises will leave a bitter legacy of liability mismanagement, with the price to be paid by future generations. Litigation and diminished access to capital markets, due to defaults, represent the most unwanted situation for SSA, which makes capable debt management invaluable, now more than at any other time.

Research contribution to the relevant body of literature is not confined to knowledge of how the cost of borrowing influences debt-incurring behaviour in the SSA. It will also catalytically inform other research directions towards understanding the dynamics and dilemmas faced in the borrower spaces. International lenders stand to exploit the relationship through more informed credit policies. Borrower governments' public-finance policy formulation will be better informed in strengthening agency issue laws. The key premise will be factors influencing or informing external borrowing and complications brought by increased creditor bases by non-Paris Club members like China.

There is existing evidence of over-indebtedness and increasing distress leading to financial instability in Sub-Saharan countries. Studies examining the economic determinants of borrowing in the region need debt and cost-of-debt nexus input. No study has zoomed in on the explanatory relationship between cost of borrowing and borrowing behaviour. Changes in the debt amount

are used as proxies for borrowing behaviour. When changes in the amount of debt raised are statistically explained by changes in the interest rate, the relationship exists.

The determinants of risk premium (in SSA) are investigated in Mpapalika and Malikane (2019). However, the impact of risk premium on (or relationship with) the amount borrowed is not investigated, even though indebtedness of countries in the region is noted, together with other risk impediments. Hence, the specific gap that this study seeks to fill is defined by an absence of studies focusing on the economic determinants of sovereign borrowing. Specifically, the study anticipates paving the way for investigating individual determinants' relationship with sovereign borrowing behaviour: the cost of borrowing is chosen in this study. Selected macroeconomic fundamentals are included as control variables, to discern their nature predictive of borrowing behaviour.

Findings should help in responding to the question: Does the cost of borrowing determine sovereign borrowing behaviour? In other words, is there a connection between external debt and cost of borrowing, and what is the nature of such a relationship, if any? Further, how are the control variables associated to sovereign borrowing behaviour? Established relationships can help understanding the borrowing appetite and debt-management situation among the SSA countries. Perceptions of agency-driven adverse selection and moral hazard may be either be rejected or not, based on the results.

Extensive use of a debt sustainability framework by the World Bank (WB) and International Monetary Fund (IMF) should bolster the research-informed debt management initiative. In particular, policymakers should benefit from the link between macroeconomic debt determinants and debt burden indicators, namely the solvency and liquidity proxied by
debt-stock and debt-service ratios respectively (Cassimon, Verbeke & Essers, 2017). Sustainability-driven debt management should give coherent consideration to the extent of budget deficit, domestic resources mobilisation, the cost of debt and debt-servicing capacity, as widely discussed in Cassimon et al. (2017) and Cyrus (2018). Debt-servicing capacity should be underpinned by: affordable cost of borrowing; healthy reserve accumulation; export growth; economic growth; and healthy, growing national income. Therefore, governments stand to benefit if consideration is given to improving gross domestic product (GDP), exports and public

sector revenue (particularly increasing domestic resources mobilisation) as more debt is accumulated.

1.7 Statement of research objectives

Key objectives of the proposed study are formulated as follows:

- Examining the relationship between external debt and borrowing costs proxied by interest rate, by all creditors (IDS, 2019) for Sub-Saharan African countries over the period 2009–2017. Choice of this period is informed by data availability and the fact that a global financial crisis had just passed, in which the severity of impact was limited by the low integration of the region in the global financial system (Bruno Bonizzi, 2017).
- Examining the relationship between external debt and other selected predictor variables, namely gross national income (GNI); imports; exports; international reserves; foreign direct investment (FDI); primary income on FDI; debt service to GNI ratio; interest arrears on long-term debt; short-term to external debt stocks ratio; and reserves to external debt stocks ratio. These variables were chosen as control variables for this study.
- Examining unique differences across country groupings: all SSA countries; SSA countries excluding South Africa (SA); SSA excluding Nigeria; SSA excluding Nigeria and SA; SSA excluding debt-distressed countries; SSA excluding countries at high risk of distress; countries with low to moderate risk of distress; Heavily Indebted Poor Country (HIPC) Initiative post-completion point recipient countries; low income countries; middle income countries; oil-exporting countries; other resource-intensive countries and non-resource-intensive countries.

2. Literature review

2.1 Introduction

Governments incur debt in the business of service delivery and development programming activities. Budget deficits are sometimes the cause of debt-contracting, apart from development projects. Countries borrow money for investments in specific projects too, often matching expected proceeds with debt-repayment amounts. Short-term loans are often a function of budget deficits, while project financing is matched with long-term debt. Loans can be secured from different creditors in the domestic and foreign markets.

Sovereign borrowing is an old concept dating centuries back (Eichengreen et al., 2019). As noted, the borrowing can be either domestic or external. The latter captured the interest of this study. Raised through various vehicles, external debt remains unique, owing to its distinct differences to corporate debt. While recourse exists for corporate debt, the same is not true for sovereign debt. A defaulter's impediment, manifested in impaired investor sentiment, leads to difficulty in future loan raising (Megliani, 2015).

2.2 Alternative financing anatomy

In the pursuit of operating public management machinery, modern governments collect revenues through taxation. These revenues are put to use through expenditure programmes. The programmes include public service administration, health and education, infrastructure, and other development projects. Comprehensive collection and expenditure programmes are carried out through the national budget. In an ideal world, the expenditure and revenue should be equal, but this is rarely the case.

In the event that revenue falls short of expenditure, borrowing becomes the alternative. In domestic markets, loans can be raised through short- and long-term instruments, namely treasury bills, treasury notes and bonds. For example, the United States government issues US savings bonds—long-term, nonmarketable securities (Mankiw, 2012). Debt instruments can be sold to individuals, commercial banks and institutional investors (Mbu, 2016). These instruments are promises to lenders that their money will be paid back with interest.

Debt can be raised in either local or foreign currency. Foreign debt may be secured from international capital markets, official creditors and the donor community. Official creditors include bilateral and multilateral lenders. Both official and donor fund sources have concession and grant elements, which are useful for eligible countries (Haile, 2018). Poor countries with substantial hurdles to overcome, to take their citizens out of poverty, have historically been eligible.

The majority of Sub-Saharan African countries are poor and only developing, with very few emerging economies, some benefitting from official loans and donations (Ocran, 2012:39-43). Access to debt markets gives these countries the wanted opportunity to finance poverty-reduction and development programmes. However, it is noted that external debt sources have advantages and disadvantages (Haile, 2018:169–170). The latter calls for investigation into how potential debt burdens are taken care of, during loan-raising transactions. The external debt–cost of borrowing nexus partly helps in the investigation of this phenomenon.

Generally, sovereign bonds have no conditions attached: monitoring by the lender and the interest rate (coupon) is fixed throughout the loan period. They are also transparent, and act as benchmarks for corporate bonds. However, bonds generally have refinancing and rollover risks. These usually ensue at maturity when the full amount must be paid. The risk of falling market sentiment exposes the borrower to an inability to raise enough funds, leading to default (Haile, 2018:169).

Local sovereign bonds guard against exchange-risk exposure and are instrumental for the development of domestic financial markets. One key disadvantage of these bonds is their high interest rate, relative to international markets. Government bonds in the domestic markets also have a potential for crowding out private investment and reducing productivity (Haile, 2018; Mankiw, 2012). A trade-off between domestic financial market development and crowding out private investment remains tricky if a balance becomes difficult to strike. There needs to be an optimal balance of domestic and international debt, to take advantage of low interest rates, exchange-rate hedging and local financial market development.

External debt stocks increase investor bases and foster lender diversification. They further enhance access to competitive markets and efficient pricing. They also foster greater

transparency, due to market discipline factors, e.g. covenants, due diligence and market scrutiny. High transaction costs and long preparation periods are salient disadvantages of raising funds from international capital markets. Eurobonds also expose the sovereign to exchange rate risk and capital flight (Haile, 2018:170), as well as macroeconomic risk, due to large capital inflows, volatility, credit booms and inflation (Willem, 2014).

Official loans, on the other hand, are not driven by market sentiment, presenting an indispensable advantage for less credit-worthy poor countries. Countries may not need to pay for credit-worthiness risk-rating as a precondition for favourable capital market access. These official loans also facilitate crowding in of private investment (Haile, 2018; Karangizi, 2019; Mbu, 2016). Conditionality and limited financing terms remain fundamental caveats to official loans. Some of their conditions effectively wipe out positive externalities due to competition with local enterprises, thus limiting the economy's productive potential. (Haile, 2012)

Donations are known for low debt-service payments and greater transparency. Regardless of controversies around its effectiveness, foreign aid plays a reprieve role to poor countries. Through these donations, poor countries' budgets could be extended to do more in delivering basic services to their people (Ocran, 2012). Donations, however, have a limited contribution to domestic financial sector development (Haile, 2018:170). Apart from the ineffectiveness of foreign aid cited in the literature, dependency syndrome affecting recipient countries goes a long way in retarding innovation and overall development.

Apart from the traditional sources of funding discussed above, developing countries have increasing innovative alternative funding options to consider. They include project financing; domestic resource mobilisation; privatisation or sale of state-owned assets; diaspora bonds; dividends from sovereign and sinking funds; resource exploitation partnerships with private corporates; remittances; virtual currency and broad-based project fees from different sources. Public-private partnership (PPP) is a common form of project financing that stands to exploit private sector expertise, owing to profit-driven business models (Cruz, 2018; Nahlik, 2012). The partnership between state and private investors serves to execute projects with public benefit as their end goal (Abu-Hijleh, 2017). PPP success stories are documented in substantial literature (including the works of Abu-Hijleh, 2017; Liang & Jia, 2018; Oyedele, 2013; Zou et al., 2008).

SSA countries have the potential to exploit other revenue sources, such as taking advantage of concession windows and grants. The advantages of soft loans are premised on their very low or zero interest rates. Official loans are also popular for being less market-sentiment-response driven: lenders consider other factors beyond risk and return (Haile, 2018). Other opportunities emerge from donations in various forms, popularly known as official development assistance or foreign aid.

Other funding options can be based on domestic resource mobilization (DRM) efforts, increasing revenues from both tax and nontax sources as articulated in Group (2017); Matovu (2010); Junquera-Varela, Verhoeven, Shukla, Haven & Awasthi 2017; Sy & Sow 2016). Advantages and various ways of implementing DRM are discussed extensively by these scholars. Taxation can be extended by tapping informal sectors and tax areas not taxed before, though they are eligible. This calls for focussed investment in the capacity-building of the tax administration, policy reforms and combating illicit financial flows (Junquera-Varela et al., 2017).

Investment in good governance can also attract official development assistance (ODA) and positively influence mobilisation of domestic resources (Sy & Sow, 2016). Apart from taxation and closely related levying revenue mobilisation, sovereigns can derive benefits from the use of other more innovative financing options. Sovereigns can issue diaspora bonds, targeting their citizens in the diaspora, clearly spelling out the message of domestic development (Alagidede, 2012). Another closely similar approach is taking advantage of remittances—levying them at a certain rate and channelling the funds to development projects. Levying online gambling and virtual currencies within domestic borders is another option for developing countries, and SSA in particular.

Another opportunity for raising revenue that can be exercised lies in state-owned enterprises (SOEs). Sale of SOEs or outright privatisation can improve a revenue base for investment in other development projects. Research advises, however, that instead of selling SOEs to private investors, policy makers should first remove mismanagement, corruption, political and external influences to improve profitability (Quartey, 2019). In another study of SOEs in SSA, telecommunications SOEs were found to be more profitable, and power SOEs below average

(Mbo, 2017). It becomes imperative, therefore, that SOEs get catalysed to become competitive, instead of selling them.

Sovereign wealth funds (SWFs) and sinking funds (SFs) comprise another revenue expansion avenue for development, primarily through yields and dividends. A second role of SWFs, particularly in SSA, is to invest in the domestic infrastructure development and desist from the usual tendency of politically influenced investing (Diallo, Tchana Tchana, & Zeufack, 2016). The importance of SWF investment in infrastructure development is corroborated by the proposal to form a global infrastructure investment platform (GIIP). Formed through coordination of all institutional investors alike, the GIIP should be mandated to pool funds from SWFs and invest them in infrastructure (Peters, 2017).

Tapping debt markets, offering interest-bearing credit, underpins the motivation behind this study. Since repayment of debt and interest represents a burden to the borrower state, the extent to which prudence applies during debt structuring calls for investigation. This prudence can manifest in many forms, but the study's interest is on the loan-raising response to the cost of borrowing. The relationship between external debt and cost of borrowing helps in establishing this response function. The model similarities or differences across different SSA country clusters help in further driving the point home in understanding determinants of external borrowing in the region.

2.3 Need for external financing and international financial markets

While there are open recourse alternatives to creditors for non-paying corporate borrowers, the same cannot be exactly true for sovereign borrowers (Mustapha & Prizzon, 2018; Kapoor et al., 2019). The inability of sovereigns to either tax their country's wealth or raise tax revenues exposes them to the risk of debt distress. A country's access to capital markets affords it the ability to expand domestic investments while not cutting its consumption (Mishkin, 2016). Raising finance from external sources becomes inevitable to expand productivity in the absence of domestic alternatives.

Financing capital projects and managing cash flow are reasons behind raising funds from credit markets, as cited in Bunte (2013). Apart from capital needs, countries have been observed, for example, borrowing against future revenue streams (Robbins & Simonsen, 2019). Fatás, Ghosh,

Panizza and Presbitero (2019) cite cyclical stabilisation as another motivation for raising debt. Distinctive differences in the requirements for sovereign debt, between developed and developing countries, lie in the use of funds. Developed countries use sovereign debt to finance their budget deficit, and developing countries use it to develop (Gulati, 2010).

External development beyond official development assistance (ODA) is another important financing alternative. This is premised on the increasing importance of alternative external financing sources. There is increasing evidence of their importance outweighing traditional financing (Prizzon, Greenhill, 2017). External financing is instrumental in complementing the sovereign budgets or executing strategic national projects. Development-oriented funding is imperative for economic development of individual countries.

In ancient times, sovereigns borrowed "to secure borders and fight military campaigns" (Eichengreen et al., 2019). While this continued beyond the eighteenth century, the succeeding century became more transitional, characteristically marked by sovereigns' borrowing for infrastructure development and education investment. Increases in debt burdens during the twentieth century were due to major wars, recessions, banking panics and financial crises, and "the public-policy responses to these events" (Eichengreen et al., 2019). While wars and financial crises partly underpinned increasing debt-to-GDP ratios at the end of the last century, other factors also emerged. Such factors comprised pensions, healthcare and "other, often-underfunded, social services" (Eichengreen et al., 2019).

Lower interest rates in advanced economies, increased appetite for risk, and borrowers' positive growth prospects continue to "fuel high and steady demand from international investors" (Mustapha & Prizzon, 2018). This came in the face of recipient countries' "huge financing needs and relative decline in concessional financing from traditional creditors" (Mustapha & Prizzon, 2018). However, there is an observation of debt-issuing even when terms and conditions are comparatively less generous than those of loans from bilateral and multilateral loans (Prizzon, Greenhill, & Mustapha, 2016). Another cited reason for issuing international bonds is the desire to diversify funding. Besides re-financing previous obligations, governments are noticed issuing bonds to send a clear signal that they can access international financial markets (Prizzon et al., 2016).

Similar observation regarding International Monetary Fund (IMF) loans has been cited in Bunte (2013). Literature citation appears of IMF loans raised, not for monetary reasons, but as a "seal of approval" signal to potential investors. Bunte (2013) also notes a tendency by governments to take advantage of IMF austerity measures to pass unpopular policies. Growing sentiment that IMF becomes an external ally against domestic resistance is not unfounded. The sentiment is, however, outdated in the modern literature of political economy. The existence of non-financial reasons for borrowing forms the premise for assessing their importance over financial counterparts such as interest rates.

The capital markets provide platforms for trading long-term debt and equity instruments. They differ from money markets, which facilitate the trading of short-term instruments. Maturity for money market instruments is one year or less, while long-term instruments mature in over one year. It is not unusual to find another classification associating short-term with one year or shorter, long-term with ten years or more, and intermediate term with between one and ten years. Short-term instruments are characteristically more liquid because they trade more widely than their long-term counterparts, making them popular for use by corporations and banks to earn interest on their temporary surpluses (Mishkin, 2016:25).

Both money markets and capital markets form part of organised exchanges, together with many other financial intermediation instrument traders. While corporations can issue both debt and equity, sovereigns issue debt exclusively. With increasingly internationalised financial markets, sovereigns can issue bonds in foreign capital markets to foster economic growth (Mishkin, 2016:29–30). Debt is issued as either foreign bonds or Eurobonds, with the former historically common (Mishkin, 2016:29). Lenders usually demand repayments in hard currencies, for example US dollars, thus popularising Eurobonds over bonds denominated in domestic currencies that are regarded as less stable.

Issuing credit is an activity with relational characteristics. It has social and institutional dimensions building on trust and shared information, "expectations and objectives between debtors and creditors" (Blankenburg & Kozul-Wright, 2016). Therefore, information symmetry between creditors and debtors is critical. Other economic factors become instrumental only as transactional complements. Capital market access is a function of meeting certain minimum

benchmarks regarding transparency and repayment ability reflected in the economic performance.

Issuing credit to an individual, company or sovereign entity is dependent on credit-worthiness. The borrower is subjected to assessment of repayment ability, reflected in the credit profile. For sovereigns, both the ability and willingness to pay are key determinants. The former is reflective of economic health while the latter is gauged by character reflected in past defaults. The assessment exercise is aimed at mitigating creditor exposures.

Sovereigns issue debt through capital markets, whose access determinants have been widely explored and discussed in literature, such as in Gevorkyan and Kvangraven (2016) and Pham (2015). Cost of borrowing and risk phenomena are discussed in Groot, Holm-Hadulla and Leiner-Killinger (2015), Nyambuu and Semmler (2017), Olabisi and Stein (2015). Lending is facilitated by the borrower's litmus testing to determine suitability, gauged by repayment certainty, risk and credit pricing. A bond-issuer credit-worthiness exercise is carried out by credible independent credit rating agencies (CRAs). To properly profile debt issue or issuer, CRAs base their assessment on a number of economic fundamentals.

CRAs, as information intermediaries, are critical market participants. To rate a sovereign issue, they summarily assess the country's economic and institutional strength. For example, Standard and Poor use the institutional and economic, flexibility and performance profiles to issue indicative rating[i]. Institutional and economic profiles come from the assessment of a country's institutions and economic performance. Flexibility and performance profiles come from external, fiscal and monetary assessments.

CRAs assess political stability and economic prospects (structure, growth). They also assess fiscal flexibility, monetary stability and external flexibility. Fiscal flexibility is gauged by revenue, expenditures; the balance of performance; debt and interest burdens; off-budget and contingent liabilities. External flexibility is defined by liquidity; public sector net external debt; bank and private sector net external debt. These determinants of credit-worthiness are important for explaining the market sentiment.

More factors from literature are fiscal and public sector balance-sheet management (Abedian, 2016), and economic growth (Chee, Fah, & Nassir, 2015; Williams, Alsakka, & Gwilym, 2013). The impact of information asymmetry and rating quality are discussed in Fischer, (2015). Impact of corruption and political (in)stability are documented in Teixeira, Silva, Ferreira and Vieira (2018). General rating biases are discussed in Cai, Gan and Kim (2018); Hill, Brooks and Faff (2010); Luitel, Vanpée and Moor (2016); and CRAs and issuers' opportunistic behaviours in Park and Lee (2018). Low credit rating negatively affects access to international capital markets and has a tendency to inflate both sovereign risk and cost of borrowing (Luitel et al., 2016).

This further reduces the ability to attract foreign direct investment (FDI) (Cai et al., 2018). The situation potentially spirals the country into a downward path of "policy sovereignty loss" to alternative funders (Abedian, 2016). The impact of external exposure is discussed in Cantor (2015). Current account adjustment and economic policy (un)certainty are discussed in Boumparis, Milas and Panagiotidis (2017). Credit ratings are useful in determining the cost of debt to the issuer (Cantor, 2015).

In this study, the explanatory power of the cost of debt on the external debt is examined. The cost of debt is proxied by interest rates charged by all creditors, as reported in the IDS compiled by the World Bank. Data is also captured for other macroeconomic variables, to investigate their power over external debt. These independent variables are: gross national income (GNI); exports; imports; foreign direct investments (FDI); primary income on FDI; international reserves; debt service to GNI ratio; interest arrears on long-term debt; short-term to external-debt ratio and reserves to external-debt-stocks ratio. They, together with interest rates, are expected to be associated with external debt, albeit at differing degrees of significance.

CRAs rate both sovereign and corporate issues, drawing from comprehensive risk assessment: measuring the likelihood of an issuer's defaulting on obligations. At the end of valuation, letter grades (e.g. AA, Aa1) are released as proxies for default risk assessment. All the three CRAs use alphabetical letter grades, although with a slight presentation difference to Moody's. The latter uses combinations of letters and numbers, while S&P and Fitch use similar presentation—letters only. Issuers pay CRAs to have their bonds rated (Haile, 2018).

The letter grades change with varying degrees of issue risk from investment to sub-investment bonds. They range from prime (the highest), representing obligation-honouring certainty, to default (absolute inability to honour obligations). CRAs are the rating services for both long-term and short-term issues. The ratings are offered for both local currency and foreign currency. In addition to ratings, CRAs offer the outlook for government and corporations, which runs from negative to stable to positive (Haile, 2018). The three agencies' ratings are as given in table 2.1 as follows.

Table 2.1: The rating scale

Moody's	S&P	Fitch	Credit Risk Rating	Implication	Grade
Aaa	AAA	AAA	Prime	Most likely debt obligations will be honoured	Investment
Aa1	AA+	AA+	Excellent	High likelihood debt obligations will be	
Aa2	AA	AA		honoured	
A1	A+	A+	Upper medium	Reasonable likelihood of honouring debt	
A2	A	A		obligations	
A3	A-	A-			
Baa1	BBB+	BBB+	Lower medium	Diminishing likelihood of honouring debt	
Baa2	BBB	BBB		obligations	
Baa3	BBB-	BBB-			
Ba1	BB+	BB+	Speculative	Future but not current repayment likely	Sub-
Ba2	BB	BB		problematic	investment
Ba3	BB-	BB-			
B1	B+	B+	Very speculative	Weak probability of repayment, cause for	
B2	B	B		concern	
B3	B-	B-			
Caa1	CCC+	CCC	Extremely speculative	Repayment uncertain, danger of default	
Caa2	CCC	CCC		possibility	
Caa3	CCC-	CCC			
Ca	CC	CC	Default vulnerable	High likelihood of default on debt obligations	
C	C	C			
	SD/D	RD/D	In default	Defaulting on debt obligations	

Sources: Lecture notes, UCT GSB, MCom Development Finance, Public Sector Finance 2018; Tadesse Haile, p.3

In summary, Haile documented that the number of SSA countries rated by global credit rating agencies increased from four in 2003 to 17 in 2017. As at 2017, out of 17 countries rated by Standard and Poor's, only two were categorised as of investment grade. With the exception of Mozambique (graded CC), all other speculative-grades are in the single 'B' category (Haile, 2018). Ten sovereigns have stable, six negative and one positive outlook.

To entice the market, with this risk rating level, the yields must be high enough to compensate for perceived risk. This has debt burden implications, especially the interest payments, further

constraining repayment ability. This is especially true if proceeds from the loan were not used for income generating assets to contribute to the repayment. The advantage of lower interest rates, often found in the international capital markets relative to domestic markets, can be eroded by adverse currency valuations against the borrowed currency (Willem, 2014). Unwavering willingness and untimely bond issuance, in the face of high yield market expectations, is a manifestation of adverse selection (Mishkin (2016).

Table 2.2: S&P's SSA sovereign rating

Country	Long-term grade	Outlook	Short-term grade
Angola	B	Negative	B
Botswana	A-	Negative	A-2
Burkina Faso	B-	Positive	B
Cameroon	B	Stable	B
Cape Verde	B	Stable	B
Congo-Brazzaville	B-	Stable	B
Congo – DRC	B-	Negative	B
Ethiopia	B	Stable	B
Ghana	B-	Stable	B
Kenya	B+	Stable	B
Mozambique	CC	Negative	C
Nigeria	B	Stable	B
Rwanda	B	Stable	B
Senegal	B+	Stable	B
South Africa	BBB-	Negative	A-3
Uganda	B	Stable	B
Zambia	B	Negative	B

Source: Haile (2018:174)

Despite the low grading (mostly sub-investment), SSA countries acquired more debt at higher yields, to compensate investors for increased risk. This rendered Africa as having "the highest sovereign Eurobond yields in the world", even surpassing the developing nations in the Asia-Pacific region (Haile, 2018:176). Total debt stock of SSA countries increased from under $1 billion in 2008 to $18 billion by 2014. In 2017, African sovereigns sold $18 billion worth of stock—well above the 2016 issue. This has largely been due to attractive yields offered by these issues, averaging six percent, compared with emerging markets' 5.5% and 4% for Asia-Pacific developing countries.

Haile (2018:176) reports that Africa lost $50 billion annually through illicit fund flows during the period 2000–2008. This was in addition to the already challenged domestic resources mobilisation, particularly taxation (Junquera-Varela et al., 2017). Capital flight is suspected to have association with the region's lack of political stability; ineffective institutions (e.g. law and order); lack of democratic accountability; lack of proper regulatory institution supervision; and corruption (Haile, 2018:177). This, together with low debt-management capacities in the region, potentially exposes the funds raised to mismanagement. The vicious cycle of increased sovereign borrowing begins, leading to unsustainable debt levels.

Between 2004 and 2017, there was a total of 49 sovereign bonds issued by SSA countries, with arithmetic cumulative of about four issues per country (Van der Wansem, Jessen, & Rivetti, 2019). Most issuing was done in 2013, following a "beauty contest" style (Willem, 2014), closely followed by 2015. In both years there was a high frequency of issues totalling ten and eight issues respectively, from six countries in each year. Apart from South Africa, Seychelles led the way by issuing its US$200 million Eurobond (Mbu, 2016). Positive market sentiment must have complemented the issuing spree that saw the highest number of issues between 2011and 2015 (31 issues in total).

Table 2.3: SSA sovereign bond from 2004

Country	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Total
Angola							1					2			3
Cameroon												1			1
Cote d'Ivoire											1	2		2	5
Ghana				1						1	1	1	1		5
Kenya										4					4
Namibia								1				1			2
Nigeria								1		2				1	4
Rwanda										1					1
Senegal						1		1			1			1	4
South Africa	1		1	1		2	2	2	1	1	2		3		16
Tanzania										1					1
Zambia									1		1	1			3
Totals	**1**	**0**	**1**	**2**	**0**	**3**	**3**	**5**	**2**	**10**	**6**	**8**	**4**	**4**	**49**

Source: van der Wansem, Jessen & Rivetti (2019:51)

Twelve SSA countries issued sovereign bonds within the period 2004–2017, with at least one country issuing in all years except 2005 and 2008. Increased appetite for SSA bonds enticed more countries to issue, as evidenced by more issues after 2009. This year marks the end of a global financial crisis that started with the U.S. sub-prime mortgage crisis in 2007. With very

low interest rates in the developed markets, the search for high yields saw portfolio flows into SSA. Improving political stability and macroeconomic 'pull' factors attracted the flow of money to SSA (Senga, 2019; Senga, Cassimon, & Essers, 2018).

Most SSA bonds were oversubscribed, clearly indicating commendable investor appetite (Mbu, 2016). This was driven by overall lower interest rates in the advanced economies after the major global financial crisis, offered in a bid to stimulate ailing economies. Meanwhile, SSA's insignificant integration in the international financial system mitigated the impact. Quantitative easing, by advanced economies and regional central banks, was met by SSA's decade of growth and macroeconomic stability. SSA bonds immediately became attractive as profitable investments (Mbu, 2016).

2.4 Development finance institutions, lending criteria, borrowing architecture

Strategic and general developmental needs of societies render traditional commercial banking less useful, owing to business model fundamentals. While the development needs require long-term patient financing, commercial banking is primarily short-term (Alagidede, 2012; Ocran, 2012). The inevitable mismatches between funding supply and demand period requirements mean that an alternative must be created. It goes without saying that this long-term financing increases creditor exposure due to the duration, and potentially scares away private investment. The public got to the cross-roads and eventually deliberated on the kind of long-term financing-model-driven institution required—and the development finance institution was born.

Development financing is an old concept, sometimes referred to as patient or long-term financing. Many development finance institutions were established after the Second World War. Their founding mandate was the development of countries after the wartime destructions, to grow economies and improve livelihoods. It underpinned industrial expansion in the now-developed world, especially Britain and continental Europe. The industrial expansion and economic growth strategic imperatives wouldn't fit the commercial banking business models (Sagasti et al., 2004). Since development finance institutions principally provide financial intermediation for a country to achieve strategic economic development (and hence take the banking format), they are also referred to as development banks.

Main activities of development finance institutions include: providing financial resources and technical assistance; creating financial markets; providing de-risking instruments; lengthening maturities in the financial sector and promoting standards (Kingombe, Massa, & Willem, 2011; Sagasti et al., 2004). The catalytic character of development finance institutions is manifested in the financial additionality and commercial mobilisations. Both serve to mitigate excessive costs of offering a service or the risk of serving in untraversed territory, (Husakova, 2018). As such, DFIs invest in a variety of sectors, including financial, infrastructural and agribusiness. Investment in finance is mainly for stimulation, and the latter two for additionality purposes, (Kingombe et al., 2011).

Owing to the myriad differences in the funding models of commercial and development banks, the latter's establishment legislation is specialised. Caution is taken not to crowd out private investment, since historic ownership of development banks has been in the hands of national governments (which already have the upper hand in balance sheet and budget support). Main instruments used by DFIs include: guarantees; equity and quasi-equity; equity funds and loans. Operational mandates are evidently driven by shareholder targets or regulations; interests of home country firms; sectoral comparative advantages; sectoral economic impact; and lack of capital or a market failure in specific sectors (Kingombe et al., 2011). Operational preference is markedly in the smaller firms and larger projects with larger firms for bilateral and multilateral DFIs respectively.

The World Bank Group has been instrumental in the formation of some large regional DFIs, namely Inter-American Development Bank (1959), African Development Bank (1964), and Asian Development Bank (1966). Those established without the blessing of the World Bank Group include: Interbank for Economic Cooperation (1963); Islamic Development Bank (1975); BRICS Bank (2014); and Asian Infrastructure Investment Bank (2015). The largest proportion of DFIs' ownership is in public hands; then mixed private and public, and least in private hands (Kenny, Kalow, Leo, & Ramachandran, 2018; Kingombe et al., 2011). There are over 500 DFIs globally, and over 140 in Africa (Ntsaluba, 2014). In terms of balance sheets, the three largest DFIs, excluding the World Bank are China Development Bank, BNDES and KfW.

The role and conduct of the International Monetary Fund (IMF) in the external financing space is discussed by Kingombe et al. (2011). Their contributions build up and further extend discussions from earlier work, laying the groundwork and giving an account of development financing architecture and growth over time. On the other hand, the discussion of African sovereign bond issues and related transaction costs can be found in Olabisi and Stein (2015). And, the emerging markets study of "resources booms and busts, borrowing and regime change" was done by Nyambuu and Semmler (2017).

Relevance to the proposed research question can be drawn from the works of Humphrey and Michaelowa, (2013), Kleimeier and Versteeg, (2010), Pham, (2015), Prizzon, Greenhill, 2017; and Dancho, (2015). The first importance of project finance is given fitting backing by panel data from 90 countries for the period 1991–2005. Project finance fans economic growth, with the highest impact on the developing countries, where (usually) "financial development and governance is weakest" (Kleimeier & Versteeg, 2010). So, the importance of project finance cannot be overstated.

This subject has attracted substantial attention and interest from scholars and practitioners, trying to develop an understanding of sovereign lending criteria. Multilateral finance institutions have spelled out their own criteria for lending within their areas of specialisation. There are some defined criteria in bilateral lending, apart from the effect of relationships between the states involved. On the other hand, capital markets are informed by sovereign creditworthiness established through creditworthiness rating exercises. Countries with better ratings win the confidence of the investor community and can borrow cheaply.

It is important to note there are both qualitative and quantitative factors used for determining the lending of funds by creditors. Financial institutions have credit profiling methodologies, largely reflecting a corporate finance approach (Mishkin, 2016). This approach is largely quantitative, but extended credit ratings (often done for large corporations and sovereigns) usually include both quantitative and qualitative factors. Typically, qualitative factors revolve around policy certainty, institutions, governance and public accountability, culminating in political maturity (Afonso, Gomes, & Rother (n.d.); Binici & Hutchison, 2018; Boumparis, Milas & Panagiotidis,

2017; Chee, Fah & Nassir, 2015; Langohr, 2008). Further discussions on qualitative drivers of sovereign lending are in the following paragraphs.

Interesting findings from the work of Winters (2010) shed light on the World Bank's lending criteria. Similarly, behaviour was closely observed for other donors, and key determinants include rule of law, good governance and democracy, (Winters, 2010). There is cited literature documenting an important observation regarding IMF lending criteria, which attest that it is not uniform across sovereign debtors (Saggar, 2001). There is another documented observation that the IMF lends to countries within which private banks of G5 countries are exposed. This inevitably implies that loans are aimed at bailing out private sector actors of its major shareholders (Bunte, 2013).

Other observed elements include "quality of economic policy and quality of governing institutions", with empirical data conclusively providing "evidence that well governed countries receive a larger portion of their project lending as nationwide projects" (Winters, 2010). However, contrary approaches (to good governance or other meriting factors) are also observed where there are stronger "political incentives, particularly for bilateral donors" (Winters, 2010). Other determinants of bank lending are discussed in Pham (2015).

Economic policy and its consistency play a vital role in ascertaining existing investment protection. Strong institutional infrastructure instils confidence in the protection of investor rights. Good governance is a requirement for sound economic policy and strong institutions. Democratic dispensation is instrumental in good governance, and government leaders being held accountable. All factors mentioned here are catalytic for strong economic fundamentals and critical for a country's creditworthiness.

Apart from the qualitative factors cited above, external lending is largely dependent on quantitative factors too. It is for this reason that responsible borrowing and lending, strongly advocated by United Nations Conference on Trade and Development (UNCTAD), calls for prudent quantitative evaluations (UNCTAD, 2012a). Evidence of possible overconfidence in the future economic performance, which happened in the SSA region, is discussed in Mustapha (2014) and Zeufack (2018). Other factors facilitating flow of capital in the region include current account surpluses (hence excess liquidity) in oil-exporting countries (Mustapha, 2014) and the

search for yield, driven by low interest rates in the developed world (Gevorkyan & Kvangraven, 2016). The ability to raise loans by countries in the SSA calls for robust debt management practices (Zampolli, 2013).

In the light of the discussion above, we can assert that sovereign creditworthiness has impact on economic growth. For example, the negative impact of credit rating on the private investor is discussed in Chen, Chen, Chang and Yang, (2013) and Hill, Bissoondoyal-Bheenick and Faff, (2018). Retarded private investment effectively slows economic growth. Bretton-Woods institutions also have rating methodologies encompassing qualitative and quantitative factors, chiefly the rule of law, strength of public institutions and good governance. Discussed below is the list of attributes desirable for borrowing from development finance institutions (DFIs).

The borrower-side-influencing factors are given interesting attention by a number of scholars and research studies. Insights from corporate finance capital structure theory by Miller and Modigliani are deliberated on in Jaros and Bartosova (2015). Another firm-level insight regarding interest burden and external finance choices is given attention by Muhamed Zulkhibri (2015), using a 1990–2010 panel data set of 900 listed firms in Malaysia (Zulkhibri, 2015). Corporate borrowing is a function of capital structure policy and other identified profitable projects and/or expansion requirements. It is, however, noted that raising loans (when deemed necessary) comes with competent prudence, manifested in the cost minimisation—particularly through securing credit at best prices.

There is light shed on multilateral lending by Humphrey and Michaelowa (2013). Interestingly, the idea exposes the dynamics of the market in influencing multilateral development bank (MDB) lending. Healthy bank lending is a function of domestic conditions, and can be seriously undermined or exposed to vulnerability by sovereign dependence on foreign capital inflows (Pham, 2015). This inevitably points towards the importance of a country's healthy economic fundamentals. They are instrumental in curbing uncertainties, and thus protecting confidence on the part of investors and consumers.

2.5 Sovereign borrowing and debt management

Generally, sovereign borrowing refers to liabilities incurred by the state for various operational and project purposes. One example is financing the national budget and domestic monetary

balance. Governments take on debt when collections from conventional revenue sources are less than projected (Bunte, 2013). Cutting spending and raising taxes are unpopular with the electorate and can seldom be chosen. One option open to the state is to raise financial resources using debt instruments—from both domestic and external creditors.

Domestic creditors consist of commercial banks, institutional investors and individuals. External lenders include capital markets, multilateral and bilateral creditors (International Bank for Reconstruction and Development [IBRD], 2019). Debt portfolios for borrowing countries have been expanded by newcomers in the new regional development bank (BRICS) and non-Paris Club[ii] members such as China (Mustapha & Prizzon, 2018). Mechanisms used by countries to raise loans include general obligation bonds, certificates of participation and revenue bonds (Robbins & Simonsen, 2019). Raising loans from domestic markets is done mainly through treasury bills, treasury notes, and bonds.

Raising funds from capital markets is through the issuance of long-term bonds. Loan contracts are used to raise loans from official creditors (bilateral and multilateral). The mechanism is common with newcomers. Whatever the vehicle, loan raising is authenticated by agreement in the form of contract, backed by the lender's faith in the borrower. Access to capital markets is facilitated by sovereign credit-worthiness which is established through an exercise carried out by independent credit-worthiness rating agencies (Alagidede, 2012; Ntsalaze, Boako & Alagidede, 2017; Ocran, 2012).

The three major global credit raters are Moody's, Fitch Ratings, and Standard and Poor's. Ratings given to debt instruments are categorised into two main groups—investment and sub-investment grades. Both have varying degrees of ratings from most stable to slightly speculative. Varying degrees correspond to varying interest rates set by the market. Most stable prime-class issues pay the lowest yield but ascertain the payment of par value of the bond with principal at stipulated times.

Ratings influence the interest rates demanded by investors to compensate for risk. Countries with higher ratings raise loan funds at lower interest rates, and the reverse is true for those with lower ratings. Borrowing cost-effectively has debt-servicing sustainability benefits. Countries struggling to honour their debt obligations are also confronted with high interest rates. Interesting

discussions about credit ratings are found in Ballester and González-Urteaga, (2017); Bedendo, Cathcart and El-Jahel, (2018); Boumparis et al., (2017); Chee et al., (2015); Hemraj, (2015); Kruck, (2011); Mattarocci, (2014); Paudyn, (2014); Cantor, (2015); Stiglitz, (2010).

Conditions for loans from multilateral and bilateral lenders are centred on the borrower's good governance and rule of law. However, literature has since asserted that bilateral relationships can have political reasoning outweighing a debtor's economic and institutional strength (Megliani, 2015). Other conditions are institutional-mandate driven. For example, the IMF is primarily mandated to help alleviate sovereign deficit problems. The IMF is also popular for pushing austerity measures onto its debtors, mainly for reasons related to repayment abilities. New creditors are seemingly positioned to exploit gaps left by traditional official lenders.

Raising loans emerges from developmental and economic premises—from budget deficit to mega-infrastructure projects. When financing capital expenditure, using debt enhances the "improving of equity and efficiency, preservation of tax base, and avoidance of dramatic fluctuations in tax rates" (Yan, 2013). Global goals and national strategies benefit from borrowing as one of the options left to sovereigns. This option appears before the backdrop of low tax-revenue growth or "only limited space for further expansion", coupled with "low equity investment inflows and flat-lining aid budgets" (Mustapha & Prizzon, 2018). Debt is also instrumental in the "mobilization of resources in the modern economies" (Blankenburg & Kozul-Wright, 2016).

Other reasons include fiscal stimulus (especially during recessions), exceptional events such as war, natural disasters, unexpected price increases of imported commodities such as oil or corn, and large investment projects (Fatás, Ghosh, Panizza, & Presbitero, (2019); Makhlouf, 2014). Development of the financial and stock markets can also be facilitated by raising debt to launch them and support sustained growth by raising the domestic debt, instilling confidence in the market participants. Dynamic inefficiency is cited as instrumental for creating government debt, and it constrains optimal transfer of wealth across generations (Fatás et al., 2019). A breeding ground for dynamic inefficiency is the economy's rate of return being below its growth rate. Interest rates on government debt also falls below GDP growth rates (Fatás et al., 2019).

Bunte (2013) gives insights on developing countries' need for sufficient capital for development programmes, inevitably becoming compelled to import it. Research has also unearthed that incurring debt is done for politically motivated, socially driven and economically unsustainable reasons (Fatás et al., 2019; Makhlouf, 2014). Political failures often lie behind bad borrowing and are associated with "intergenerational transfers, strategic manipulation and common pool problems" (Fatás et al., 2019). Makhlouf (2014) cites as another closely related reason, governments' irresponsible or fiscally unsound policy choices. Others are "the desire to finance or subsidise costly social programs, and the implementation of ambitious development projects that have not been adequately funded from other sources" (Makhlouf, 2014).

Table 2.4: Some documented reasons for sovereign debt

Reason for borrowing	Cited source
Enhancing the improvement of equity and efficiency, preservation of tax base, avoidance of fluctuations in tax rates	(Yan, 2013)
Low tax revenue growth, limited space for further expansion, low equity in investment inflows, flat-lining aid budget	(Mustapha & Prizzon, 2018)
Mobilisation of resources	(Blankenburg & Kozul-Wright, 2016)
Political failures, fiscal stimulus, exceptional events, large investments projects	(Fatás et al., 2019; Makhlouf, 2014)
Need for sufficient capital by developing countries	(Bunte, 2013)
Dynamic inefficiency	(Fatás et al., 2019)

Source: author (using selected literature)

Criticisms levelled against borrowing draw sentiments from some of the bad reasons mentioned. One argument asserts that sovereign borrowing has tendencies of crowding out private investment and financial business in the domestic domain (Yared, 2019). The ease with which a country can borrow money encourages unsustainable, excessive borrowing behaviour, which can lead to financial distress. Unsustainable debt levels can do irreparable harm to the economy, reversing any gains achieved and affecting the poor (Mustapha & Prizzon, 2018; UNCTAD, 2012). Debt servicing deferred to the future makes it a burden on future generations, and potentially constraining future fiscal policy.

Debt can be become prohibitively unsustainable and attract high costs in future borrowing (Storkey, 2001). A measure of debt level indicative of the ability to service it, is the debt-to-GDP ratio. European Union members adopted the 60% debt-to-GDP ratio, which was later "taken by

many countries as a guide, not a mandate" (Makhlouf, 2014). However, this ratio has often been exceeded by a number of countries in the developed and low-income countries alike. The situation becomes critical when high debt repayments lead to financial distress, restructuring, repudiation or outright default in the worst cases.

Debt limit discussion is found in Bastos, (2013); Martins-da-rocha and Vailakis (2016); Robbins and Simonsen (2019). Pierre Yared (2019) documented that for the period 1990–2015, a number of countries with fiscal rules in place increased from seven to 92. This was despite the cited evidence of gross misconduct, by policy makers, of depleting fiscal space once in power in pursuit of political mileage (Makhlouf, 2014). Limited evidence linking public debt accumulation and surges in public investment, found in Fatás et al. (2019), attracts public perceptions of imprudence on the part of policy makers. Apart from bad reasons for borrowing, misbehaviour on the part of debtors or creditors are partly to blame for sovereign debt limited impact (Gulati, 2010b; Mustapha & Prizzon, 2018; UNCTAD, 2012a).

Sovereign debt management entails the process of looking after government debt activities from loan planning to servicing it fully, carefully managing all risks while maximizing benefits. The funding details required, possible sources of funding, currency, costs of borrowing, repayment ability, maturity profile and specific lender conditions comprise debt management (Zampolli, 2013). It is the function of debt management to ensure that country's credibility and image is enhanced in the creditor markets. This is achieved through ascertaining debt repayment with the lowest possible cost, while optimally executing the financing objectives in place. In other words, debt management should raise, manage and retire government debt at the lowest cost consistent with acceptable risk exposure (Jonasson & Papaioannou, 2018; Karangizi, 2019; Willem, 2014).

Debt levels rise and fall with business cycles (Makhlouf, 2014). The advantages of sovereign debt management are sufficiently discussed in Jonasson and Papaioannou, (2018 and Karangizi (2019). The government's ability to reduce market exposure, rollover or refinance, liquidity, credit, settlement and operational risks is a function of competent sovereign debt management (Jonasson & Papaioannou, 2018). Independence of the debt-management function from fiscal and monetary policies makes it effective (Hoogduin et al. (2011). Cost-benefit analytical and risk minimisation characteristic features of debt management make its importance salient. Strong

debt management helps maintain debt sustainability and prevents a country's increased spending on servicing debt being at the cost of education, health and infrastructure (Mustapha & Prizzon, 2018).

Reducing the risk that government's own portfolio becomes a source of instability—within and across borders—is one of debt management's primary responsibilities. Put in place, the debt-management strategies help reduce a country's susceptibility to contagion and financial risks (Hoogduin et al., 2011). Strong debt-management uses sound planning to determine the amount to be borrowed, the best borrowing instruments, the situation after debt, and calculates the risks in the short-, medium- and long-range horizons (Makhlouf, 2014). This underpins robust crafting of debt-management strategy, through designing the least risky debt portfolio that also minimises the debt-servicing cost (Makhlouf, 2014). Other debt- management strategy advantages include setting the annual maturity debt ceiling and the average time to maturity (Makhlouf, 2014).

2.6 Debt situation in Sub-Saharan African countries

Sub-Saharan Africa is facing a number of economic hurdles to overcome to encourage economic growth and financial development. Foreign direct investment is slower, and capital market development is still in the infancy stage. Revenues from export markets are yet to reach the momentum that will facilitate sound growth and take many people in the region out of poverty. This is against the commendable efforts by a number of countries establishing stock markets. The countries are still considered risks, so their fund-raising comes at a substantial cost (Akanbi, 2016; Coulibaly, Brahima & Gandhi, 2019; IMF, 2019).

Many countries in the region qualified for Heavily Indebted Poor Country (HIPC) and Multilateral Debt Relief (MDR) initiatives and benefitted handsomely. This improved individual sovereign countries' balance sheet ratios, thus enabling them to secure more loans for development and poverty-reduction purposes. Improved creditworthiness was coupled with a wider choice of creditors. For example, borrowing expanded from traditional lenders to include non-Paris Club members such as China. Increased access to international capital markets, development of domestic markets, improved investor confidence and search for yield, improved sovereign borrowing in the region (Prizzon & Greenhill, 2017; IBRD, 2019; Mustapha & Prizzon, 2018).

According to the IMF (2019), the region's economic outlook is currently characterised by increased balance sheet vulnerabilities. Debt-to-GDP ratio in the region is seemingly stabilised at an average 55% across the countries. This culminates in macroeconomic policy constraints to address growth volatilities. Weak balance sheets with unsustainably high debt ratios, and increasingly limited debt-service capacity, grossly increase the region's exposure. Low international, financial and non-financial corporate balance sheet weaknesses effectively limit the potential for sustainable growth. Tabled below is the situation in numbers extracted from the IMF (2019:17).

Table 2.5: SSA countries in debt distress or at high risk of debt distress

Debt distress	**High risk**
Eritrea, The Gambia, Mozambique, Republic of Congo, Sao Tome and Principe, South Sudan, Zimbabwe	Burundi, Cabo Verde, Cameroon, Central African Republic, Chad, Ethiopia, Ghana, Sierra Leone, Zambia

Source: Regional economic outlook. Sub-Saharan Africa: navigating uncertainty, p17

Table 2.6: SSA countries' distributions:– debt and economic characteristics

Economic category	**Debt category**	**GDP**	**Number**	**Regional GDP share**	**Number of countries**
Low-income and developing	Distress	Distress	7	3%	35
	High distress risk	High distress risk	9	16%	
	Low to moderate	Low to moderate and sustainable	19		
Middle and upper income	Sustainable		10	81%	10
TOTAL			**45**	**100%**	**45**

Regional economic outlook. Sub-Saharan Africa: navigating uncertainty, p17

The above situation increasingly led to skyrocketing debt levels that called forth sustainability issues and concerns. There is an upward trend in the debt-to-gross-domestic-product (GDP) ratios across countries, indiscriminately. This, together with potential political instability, still calls for high interest-rate demands from investors—the region is still regarded as less safe. Not only is the region prone to shocks, but wealth management issues call for swifter, robust actions if sustainability is to be maintained (Kapoor, Kararach, Odour, Odero, Sennoga & Coulibaly, 2019). Higher interest rates demanded by investors potentially drive countries into financial distress, and society's poorest suffer most in the process.

The International Debt Statistics report (2019) shares important empirical data about the debt situation in the region. Average debt levels doubled in the period 2010–2017. For thirty countries that benefitted from HIPC and MDRI, "external debt rose 11% in 2017, compared to 7% in 2016; and a 15.5% increase in external debt, to $535 billion" (IBRD, 2019). For the period 2010–2017, external debt-to-GNI ratio rose by over half, GNI in U.S. dollars rose by 23% on average, and combined external debt rose by 90 (IBRD, 2019:10). Increases were as high as 200% and 140% for some countries, with eight countries' ratios standing at over 60% by the end of 2017, including six that benefitted from HIPC and MDRI. The debt-to-export-earnings ratio average of 138% in 2017 is close to twice the 2010 70%; and 54% of countries had ratios of 150%, compared to 28 countries in 2010; while those with ratios over 200% rose from six to fourteen countries in the period 2010–2017.

Other encompassing statistics reveal that a third of countries in the region had a debt service-to-export ratio of over 10%, with extremes of 15% in some countries. The ratios are not expected to go down, because of higher debt-service payments in the future (due to bullet payments falling due on maturing international bond issues) and rising global interest rates (IBRD, 2019).

Debt-service payment projections stand at $48 billion for 2021, with expectations of a steep rise, or remaining elevated, for many countries over the next two to five years (IBRD, 2019). Against the rise of new creditors, most countries in the region are still dependent on "financing from official bilateral and multilateral creditors, which together accounted for 60% of total long-term external debt-stock at the end of 2017" (IBRD, 2019). Multilateral creditors play a bigger role, though the share declined from 44% to 34% over the 2010–2017 period.

On the other hand, capital market development and increased access to international capital markets further increased external borrowing, owing to the greater number of options. At the end of 2017, bondholders were owed $105 billion, representing "29 of outstanding external long-term debt of countries in the region, compared to 13 in 2010" (IBRD, 2019). Bond issuance rose more than four times between 2016 and 2017, from $4 billion to $27 billion, with major contributions coming from South Africa ($19 billion). The $8 billion contribution by other countries represented a tenfold increase from 2016. "Private creditors and lending by commercial

banks and other private entities, accounted for 40% of the long-term debt-stock of SSA countries by the end of 2017" (IBRD, 2019).

In summary, the SSA region is exhibiting characteristics of growth prospects and huge potential for accelerated financial development. The increasing abilities to raise loans must still be complemented by heightened investor confidence, manifesting in both lower interest rates and foreign direct investment. With development of financial infrastructure and export market competence comes real economic growth, capable of taking multitudes from the bottom of the pyramid out of poverty. This sentiment is shared across scholarship in Asteriou, Masatci and Keith, (2016); Habib, Mileva and Stracca, (2017); Hall, Hondroyiannis, Swamy, Tavlas and Ulan, (2010); Sercu, (2000); Sercu and Vanhulle, (1992); and Serenis and Tsounis, (2014). Nevertheless, prudence-driven sovereign loan contracting and debt-management tools should be handy for sustainable development. The extent to which changes in interest rates affect borrowing behaviour merit examination, potentially unearthing contributions of borrowing behaviour to debt management.

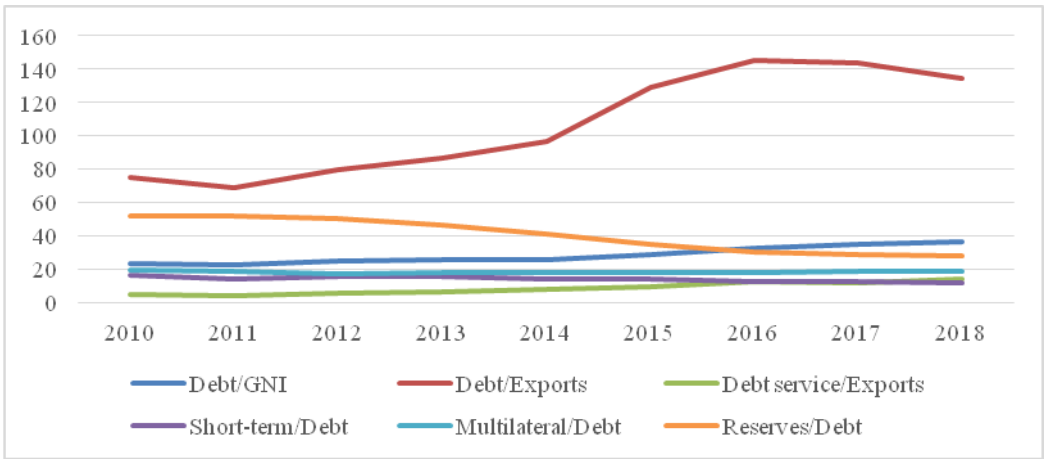
2.7 Empirical comparative analysis: SSA and peer regions

Using the 2010–2018 debt ratios, analysis has been made for Sub-Saharan Africa (SSA) and peer regions, namely Latin America and the Caribbean (LAC), South Asia (SA), and East Asia and Pacific (EAP). Data were collected from International Debt Statistics 2020, compiled by the World Bank. Ratios analysed are: debt-to-gross-national-income (GNI); debt-to-exports; debt-service-to-exports; short-term-to-debt; multilateral-to-debt; and reserves-to-debt. The word 'debt' as used represents total external debt-stocks for each region. Trend analysis, correlations and regressions are made.

Debt-to-GNI ratio is regressed against debt-to-exports; debt-service-to-exports; short-term to debt; multilateral-to-debt; and reserves-to-debt. Explanatory power and statistical significance of each variable is reported in the analysis. Correlations between all variables including the dependent variable are observed. Trends on the variable changes over a period for each region are also analysed and noted. Finally, the aggregate regional comparative analysis is made, to see how SSA fares against peers.

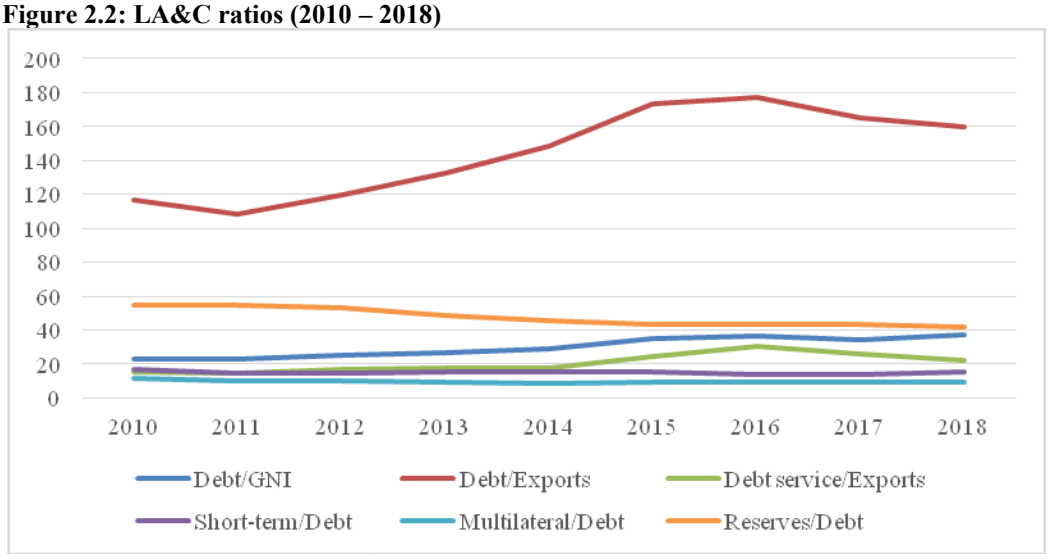
Appendix 3 presents data, and analysis results are presented in the Appendices 4, 5, and 6. Trend analysis results are presented in figures 2.1, 2.2, 2.3 and 2.4 below.

Figure 2.1: SSA debt ratios (2010 – 2018)



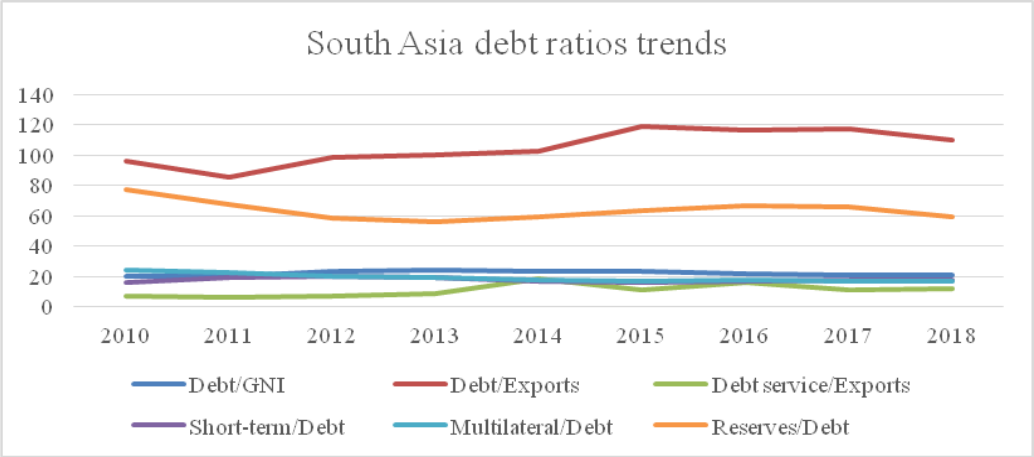
Source: author data analysis using data from International Debt Statistics, 2020, The World Bank

Figure 2.2: LA&C ratios (2010 – 2018)



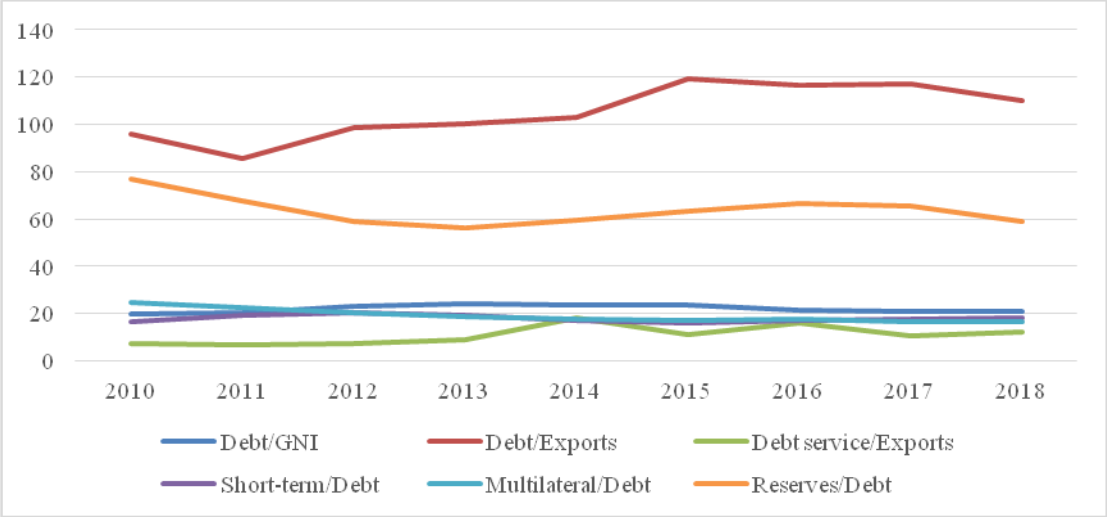
Source: author data analysis using data from International Debt Statistics, 2020, The World Bank

Figure 2.3: South Asia debt ratios (2010 – 2018)



Source: author data analysis using data from International Debt Statistics, 2020, The World Bank

Figure 2.4: EA&P debt ratios (2010 – 2018)



Source: author data analysis using data from International Debt Statistics, 2020, The World Bank

Detailed analysis

SSA

Notably, for the 2010–2018 period, debt expressed as a percentage of gross national income increased steadily in the Sub-Saharan Africa (SSA) region. The figure falls in the 20%–40% band throughout the period. Debt-service-to-exports ratio follows the same pattern, with the figure enclosed in the 0%–20% band. The ratios of short-term to total external debt-stocks and multilateral to total external debt-stocks fluctuated within narrow bands of approximately 12%–6% and 17.5%–19.5% respectively. Reserves to external debt stocks steadily fell, covering a slightly wider band of 52%–28%.

On the other hand, while debt-to-exports ratio is seen falling in the periods 2010–2011 and 2017–2018, it has largely been increasing throughout the period under observation (2010–2018). The only other slight decrease happened in the 2016–2017 period. Otherwise, the trend has mostly been upward, spanning the 68.8%–145.6% band for the observation period. This inevitably implies increased exposure to decreased international reserves and volatility challenges to foreign exchange. Indeed, reserves as a percentage of external debt-stocks have been falling throughout the period, further increasing potential for distress since these loans are largely denominated in the foreign currencies.

Falling reserves, rising debt and falling exports obtained the attention of scholars, other researchers and reporters in closely related topics. Interesting discussions are found in the works of Mustapha and Prizzon, 2014, 2018. Bonizzi and Toporowski reported on the same, shedding light on concerns regarding debt service and interest payments since 2012, that suggested a reversal in debt vulnerability factors, namely private debt and volatile liquidity in capital markets (Bruno Bonizzi, 2017).

Latin America & Caribbean

Debt-to-GNI ratio increased steadily from 22.6% to 37.6%—representing 15% band size, for the 2010–2018 period. The debt-service-to-exports ratio fluctuated within 15%–30.3% range, rising slowly in 2010–2014 and increasingly in 2014–2016. It started falling thereafter to nearly the 2010 value. Both the short-term-to-total-external-debt-stocks and multilateral debt-to-total-external-debt-stocks ratios fluctuated the least relatively, spanning band size (range) of about 3% each. Reserves-to-external-stocks ratio decreased throughout the period (from high of 54.9% to low of 41.5%), rising insignificantly in 2010–2011, falling slowly during 2011–2012, increasingly for 2012–2015, and decreasingly thereafter.

Debt-to-exports ratio decreased in the 2010–2011 period. It increased steadily during 2011–2014 period and accelerated one year later; then decreasingly for another year before gradual and dampened falls each of the next two years respectively. Overall fluctuations represent statistical range of 68.6%.

South Asia

South Asia's debt-to-GNI ratio fluctuations were very narrow and smooth, ranging from a low of 19.9% in 2010 to high of 24% in 2013. Of peculiar nature is the very narrow fluctuation band and/or extremely small changes between years: for example, 21.4%, 21.1% and 21.1% for 2016, 2017 and 2018 respectively. The same is the case with 23.4% and 23.5% for 2014 and 2015 respectively. Greatest changes from one year to the next are 2.8% for 2011–2012 and 2.1% for 2015–2016 periods. Any other change from one year to the next is less than a full percentage point. This resulted in a smooth and close to flat trend graph.

Debt-service-to-exports ratio curve fluctuations were equal in both up and downwards directions. Overall, band size ranged in the low and high of 6.6% and 18.1% respectively. At least for the 2010–2013 period fluctuations were moderate (both up and downwards) at less than a full percentage point from one year to the next. The spike occurred in 2013–2014 (increase) and 2014–2015 (decrease) period. For the period 2015–2018, there occurred upward, downward, and upward movements in that order. This gives a clear indication of inconsistency in the ratio, possibly related to changes in any export quotas, exchange rate, or export commodity price volatilities.

Short-term debt-to-total-external-debt-stocks ratio spanned a very narrow band, with maximum of 2.8% for 2010–2011 period, followed by 2% decrease and 1% increase during 2011–2012 and 2015–2016, and decrease in 2012–2013 periods in that order. Otherwise, fluctuations remained quite slim, resulting in a much flatter graph for the period. Multilateral- debt-to-total-external debt-stocks ratio shows features like those of debt to GNI and short-term-to-total-external-debt ratios, fluctuating only slightly but on a moderate downward trajectory. Fluctuations ranged from a high of 24.5% in 2010 to low of 16.6%, yet moderately decreasing from one year to the next throughout the observation period.

The reserves-to-total-external-debt-stocks ratio graph meandered smoothly incepting with a downward but moderate trend for 2010–2013, followed by a moderate upward trend for 2013–2017 before a moderate decrease for 2017–2018. Fluctuations ranged from maximum to minimum of 76.9% in 2010 and 39.2% respectively, with only slight up and downward movements, but generally going downwards. This correlates with the movement in exports as

one of the major sources of foreign currencies. Debt-to-exports ratio generally increased for 2010–2018, with combination of leaps and moderate increases. A major decrease was recorded during 2010–2011, followed by 2017–2018 and 2015–2016.

East Asia & Pacific

Debt-to-GNI ratio generally but gradually increased for the 2010–2018 period, from the beginning value of 15.6% to the ending value of 17.6%. The trend was upward for 2010–2014 period. Steep decrease during 2014–2015 was followed by a smooth upward trend throughout the 2015–2018 period. Generally, the curve is slightly flatter spanning the 15.6% to 19.7% band for the entire observation period. Both the minimum and maximum values were largely away from measures of central tendency, namely the mean and median values.

Debt- service-to-export ratio fluctuated (up, down and up in that order) in the four-percentage points range (4.2%–4.7%) for the 2010–2013 period. An increase spike happened during 2015–2016, but the trend was generally upward though gradually for the 2016–2018 period. Trend minimum and maximum values were 4.2% and 9.1% respectively. Short-term-to-total-external-debt-stocks ratio spanned low and high values of 43.9% and 58.3%, displaying the combination of increasing and decreasing trajectory, but generally decreasing.

Multilateral-to-total-external-debt-stocks ratio generally decreased smoothly for the 2010– 2018 period. Greater changes happened in 2010–2011 (decrease) and 2014–2015 (increase) periods. In all the years but 2014–2015, the trend was moderately downward albeit some spike during 2010–2011. Reserves-to-external-debt-stocks ratio decreased in all years except for 2014–2015. This tallies with well with the general upward debt-service-to-export ratio trend, signifying the debt increase against the falling exports–inevitably exposing the region to difficulties of servicing external debt, which is largely denominated in the foreign currencies.

Debt-to-exports ratio curve is generally upward sloping in all years except for 2014–2015, though with a combination of moderate and accelerated increases. The fluctuations spanned the band of 51% (2010) to 72.1% (2018). Interestingly, through the entire period, the debt-to-exports ratio remained below 75%.

Summary

LA&C recorded the highest overall increase, average and fluctuation bands in the external debt-stocks-to-GNI ratios, followed by SSA. SA and EA&P had equal fluctuation bands, though EA&P's overall increase is slightly greater. On the other hand, SA's average ratio surpasses that of EA&P. Both regions rate better than SSA and LA&C. SSA is generally not in either extreme: lowest or highest. Overall increase in the debt-service-to-exports ratio was highest for SSA followed by LA&C, which recorded higher in both the average ratio and fluctuations band. EA&P recorded the least in all the matrices.

Moving forward, SSA recorded the greatest overall decline in the short-term–to-total-external-debt-stocks ratio, followed by EA&P and LA&C respectively. Conversely, SA recorded an overall increase comparable in magnitude to LA&C. EA&P recorded the highest average ratio of short-term-to-total-external debt-stocks, followed by SA, LA&C and SSA respectively. EA&P's average is way out of peer regions' values. It recorded the largest ratio fluctuations band, followed by SSA. SA and LA&C in that order, with EA&P's value lying way out of relative (comparable) range. SA recorded the highest values in overall decrease, average and fluctuations in the multilateral-to-total-external debt-stocks for the period.

While EA&P followed in the overall decrease and fluctuations, it recorded lowest in the average ratio. SSA recorded the lowest decrease and fluctuations but second highest in the average ratio. EA&P recorded the greatest decrease, average, and fluctuations band in the ratio of reserves-to-external debt-stocks, followed by SSA in all but average, which is occupied by SA. LA&C recorded the least values in all matrices. SSA recorded highest in the overall increase and fluctuations band, but comes second to LA&C in the average ratio of debt-to-external debt-stocks.

Otherwise, LA&C came second in the two values. EA&P recorded the least values in the average ratio and fluctuations band, but second highest in the average ratio, after SA. Overall, there is a noticeable declining trend in debt-to-export ratio in all regions towards 2018. It can be suspected that debt-management practices are increasingly being put in place. With decreasing debt against increasing exports, countries' exposure to exchange-rate volatilities is minimised.

Debt-service-to-exports is, however, stubbornly either remaining constant or slightly increasing in all regions except LA&C. Reserves-to-debt is also falling towards 2018. Rising debt-to-GNI for SSA and LA&C is threatening debt servicing sustainability. In SA and EA&P, the ratio is mostly constant. One possibility is that national income is not growing in SSA and LA&C.

Another possibility is that the two regions' sovereigns are not able to tax their economies sufficiently. Indeed, taxation is wanting in the developing countries, with many having debt-to-GDP ratio falling short of the 15 per cent benchmark (World Bank Group, 2017).

From correlation analysis, the relationship between external debt and debt-service is positive. Exports move in the same direction as GNI and reserves are positively correlated to short-term debt and multilateral loans. Across the regions (except East Asia and Pacific) exports are negatively correlated to debt and debt generally moves in opposite directions to GNI. In East Asia and Pacific, debt is positively (but moderately) associated with GNI, implying effective use of debt for investments, coupled with maintaining healthy debt ratios.

Debt-to-GNI ratio is the regression-dependent variable. Debt-to-exports; debt-service-to-exports; short-term-to-debt; multilateral-to-debt; and reserves-to-debt are explanatory variables. Explanatory power strength is determined by R-squared from the results table. Statistical significance is assessed from the results p-values and t-statistics values. Comparison is done across the respective areas regression results.

There is generally a strong explanatory power of independent variables over dependent variable across SSA, LA&C, and EA&P. SA exhibited a comparatively weak explanatory power of independent variables. Indiscriminately, the independent variables are largely not statistically significant. Statistically significant variables are reserves-to-debt ratio for LA&C and SA—in the increasing order. Debt-to-export ratio is statistically significant for EA&P while no explanatory variable was found to be statistically significant in SSA regression model.

Strong positive response comes from debt-service-to-exports ratio for both SSA and LA&C, and from multilateral-debt-to-external-debt-stocks ratio for SA and EA&P. So, GNI is influenced by exports in the SSA and LA&C, and by debt in SA and EA&P. Strong negative responses come from different explanatory variables across different regions: short-term-debt-to-external-debt-

stocks ratio for SSA; reserves-to-external-debt-stocks ratio for LA&C; and debt-service to external debt-stocks ratio for EA&P. Weak, but worthy of a mention, reserves- to-external debt-stocks ratio gives negative response among LA&C, SA and EA&P; but positive response in SSA.

Overall, only a few explanatory variables are statistically significant across the regions. In SSA, not all variables are statistically significant. In EA&P, only debt-to-export ratio is statistically significant, with strong evidence. In SA, reserves-to-debt ratio is statistically significant, with strong evidence. For LA&C, there is weak evidence of statistical significance of reserves-to-debt ratio.

2.8 SSA's unsustainable borrowing, financial distress and debt restructuring

Prior to the 1990s, Africa's decades of snail-pace economic growth resulted from the accumulation of unsustainable debt and serial restructurings (Karangizi, 2019:14). Reprieve was provided by debt relief initiatives, namely Heavily Indebted Poor Country (HIPC) initiative (1996), extended HIPC (1999) and the 2005 Multilateral Debt Relief Initiative (MDRI). HIPC was launched by the World Bank and International Monetary Fund (IMF). MDRI was launched by the African Development Bank, the World Bank, and the IMF. Aims of joint HIPC and MDRI initiatives came to an end in 2011, HIPC closed to new entrants and MDRI terminated activity ten years after launch (2015).

Initiatives brought the debt back to sustainable levels, inevitably improving Africa's investment appeal (Karangizi, 2019:14). New debt levels enabled Sub-Saharan African (SSA) countries to service their external debt without a restricting burden. They managed to honour their debt obligations without further relief, while at the same time not compromising growth. The region's economic growth complemented by responsible macroeconomic policies, attracted investor interest. This partially explains the oversubscriptions of SSA sovereign bonds (Mbu, 2016).

Access to debt, in any form, enabled SSA countries to develop infrastructure, exploit their natural resources, and improve health and education (Karangizi, 2019:13). Overall socio-economic wellbeing was widely realised through poverty-reduction programmes, expanded by debt-burden relief initiatives. However, the notable rapid accumulation of new debt in the SSA region calls for attention. Some countries are getting into high risk of debt-distress and some are

already in distress (Karangizi, 2019:14). The World Bank and IMF estimates of January 2019 posit that thirteen SSA countries are at high risk of debt-distress and five are already in distress.

Factors contributing to SSA countries' debt increase are documented in Karangizi, (2019:16). They are: falling prices of export commodities in 2014–2016; failure to generate extra revenue to service debt; migration of liabilities to public balance sheet, e.g. state-owned enterprise losses; exchange rate depreciations; and poor institutional governance at debt- management and tax administration levels (Karangizi, 2019:16). The manifestation of these factors indicates weaker institutional and macroeconomic management. Swift but sustainable reversal of the situation is warranted, to avoid a repeat of the 1970s debt crisis. The matter may be further complicated by the current diversified, complex creditor base.

The growing over-indebtedness and risk of future debt-distress among the Sub-Saharan African countries triggers concerns (Mustapha & Prizzon, 2018). Heavy debts come with the cost of eventual distress. Extreme debt distress warrants restructurings to restore sustainability and avoid default. Distress and defaults leave a sour taste in the borrower-lender relationship. This is additional to high restructuring and post-default borrowing costs.

Political distortions underpin unsustainable borrowing and lead to "time inconsistent preferences and bias towards present consumption" Fatás et al., (2019). The tendency of politicians to use debt for decreasing the odds against being re-elected is noted. The presence of 'fiscal illusion' encourages excessive borrowing tendencies by rewarding them through re-elections, due to present consumption bias (Fatás et al., 2019). This culminates in increasing expenditure without increasing taxes. While this debt expansion may be necessitated by desire to boost economic performance (e.g. getting out of recession), running surpluses during good economic performances is evidently less popular (Fatás et al., 2019).

Documented factors impacting the debt limit are: current and projected economic growth rates; sources of debt in a country's portfolio (internal vs. external); intended use of debt; debt cost; size of the economy; projected inflation rates; debt type (concessionary vs. non-concessionary); loan conditions; political leadership and general public attitudes towards sovereign debt (Makhlouf, 2014).

There are measures to address unsustainable debt levels. While restructuring provides a reprieve to borrowers, GDP growth, fiscal austerity, inflation, financial repression and defaults can bring down debt levels to sustainability (Makhlouf, 2014). Financial repression manifests in capping interest rates, restricting cross-country financial transactions and tighter banking regulations (Makhlouf, 2014). Another repression approach is borrowing from state-owned and/or controlled funds such as employee retirement and social security funds (Makhlouf, 2014). Care must, however, be exercised when implementing repression, since unpalatable outcomes can ensue.

The litmus test for debt sustainability is the ratio of the amount of debt to the country's gross domestic product (GDP). There comes, with increasing levels of debt relative to GDP, the heightening of fiscal space strain. Fiscal space is defined as the theoretical debt limit set by policymakers net of existing debt (Bastos, 2013). High sovereign debt level not only increases the country's exposure, but it also impacts the GDP negatively (Makhlouf, 2014). Caution should be taken while squeezing fiscal space, since economic performance uncertainties can exacerbate the problem.

The above sentiment is shared by Mustapha and Prizzon (2018). The general assertion is that raising debt has undisputed benefits, but poorly managed debt can become the nation's curse for future generations. An excessive amount of debt cunningly exacerbates uncertainty and retards innovation and further investment. Overall, these have negative impacts on economic growth (Mustapha & Prizzon, 2018). Therefore, increasing debt against warning signals of unsustainability is imprudent.

For SSA countries, the road to sustainable recovery from unsustainable debt situations has a number of feasible options. Growth must be complemented by matching institutional capacity; well-designed and implementable macroeconomic policies; and functional, robust debt management processes (Karangizi, 2019:14). Increasing tax bases is one of the feasible options in mobilising domestic resources. Designing the policies and systems to tax the initially difficult-to-tax sectors of the economy is critical for this objective. Carefully monitored accumulation of liabilities by sub-governments and state-owned entities (SOEs) should not be left to chance (Mbu, 2016).

There is a trade-off between privatising SOEs and using the proceeds to reduce debts, and keeping them for their mandates, while stomaching the transfer of losses to the public balance sheet. Sovereign wealth funds need clear performance goals and their monitoring should be enforced to complement sovereign financial obligations. Innovative financing, such as pre-financing agreements with multinational trading groups to extract minerals and develop infrastructure, is a viable option for resource-rich countries (Karangizi, 2019). Specialised functional debt-management units should be established by governments, following the Nigerian approach. Development of domestic financial markets is the long-term exchange-rate hedging strategy that SSA countries should consider (Mbu, 2016).

2.9 SSA and sovereign debt crisis

This happens when the country is unable to pay creditors timely or in full, due to either lack of funds or repudiation tendencies. Fund shortages emanate from insufficient tax collection or bad debt management; and repudiation is a function of debt repayment. Sovereign default is described as the non-payment of principal or scheduled interest. It is also characterised by a debt restructuring event, the end result being terms that are less favourable than the original loan (Mukherjee, 2015). The newer terms often worry the investment community.

Debt crisis is not an instantaneous event, but takes time to ferment and signs become visible prior to full eruption (Amadeo, 2019). The country would have had a choice to address the situation, though there is tendency to procrastinate. In the worst case, the country defaults in some or all of its outstanding loans. Apparently, sovereign creditors have limited recourse apart from loan restructuring (Gulati, 2010). Sovereigns' only collateral is the credibility derived from credit risk ratings by third party agencies trusted by the market (Mukherjee, 2015).

The market is unforgiving to defaulters, sentiment takes time to become positive again (Luo & Wang, 2018). Default history is used as a key determinant of willingness to pay—an important aspect of credit risk valuation. In the absence of domestic alternatives, inability to access international capital markets breeds ramifications. The sovereign loses an opportunity to provide a benchmark for domestic entities to access the market (Willem, 2014). This and other calamities disincentivise sovereign defaults (Roos, 2019).

Indicators that a country is heading toward debt distress, or is already in distress, are discussed in Karangizi (2019). They comprise: currency devaluation; falling market demand; falling bond prices; shifts in debt sustainability analysis; falling credit rating; default on sovereign contracts; banking crises; rapid accumulation of new debt; and insufficient historical data (Karangizi, 2019:147). These indicators may not all happen concurrently, and their severity may differ from one country to another. Emergence of one or more critical signals indicate debt-servicing sustainability imperative. These signals have implications, directly or indirectly, for the economic fundamentals and the sovereign's macroeconomic management.

Table 2.7: Possible signals of debt distress

Signal	Indicative character
Currency	Devaluation signals loss of market confidence, possible distress leading indicator
Foreign exchange reserves	Falling trade balances (hence foreign reserves) signals economy mismanagement and potential for distress
Debt market access	Falling market demand for sovereign debt indicates that investors will not invest more capital – leading to possible distress
Bond yields	Falling bond prices, and increasing yields signal accelerated shift toward distress, since investors quickly sell those bonds
Debt sustainability analysis	Significant shift in the analysis results (National or IMF/WB) of ability to pay debt is indicative of looming distress
Credit risk rating	Falling credit risk rating indicates expensive future debt raising, servicing and possible distress
Sovereign debt contracts	Defaulting on one or more sovereign debt contracts is indicative of struggling to service obligations – distress situation
Banking system crisis	Collapse of domestic banking system exposes sovereign to banks' recapitalising liability, causing it to dishonour own (sovereign) obligations – distress indication
New sovereign debt	Rapid accumulation of new borrowing in excess of medium-term growth potential is indicative of possible distress
Historical data	Absence of historical data implies prior debt accumulation and/or strategies were uninformed, signaling possible debt distress

Source: Stephen Karangizi, 2019:14

Sovereign debt-crisis traces its source to a number of factors documented in the literature. Inability to issue bonds denominated in own currency, relying on short-term bonds, and excessive, unsustainable borrowing (Fatás et al., 2019; Mustapha & Prizzon, 2018). Other triggers are "unsustainable fiscal policies (e.g. cyclical) or institutional capital market arrangements that conceal the true risks of lending and borrowing" (UNCTAD, 2012). Revenue volatility is capable of throwing the country into debt-crisis if public financial management is

incompetent (Yan, 2013). Generally, causes of sovereign debt-crisis emerge from imprudence of solvency management practices.

Potential severity of debt-crisis aftermath compels debtors to opt for restructuring as financial distress looms. In extreme cases, sovereigns default through running inflation or repudiation (Yared, 2019). The consequences of debt crises have a range of severities because sovereigns cannot access formal bankruptcy processes. Contrarily, corporate or personal debtors' unsupportable liabilities can be adjusted according to pre-established rules (Gulati, 2010). National debt crises are costly, murky and difficult to mitigate (UNCTAD, 2012).

The tendency to keep central bank bailouts secret often blurs the gravity of the crisis (Boone & Johnson, 2019). Debt crises negatively impact output through "high borrowing costs; exclusion from international capital markets; reduction of international trade; lower consumption, investment and productivity; and much greater likelihood of currency and banking crisis" (UNCTAD, 2012). Other calamities include financial institutions' increased stress, decreased domestic firms' funding from international markets; and depletion of export market access (Yared, 2019). Debt-service, long-term and short-term nominal interest rates also affect economic growth (Ewaida, 2017). In the study of general debt impact on economic growth for two different groups of countries for the period 1993–2013, Ewaida (2017) found public debt impacting economic growth negatively.

From the study findings, the negative impact starts from levels between 60 per cent and 90 per cent of GDP on the long-term. The impact is detected for both long- and short-terms when debt-to-GDP ratio is higher than 90 percent. Beyond 90 percent, raising public debt by 10 per cent leads to decreasing economic growth by 1–2 per cent on average (Ewaida, 2017). The negative impact of debt on productivity is also shared by Makhlouf (2014). Prudent debt- management is warranted for preventive and corrective measures, prior to and during crisis events respectively.

Empirical study, yielding contrary results to the above-cited literature and logical economic reasoning, was done by Robbins and Simonsen (2019). In the United States (US) environmental setting, their study explored the relationship between the state debt and interest rate. Outcomes were inconclusive about debt-level influence on the borrowing costs. Instead, they found "little evidence that the states pay an interest-cost penalty as their outstanding debt mounts" (Robbins

& Simonsen, 2019). Citing this work is driven by the exceptional nature of the results, particularly because of the study's environment.

The US is economically advanced, with strong institutions and macroeconomic management. It becomes a safe haven during global financial uncertainties and related volatilities. On the other hand, the current study's environment is the emerging and developing countries of Sub-Saharan Africa. This environment is characterised by challenged economic development policies and under-developed capital markets. Institutional governance and debt-management accountability are at infancy.

In the wake of increased volatility in exchange rates, interest rates and commodity prices, inadequately managed sovereign debt increases the country's exposure. Strengthened debt-management is instrumental in deterring reverses to progress made, achieving sustainable development goals and socio-economic development in general. This must be a clarion call to the SSA countries, the majority of which are currently plagued by over-indebtedness (Mustapha & Prizzon, 2018). Incorporating the principles of responsible borrowing and lending is pivotal in strengthening debt management (Gulati, 2010; Mustapha & Prizzon, 2018). Borrowing more than is socially optimal is considered unsustainable borrowing.

The benevolent social planner's borrowing attitude is that debt should be limited at the point where social marginal cost equals social return for any "additional unit of debt financed government expenditure" (Fatás et al., 2019). This measure should be in the policy maker's toolkit and implementable. Debt-crisis can happen even within boundaries of best policies and institutional arrangements (UNCTAD, 2012). This and other related debt-management caveats prompted UNCTAD to advocate and champion the development of responsible borrowing and lending principles. They form the fundamental architecture of regulations and national bankruptcy laws (UNCTAD, 2012).

Policy actions aimed at reducing and mitigating severity of debt crisis have been drawn. They include adoption of the principles and reform of international financial architecture, and improved early warning systems (UNCTAD, 2012). The assertion in this study is that the cost of borrowing (proxied by interest rate) is instrumental and merits adoption for the sovereign debt management system's efficiency. It warrants further investigation regarding how it relates to

borrowing behaviour. Its explanatory power is compared with other macroeconomic elements suspected to have association with debt levels.

Some SSA countries have histories of default episodes, apart from HIPC- and MDRI-driven debt cancellations. At the time of implementing the debt reprieve initiatives, it was clear that countries affected were not able to service their debts. Debt repayments were unsustainable and constrained crucial poverty reduction fiscal policy programmes. From Table 8, between 1990 and 2013, a total of 16 defaults by six SSA counties occurred, with most happening in 2000. In the same period, Nigeria had the most defaults (5) in the whole period, and South Africa had the most defaults (3) in only a single year:1993 (Mukherjee, 2015:53). Zambia follows Nigeria and South Africa with three defaults within the years 1996 and 2009.

Table 2.8: SSA sovereign defaults for 1990 – 2013

Country	Year (s) of default	Number of defaults
Cote d'Ivoire	2000	1
Nigeria	1992, 2001, 2004	5
Kenya	1994, 2000	2
South Africa	1993	3
Zambia	1996, 2009	3
Zimbabwe	2000, 2006	2

Source: Mudra Mukherjee, 2015:53

In their work of examining the consequences of debt accumulation, Koh, Kose, Nagle, Ohnsorge, and Sugawara (2020) established key findings. One finding is that debt accumulation is common; they recorded over five hundred since 1970. In around half of these episodes, economic consequences were dire, relative to non-crisis episodes. The likelihood of financial crisis was increased by build-up of debt, larger share of external debt, higher debt service cover, and lower reserve cover. Unsustainable fiscal, monetary and financial sector policies and structural and institutional weaknesses were characteristically associated with countries that experienced financial crises.

Decrease in economic output, investment and consumption were associated with crisis episodes. Further, defaulting countries' access to capital markets is lost and they suffer higher borrowing

costs. Vicious cycle of indebtedness developed as they sought other means of raising debt, including bilateral and other private lending arrangements. Typically, debtors only get disillusioned by what seems like debt reprieve, yet the burden does not go away. Loss of national assets is possible with aggressive lenders who have the capacity to confiscate the country's foreign assets.

The crisis can be avoided through renegotiation and debt restructuring, banking on good faith from both sides of the deal. Debt restructuring is expensive due to lengthy litigation and prolonged interest-rate revisions—apart from being unpredictable and disorderly (Gulati, 2010). Restructuring is the government's first reaction as repayments become unsustainable due to shortage of funds. Debt sustainability is measured by the ratio of debt to a country's gross domestic product (GDP)—with higher ratios warranting policy makers' attention. Creditors' reaction to an unsustainably high debt-to-GDP ratio is to seek a higher interest rate, fearing the borrower's increased default potential.

2.10 Qualitative sovereign borrowing determinants and cost of debt

It is acknowledged in this study that sovereign borrowing choice can be determined by quantitative and qualitative factors. Human elements are instrumental in the qualitative determinants. The influence of these factors on decision makers does not have measurable quantitative value. Their characteristic is subjectivity and they are seldom premised on quantitative logic. They are included because their contribution to decision making is undeniable, though the study's focus is on the quantitative factors.

There is an interesting proximity to what is proposed in the works of Dancho (2015) and Mustapha et al. (Prizzon & Greenhill, 2017). Though Dancho's work is municipal-related (Bulgaria, City of Burgas), it shares important insights. Financing alternatives available to the municipality were its own resources; bank loans; bond issues; pooling and revolving schemes. Factors found to influence choice were: costs of funding; level of financial infrastructure; regulative conditions; debt-risk; level of decentralisation; and opportunities for generating revenues (Dancho, 2015). No level of importance has been attached to any and their listing follows no order.

There are other factors discussed in the literature, albeit scantily. They include transaction costs, diplomatic relations with DFI home country or influential shareholder country. Others are positive externalities and other unrelated benefits, e.g. trade relations, domestic and foreign political reasons. Economic and finance related factors also include revenue volatility; debt-service and financing choices; economic fundamentals and lenders' qualifying criteria. Another important factor to note is the lending relations (for example, repeat application, revolving loan, successful repayment).

Borrowing from the same lender repeatedly improves the relationship and cost of borrowing (Bharath, Dahiya, Saunders, & Srinivasan, 2011). In the Malaysian study of 900 listed firms using 1990–2010 panel data, Zulkhibri (2015) made discoveries. Study findings show that "firm-specific characteristics" vitally influence the financing choice (Zulkhibri, 2015). Interest rate is also identified as playing a pivotal role in constraining firms' access to external finance, with premium pricing experienced by financially constrained firms.

Theoretical economic factors attesting to the cost-of-debt captured the attention of this paper. Cost-of-debt is used for setting loan repayment instalment amounts. These amounts are usually fixed and must be paid periodically, irrespective of state of the economy. In other words, the sovereign borrower is compelled to keep paying the same amount to service the loan. And, the amounts must be paid timely. Paying late categorises the country as defaulting.

During good days when the economy is doing well, and the state could tax it accordingly, everyone gets better off. In the direct opposite situations, servicing the debt by the borrower becomes rocky. In moderate circumstances, debt repayments impose cutting domestic consumption (Mankiw, 2012). Decreasing domestic consumption impedes economic growth, breeding other socio-economic ills from unemployment to insufficient service delivery and instability.

Highly indebted states struggle to raise further debt due to less favourable market sentiment and unsustainably high interest rates—set by lenders out of fear that the state will default. Less moderate situations—financial distress—pushes the parties into restructurings. Debt restructuring is costly for both creditors and borrowers. Costs can be extreme in the absence of good faith, especially from borrowers. This may be incentivised by unfair practices and

advantage-taking by lenders. The likely result is failure to cooperate by creditors, with others pushing for sovereignty according to the original agreement.

In the worst-case scenario, the financial distress can negatively affect the repayment so badly that repudiation and/or outright default result. With default comes experience of the market's punitive character. Sovereign credit-worthiness is affected and the borrower's financial character. Future debt-raising in the capital markets becomes increasingly expensive. The same is true with raising funds from other sources, since a debt repayment history may be referred to when lenders evaluate a borrower's debt conduct.

Debt crises have a history of leaving a bad taste, rendering defaulters incapable of avoiding any future defaults, in the eyes of lenders. The borrowing government is compelled to raise debt domestically. Domestic debt is usually through short-term bonds with higher interest rates than international financial markets. This further pushes the country into a very tight corner, making it difficult to recoup. State failure traces its roots to initial imprudent debt structuring.

It is against this background that an interest in investigating sovereign debt contracting emerged. It makes economic sense to assert that low-cost debt can be serviced sustainably. Low-cost debt-servicing affords the borrower resilience in the face of adversity. Hence, it makes sense to suggest that choosing the lowest cost loan is in the public interest. Anything less than this may trigger the perception of moral hazard.

Table 2.9: Summary: determinants of sovereign borrowing

Determinant/factor	Source
Cost of funding	Dancho (2015)
Repeat-borrowing-driven relationship	Bharath et al. (2011)
Firm specific characteristics	Zulkhibri (2015)
Political reasons	Bunte (2013)

Source: author, select literature extracts

2.11 Capital flows: summary

External financing is a component of global capital flows. Capital inflow represents all capital flowing into the domestic economy for the purposes of fixed investments (fixed assets) and financial investments (portfolio assets). Two primary classes of capital flows are official capital flows and private capital flows. The former includes official aid, bilateral and multilateral loans,

and private loans. On the other hand, private capital flows take the form of fixed and portfolio investments (Frederick C v n Fourie, 2008: 101–104; Schiller, 1991:445–447).

While the reasoning may be slightly different for official (public), global capital flow is influenced by owners' desire to get highest possible rates of return on investments—real or financial. So, differentials in the economic fundamentals are responsible for pull and push factors. This the sentiment shared in the discussions by (Gossel & Biekpe, 2017; Kodongo, 2011). Economic fundamentals are complemented by institutions and political (therefore policy) certainty (Fourie, 2008; Gossel, 2017). Factors influencing capital flows are documented and modelled across research and scholarship.

Frederick C v n Fourie (2008:102) identified determinants of capital inflows. His model included relative interest rates and relative rates of return (on financial and real investment respectively), the exchange rate, and economic and political expectations. According to his model, interest rates differentials and relative rates of return have positive effect on the capital inflow while exchange rate moves in the opposite direction. While economic and political uncertainties are not given the definitive impact from his model, Sean Joss Gossel (2017) found the negative impact of the latter. Former's impact is shared in the discussions about economic fundamentals such as in (Holmes & Smyth, 1977; Jeanne, 2012; Jiang et al., 2019; Mustapha, 2017; Salahuddin & Islam, 2008; Shibuya, 1999; Wang, Chung, & Hwang, 2010).

Shibuya (1999)'s model of international capital flows identified six basic factors capable of triggering capital flows reversals. These determinants are expected exchange rate change, expected productivity change, the world interest rate, exchange rate risk, productivity risk, and the risk aversion of international investors. Arbitrage presence in the model has the effect of rendering the interest rate differential impact on the capital flows inconsistent as initially modelled in (Holmes & Smyth, 1977). In their two nations model, excess saving and investment behaviour in the domestic and foreign countries are responsible for all capital flows. They concluded that a "theoretical need for a capital flow function, in order to solve for capital flows, is completely satisfied by the alternative procedure of explicitly stating the arbitrage equation in securities" (Holmes & Smyth, 1977:107).

Democratic capital in the sub-Saharan Africa region was found to be positively correlated to capital flows in (Gossel, 2017). In a study of forty-two SSA countries for 1972-2014 period, for more democratic states, foreign direct investment (FDI) responded positively to recent accumulation of democratic capital. FDI response is the same for durable accumulation of democratic capital in less democratic states, and political repression for more democratic countries. Results, however, were "more susceptible to socio-cultural variation, particularly among the European heritage SSA countries" (Gossel, 2017:1055). Nevertheless, except for five resource rich countries, FDI flow to SSA is among the lowest globally (Gossel, 2017:1054).

Salahuddin and Islam (2008) further confirmed that traditional capital flow determinants such as growth, domestic savings, and trade openness affect investment decisions. Effective utilization of official aid was also found to have positive effect on the investment. On the other hand, the effect of real interest rate on investment decision was not established. Jiang, Chen and Wang (2019) investigated cross-border capital flows in China's eight coastal regions. Their study identified interest rate spread, exchange rate expectation, real estate price change, and change in securities' market value as determinants of cross-border capital flows.

Capital flows across nations today more than before in the face of liberalizations and increased global trade. Theoretically, the flow should be coming from area of high concentration to that of low concentration. This simplified assumption does not easily hold in the real world characterized by myriad factors – economic, political, social, etc. Economic and political factors featured prominently in the documented literature. Number of models depicting the determinants of capital flows have also been developed as discussed above.

Summarily, economic fundamentals and political factors are found to influence capital in and outflows in SSA countries. In the positive economic climate, the impact of sovereign loans can be amplified by complimentary positive effect of other capital inflows. In the regime of wanting economic performance and institutional effectiveness, borrowed funds are likely to have less impact. In the unfortunate case, the proceeds from capitalized investment may not meet debt service requirements. Therefore, borrowing funds should be complemented by positive, enticing, economic fundamentals and strong institutions.

This tends to strengthen investment confidence, particularly foreign investment. Foreign investment is critical because investment is increased without compromising the current expenditure. Increasing volatility of economic fundamentals potentially deters capital inflows, and further perpetrates capital flights. The same can as well be said about political and policy uncertainties. Policy changes and/or uncertainties are known to scare away investors—something developing countries cannot, given the investment gaps in areas of energy, infrastructure, health, housing, and education.

The impact of COVID-19, which gained global pandemic status in the first quarter of 2020 triggering national lockdowns, cannot be ignored. The impact is evidently substantial amid the targeted budgetary expenditure stimulus packages. African Development Bank has revised the growth projections SSA countries downward (Morsy, 2020:1). The consequences can only be expected to be dire for countries already in financial troubles, and debt crisis in particular. Whether and with what conditions existing debt burden will be eased to weather the storm are yet to be established.

2.12 Macro-economic determinants

A number of macro-economic external debt determinants, with close relevance, is found in the works of Abdullahi, Bakar and Hassan (2015); Al-Fawwaz (2016); Awan, Anjum and Rahim (2015); Belguith (2017); Bittencourt (2015); Lau, Lee and Arip (2015); Mensah, Bokpin and Boachie-Yiadom (2018). Table 2.10 shows a summary of approaches used, data and findings.

Table 2.10: Overview of external debt determinants

Author(s)	Method	Data	significant determinants & direction
Abdul Waheed (2017)	Panel Ordinary Least Squares (OLS) regression	Twelve oil & gas exporting and 12 oil and gas importing countries in Asia over period 2004 –2013.	**Exporters:** economic growth (-), reserves (-), income (-), oil price (-), domestic investment (-), current account deficit (+), expenditure (+), inflation (+); and **Importers:** economic growth (-), income (-), savings (-), trade deficit (+), oil price (+), debt repayment (+), foreign direct investment (FDI) (+), domestic investment (+)
Manuel Bittencourt (2015)	Time series dynamic panel data analysis	Nine South American young democracies for period 1970 –2007	Economic growth (-)
Muhammad Mustapha Abdullahi, Nor	Time series Autoregressive Distributed Lag	Nigeria's economic data for period1980–2013	Interest rate (-), national savings (-), exchange rate (-), budget deficit (-)

Author(s)	Method	Data	significant determinants & direction
Aznin Bt. Abu Bakar, and Sallahuddin B. Hassan (2015)	(ADRL) model		
Lord Mensah, Godfred Bokpin and Eric Boachi-Yiadom (2018)	IV-System GMM	36 SSA economies over the period 1996–2013	Institutional quality (+) within the right side of Debt-Laffer curve
Torki M. Al-Fawwaz (2016)	ARDL model	1990–2014 Jordan economic data	Trade openness (+), gross domestic product (GDP) per capita (-)
Evan Lau, Alvina Syn-Yee Lee, and Mohammad Affendy Arip	Time series JJ cointegration test	Malaysian economic data from 1970 to 2013	Real interest rate (RIR) (-), inflation (+), GDP (+), money to total reserves ratio (+)
Rehmat Ullah Awan, Akhtar Anjum, and Shazia Rahim (2015)	Time series ARDL approach	Pakistan annual data for period 1976 –2010	Fiscal deficit (+), nominal exchange rate (+), trade openness (+)
Samia Omrane Belguith and Hanen Omrane (2017)	Vector error correction (VEC) model	1986–2005 data for Tunisia	Budget deficit (+), inflation (-), investment (-), RIR (+), trade openness (+)

Source: Author, select literature extracts

To examine the deterministic nature of the interest rate and other control variables over external debt, panel data of 36 Sub-Saharan countries for the period 2009–2017 is used. External debt, as a dependent variable, is regressed against interest rate and other control variables, listed in the following paragraphs. Panel data has been used extensively for studies of a similar nature. Studies from empirical literature making use of panel data have been examined to inform this study's approach. One study with close relevance is found in Bittencourt (2012).

A study by Pankaj Sinha (2011) was also instrumental in informing the approach adopted in this study. It explored the possibility of sovereign default, using panel data for 31 countries for the past 30 years. Another interesting study by Arif and Hussain (2018) explored budget deficit instability for the period 1984–2016, using panel data for South Asia and ASEAN countries. Other studies examined the relationship between debt and economic growth, using panel data (Ibrahim & Halima, 2015; Ogawa & Sterken, 2016; Ndieupa, 2018; Spilioti, 2015). Factors influencing long-term interest rates were studied using panel data in (Nakamura, 2015; Petrovic, 2013).

This study's close relevance from empirical literature culminates in estimation techniques and regression modelling. Sufficient evidence suggests that panel data analysis suitability is inherent

in the advantages it has over both time-series and cross-sectional data analysis. The study seeks to establish the relationship between external debt and control variables, with focus being on the interest rate. That creditors demand better returns is a widely theorised and researched phenomenon in finance and investment (Abor, 2011; Paudyn, 2014; Rao, 2003; Robbins & Simonsen, 2019; Sercu, 2000). Increased cost of borrowing (to borrower) represents the incentive for lenders to extend more credit.

On the other hand, increased cost of borrowing discourages extended borrowing (Mishkin, 2016). This argument forms the premise of this study's expected negative relationship between external debt and interest rates charged by all creditors. Indeed, managing the cost of borrowing is one of the positive tenets of prudent debt management (Eichengreen et al., 2019; Spilioti, 2015; Zampolli, 2013). Macro-economic variables used as control variables in this study are discussed below. These selected explanatory variables are gross national income (GNI); exports; imports; foreign direct investment (FDI); international reserves; debt-service- to-GNI ratio; interest arrears on long-term debt; short-term-to-external-debt-stocks ratio; and reserves-to-external debt-stocks ratio.

Gross national income (GNI)

The impact of external debt on economic growth has caught the attention of scholars, including the work of Ali and Mustafa (2012). In their study of the impact of external debt on economic growth in Pakistan, over the 1970–2010 period, they found that external debt had a negative impact on economic growth (Ali, 2012). The negative relationship of external debt is found in other works, albeit with benchmark debt-levels in some, such as Senadza and Fiagbe, (2017) and Buthelezi (2018). Reverse causality, and the association of GNI with external debt in particular, is not an absolute impossibility. It is therefore proposed that GNI is associated with external debt.

Exports

A healthy export base facilitates the flow of foreign currency into the domestic economy. Foreign currency also facilitates the repayment of external liabilities, since the majority are denominated in foreign currencies. Exports also increase national income, building healthy balance sheets and improving investor sentiment, despite exposure to market fluctuations, as

widely discussed in Gevorkyan and Kvangraven, (2016) and Kodongo (2011). Foreign currency mitigates the severe effects of currency devaluation, inevitably incentivising external debt funding. It is, therefore, proposed that exports are associated with external debt.

Imports

Imports, in the form of investment inputs and machinery, are instrumental in domestic economic growth. External debt can be used to import machinery and equipment unavailable in the domestic market, thus creating a need for investment. Imports do erode foreign currency reserves, potentially impeding the country's ability to service foreign currency denominated debts. Imports largely play the role opposite that of exports (Chee et al., 2015; Mishkin, 2016). So, it is proposed here that imports are associated with external debt.

Foreign direct investment (FDI)

FDI encourages economic growth (Behname, 2012). Economic growth is also a function of socio-economic factors, including national income (Saini, Madan & Batra, 2011). FDI is also instrumental in mobilizing foreign currency when production is for the export market, as discussed in Addison, Pikkarainen, Rönkkö and Tarp (2017). With a strong FDI base, a country can afford to service foreign-currency-denominated debt. Potential debt-servicing sustainability increases the appetite for external debt. From prior discussions, FDI and external debt individually are associated with economic growth. It is postulated here that FDI is associated with external debt.

Primary income on FDI

Primary income on FDI increases national income and economic growth. With a healthy primary income from FDI, a sovereign can raise liabilities without increasing exposure to the risk of inability to pay interest or capital. Income from FDI is directly proportional to the amount of FDI in the economy. The relationship between FDI and economic growth has been empirically discussed in Behname (2012) and Saini et al. (2011). With healthy growth, a country is enticed into acquiring debt by positive market sentiments (Cantor, 2015). As such, during times of solid primary income from FDI, the country can be tempted to raise external loan funds. So, it is proposed that there is an association between primary FDI income and external debt.

International reserves

The availability of international reserves may afford the country the ability to service external liabilities, without worrying about exposure to volatilities in the international finance markets (Mishkin, 2016). In their open-economy model, supported by empirical panel data from Pen World Trade, Fukuda and Kon (2010) found supporting evidence. They discovered that increasing foreign exchange increases both liquidity and total debt, but shortens overall debt maturity (Fukuda & Kon, 2010). Their additional finding was that increasing foreign exchange could facilitate a decrease in domestic consumption while enhancing investment and economic growth. Against this background, it is postulated that international reserves are associated with external debt.

Debt service to GNI ratio

Healthy debt-to-GNI ratio indicates to investors that the country is not at risk of debt-distress and can service any debt comfortably. A smaller ratio is healthy, since debt-service represents cash outflow, rendering a country attractive to international investors. The literature further documents positive (Spilioti, 2015) and negative (Senadza & Fiagbe, 2017; Buthelezi, 2018) relationships between debt and gross domestic product (GDP). Healthy GDP growth and consequent national income (GNI) entice increasing debt (Mankiw, 2012). So, it is proposed that debt-to-GNI ratio is associated with external debt. Increasing debt-service-to-GNI ratio implies increasing indebtedness, and potential distress.

Interest arrears on long-term debt

Creditors may have concerns as interest arrears on long-term debt perpetually increase. This threat may be premised on the fact that increasing arrears indicate debt-distress. Arrears not only potentially constrain domestic spending in favour of paying off the arrears, but also attract the imposition of austerity as a condition for further credit extension by the lender community (Block-Lieb, 2015). Debt does not have a positive influence on long-term growth (Pato, 2019). Accelerating the decrease in arrears on long-term debt indicates to creditors that the country's economic health is improving. Raising more external loans may not then be extremely constrained. So, it is postulated that interest arrears on long-term debt have an association with external debt.

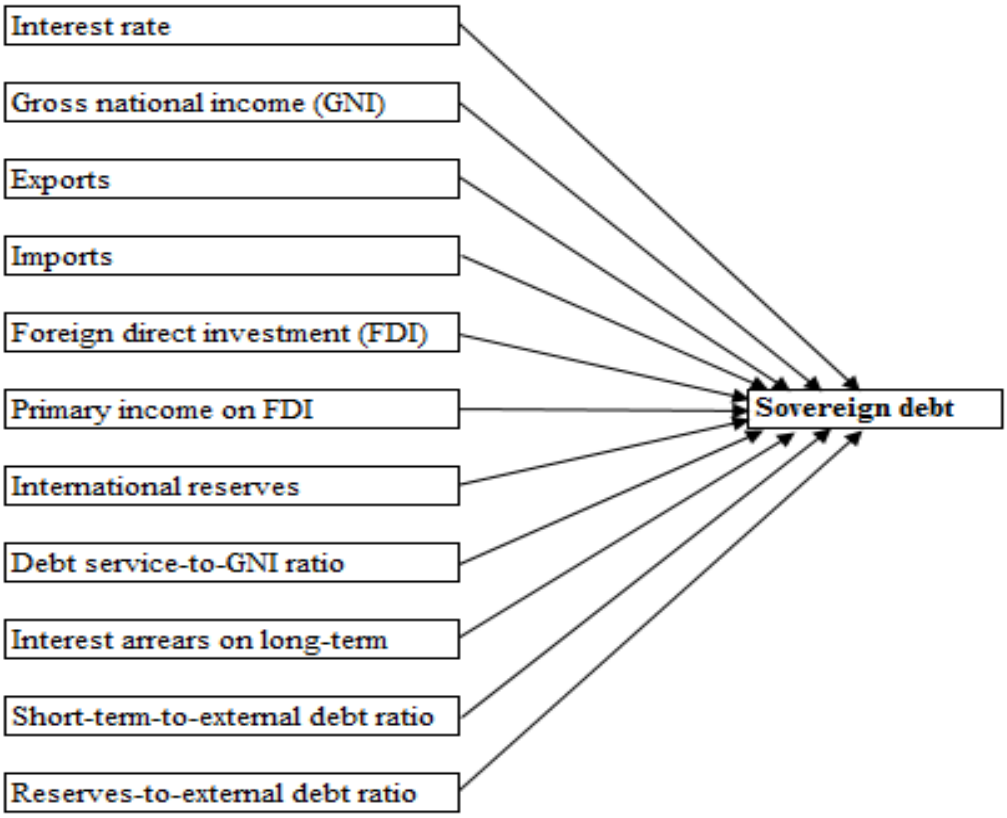
Short-term borrowing to external-debt ratio

Increasing the short-term-to-external-debt ratio implies that the country is increasing short-term debt in its total debt portfolio. Increasing short-term debt has the effect of limiting project financing. Short-term is, therefore, not instrumental for development financing, as discussed in Alagidede (2012) and Ocran (2012). Both the increase and decrease of short-term debt has an impact on the amount of external debt raised (Mustapha & Prizzon, 2018), so, it is proposed that the short-term-to-external-debt-stocks ratio is associated with external debt.

Reserves to external debt-stocks ratio

Increasing reserves-to-external-debt-stocks ratio indicates to international investors that the country's ability to honour foreign currency denominated obligations is not questionable. Foreign reserve muscle can incentivise a sovereign to incur more debt for development projects, encouraging economic growth. Thus, foreign reserves represent foreign assets' buying power (Asteriou et al., 2016). Importing important plant, equipment and machinery for critical developmental projects is indispensable (Mishkin, 2016). It is, therefore, proposed that reserves-to-external-debt-stocks ratio is associated with external debt. The anticipated relationship is as depicted in Figure 2.5.

Figure 2.5: Debt and its determinants in SSA countries



Source: Author: deduced from literature

The expected association between independent variables and external debt is presented in Table 2.11 below.

Table 2.11: Variable description and data sources

Variable name	Proxy	Expected association	Source
Sovereign borrowing	External debt stocks		IDS, 2019
Cost of borrowing	Interest rate	Negative	IDS, 2019
Other explanatory variables	Gross national income	Negative	IDS, 2019
	Exports	Positive	IDS, 2019
	Imports	Negative	IDS, 2019
	Foreign direct investment (FDI)	Positive	IDS, 2019
	Primary income on FDI	Positive	IDS, 2019
	International reserves	Positive	IDS, 2019
	Debt service-to-GNI	Negative	IDS, 2019
	Interest arrears on long-term	Negative	IDS, 2019
	Short term-to-external debt ratio	Negative	IDS, 2019
	Reserves-to-external debt ratio	Positive	IDS, 2019

Source: IDS, 2019

2.13 Conclusion

Traditionally, taxation is the source of funding for government programmes. When taxation falls short of budget, borrowing becomes inevitable. The need for external financing is known to be driven by the desire to maintain or increase government spending without increasing taxes (McConnell, Brue & Flynn, 2012). Governments borrow from domestic and international capital markets and from official creditors. Donors also play an important role in the developing countries' development programmes. Mobilization of domestic resources, including tax expansion, plays a critical role in breaking developing countries' cycles of dependence on donations and foreign loans.

Accessing capital markets is a function of investigating creditworthiness established by independent, market-trusted credit-worthiness rating agencies: Standard and Poor's, Moody Investor Services, and Fitch Ratings occupy 95% of the global market. Credit ratings have two major categories—investment and sub-investment grades. Sovereign credit rating is affected by macro-economic management, strength of local institutions, and governance. Countries with low ratings obtain debt expensively, compared to their better-rated counterparts. Sub-Saharan African (SSA) countries have a commendable accumulation of debt, and their Eurobonds have mostly been oversubscribed, despite their low credit ratings by Standard and Poor's.

Apart from international capital markets, sovereigns can raise long-tenure debt from official creditors—the World Bank (WB) and affiliates, regional development banks and sovereign creditors. Loan disbursement by multilateral creditors is influenced by their mandates; for example, WB loans are instrumental in poverty reduction and development in developing countries. Official creditors offer key advantages to developing countries, including concessions and grants with little or no influence from market sentiment. For this reason, their loans have conditions attached: rule of law; sound macroeconomic management; capacitated domestic institutions; and international political relations. The International Monetary Fund (IMF) intervention loans, during sovereign budget deficit challenges, are accompanied by conditional austerity measures imposed on the borrower. Development finance institutions (DFIs) raise funds from capital markets cheaply because of their favourable credit ratings and use them for extending loans.

High debt levels (measured by debt-to-GDP ratio) expose the borrower to high risk of distress and defaults in the worst case. Therefore, prudent sovereign debt management cannot be left to chance. Beyond HIPC and MDRI initiatives, SSA recipient countries have increasingly become over-indebted, as evidenced by some countries being at low risk of distress and others already in debt distress. Domestic capital markets in the region are under-developed and shallow, making them unfit as alternatives. SSA needs infrastructure development and poverty reduction funding, in the pursuit of Sustainable Development Goals (SDGs).

However, SSA countries incur expensive debt in the international financial markets. Compared with their peers—Latin America and Caribbean (LA&C), South Asia (SA), and East Asia and Pacific (EA&P)—SSA Eurobonds give the highest yields. Debt is increasing relative to national income in SSA and LA&C, but the situation is different in SA and EA&P. Unsustainable debt and increasing debt-distress among a number of SSA countries caught the attention of this study. Getting back to sustainability, SSA countries must complement growth with institutional capacity, sound macro-economic policies, and robust debt-management programmes.

Debt-crisis ferments over time, with cautioning signals to respond to. Indicators of looming or existing debt-distress are: currency devaluation; falling foreign reserves; reduced debt market access; falling bond prices; significant shift in sustainability analysis results; worsening creditworthiness risk rating; defaulting on sovereign debt contracts; banking system crises; new debt accumulation; and insufficient historical data. Inability to issue domestic currency denominated bonds; reliance on short-term bonds; and excessive unsustainable borrowing lead to debt crisis. Defaults take the form of restructuring, running inflation, repudiation and expropriation of project assets. Debt-crisis has a negative impact on a country, on both economic and social fronts, through decreasing productivity and the nation's overall wellbeing.

Qualitative determinants of sovereign borrowing are: regulative conditions; level of decentralisation; lender-borrower relations; political factors; revenue-generating opportunities; and level of financial infrastructure. Quantitative determinants are: cost of funding; debt risk; transaction costs; debt costs; and financing choices. This study's proposed determinants are: gross national income (GNI); exports; imports; foreign direct investment (FDI); primary income on FDI; international reserves; debt service; interest arrears on long-term debt; and short-term

debt. Cost of debt is also suspected to have explanatory power on the amount of debt raised. The study seeks to investigate the relationship between debt as a dependent variable and cost of debt, proxied by interest rate, as an independent variable, as well as other proposed explanatory variables.

Analysis extends to different country groupings to examine any similarities and differences in the determinants of external debt. Categorisation is based on the work of the IMF (2019:17). Countries have been classified into: all SSA countries; SSA countries excluding South Africa (SA); SSA countries excluding Nigeria; SSA excluding Nigeria and SA; SSA excluding debt-distressed countries; SSA excluding countries at high risk of distress; countries with low to moderate risk of distress; Heavily Indebted Poor Countries (HIPC) Initiative post-completion point recipient countries; low-income countries; middle-income countries; oil-exporting countries; other resource-intensive countries; and non-resource-intensive countries. Drawing on the theoretical literature and control variable models above, it is posited that there exists a relationship between debt and the proposed explanatory variables—individually and collectively. Given the theoretical inverse relationship between debt and interest rate (Mishkin, 2016), it is posited that there exists a relationship between the interest rate and external debt.

Therefore, the following sets of hypotheses have been developed, each set comprising both the null and alternative hypotheses.

Hypothesis 1:

H_{0a}: No relationship exists between external debt and cost of debt.

H_{1a}: There is a relationship between external debt and cost of debt.

Hypothesis 2:

H_{0b}: External debt is not related to any one control variable.

H_{1b}: There exists a relationship between external debt and chosen control variables.

Hypothesis 3:

H_{0c}: The same set of explanatory variables has a similar effect on debt across all country groupings.

H_{1c}: Different country groupings are unique.

3. Methodology

3.1 Research approach and strategy

There are two available methods of data collection and analysis, the qualitative and quantitative approaches. The former employs inductive and latter deductive reasoning (Schindler, 2014). This study's approach employs a deductive method to achieve its aims and objectives. The deductive approach involves testing a developed hypothesis or set of hypotheses deduced from theory or literature. Choosing this approach is premised on its suitability for collecting interval data related to quantities of a variable (determinants of sovereign debt in Sub-Saharan Africa), with the end goal of providing the researcher with an opportunity to establish the relationship between dependent (debt) and independent variables (Schindler, 2014).

The qualitative approach on the other hand is prone to researcher subjectivity and would not be suitable for this study because the investigation is done on the existing numbers (Dawson, 2009). There is no need for any interpretation or inductive reasoning. The deductive approach affords the researcher in-depth comprehension of the research context, allowing for structure flexibility. Given greater reliance on researcher interpretation, an inductive approach makes generalisation from large population results difficult (Williams, 2007). A quantitative approach invariably mitigates this caveat.

3.2 Model specification

While the literature documents both qualitative and quantitative determinants of sovereign borrowing, this study's focus is on the latter. Sovereign debt (represented by external debt-stocks) has been described as a function of a set of macro-economic factors. Interest rate is the explanatory variable of interest with regard to the impact it has on borrowing behaviour (proxied by amount of debt). The study does not exhaust all macro-economic factors, though they could have association with sovereign debt. Nevertheless, the study includes major variables with potential impact on the borrowing behaviour, subject to data availability.

Values of a dependent variable (debt) have been collected annually for 2009–2017. The matching independent variables have been collected over the same period for each of the 36 SSA countries. The panel data set is created from the paired variables for all countries in the sample

(36) over the stated period. Independent variables are: interest rate; gross national income (GNI); exports; imports; foreign direct investment (FDI); primary income on FDI; international reserves; debt-service-to-GDP ratio; interest arrears on long-term-debt; short term-to-external-debt ratio; and reserves-to-external-debt ratio. For this purpose debt, external debt, and external debt-stocks have been used synonymously.

The estimated empirical model in this study, for different country categories, is as follows:

$$y_{it} = \alpha + \beta_1 x_{1it} + \beta_2 x_{2it} + \beta_3 x_{3it} + \beta_4 x_{4it} + \beta_5 x_{5it} + \beta_6 x_{6it} + \beta_7 x_{7it} + \beta_8 x_{8it} + \beta_9 x_{9it} + \beta_{10} x_{10it} + \mu_{it}$$

The descriptions of all variables are given in table 3.1. The parameters $\beta_1, \beta_2, \beta_4, \beta_7, \beta_8, \beta_9$ are expected to be negative while $\beta_3, \beta_5, \beta_6, \beta_{10}$ were expected to be positive.

Where GNI is the gross national income, FDI is the foreign direct investment;
'ln' is the natural logarithm;
y = ln(debt), x_1 = interest rate, x_2 = ln(GNI), x_3 = exports-to-imports ratio, x_4 = ln(primary income on FDI), x_5 = reserves-to-imports ratio, x_6 = FDI-to-GNI ratio, x_7 = debt service-to-GNI ratio, x_8 = interest arrears on long-term debt, x_9 = short-term-debt-to-total-debt ratio, and x_{10} = reserves-to-debt ratio. And the variable lag y, it is denoted y_{t-1} or Debt (-1), to mean $\ln(\text{debt})_{t-1}$.
The μ_{it} is the error term, α = intercept and $\beta_{1, \ldots, \beta_{11}}$ = slopes.

3.3 Variable specification

Dependent and independent variables, hypothesised relationships and their sources are presented in this section. Summary is given in table 2.11 concluding the section. Countries are clustered to reflect similarities and differences in their models. The model variables descriptions and sources of data are given in table 3.1. below.

Table 3.1: Variables definition and data sources

Variable	Definition	Source
Debt	External debt stocks	IDS, 2019
Interest rate	Interest rate on external debt	IDS, 2019
GNI	Gross national income	IDS, 2019
Exports/Imports	Exports to imports ratio	IDS, 2019
FDI	Foreign direct investment	IDS, 2019

Variable	Definition	Source
Primary income on FDI	Payments from direct investment income	IDS, 2019
Reserves/imports	Reserves to imports ratio	IDS, 2019
FDI/GNI	FDI to GNI ratio	IDS, 2019
Debt service/GNI	Debt service-to-GNI ratio	IDS, 2019
Interest arrears on long term	Arrears on long-term debt interest	IDS, 2019
Short-term/debt	Short-term to total debt ratio	IDS, 2019
Reserves/debt	International reserves to debt ratio	IDS, 2019

Source: IDS, 2019

Dependent variable

The dependent variable is the debt amount for each country captured annually over the 2009–2017 period. The total of 36 Sub-Saharan African countries was chosen, subject to data availability. The data were collected from the International Debt Statistics publication, compiled by the World Bank. After data preparation, data were analysed based on the different country groupings. The groups are: all SSA countries; SSA countries excluding South Africa (SA); SSA excluding Nigeria; SSA excluding Nigeria and SA; SSA excluding debt-distressed countries; SSA excluding countries at high risk of distress; countries with low to moderate risk of distress; Heavily Indebted Poor Country (HIPC) Initiative post-completion point recipient countries; low-income countries; middle-income countries; oil-exporting countries; other resource-intensive countries; and non-resource-intensive countries. Lag variable Debt (-1) represents $\ln(y)_{t-1}$ throughout the document.

Independent variables

Explanatory variables data source is the International Debt Statistics (IDS), as shown in figure 3.1 below and consist of:

Interest rate – this variable is expected to have negative association with debt. Opposite directions of interest rate and demand for funds are discussed in (Mishkin, 2016).

Gross national income (GNI) – is expected to have negative association with debt. In particular, increasing GNI is expected to disincentivise increased borrowing. Negative relationship between domestic productivity and external debt is discussed in the empirical works of Buthelezi (2018), Fiagbe (2015), and Ali (2012).

Exports – this variable is expected to have positive association with debt; its increase gives the sovereign foreign assets buying power in currency reserves. This potentially enables the country to service foreign currency-denominated debt, thus increasing the borrowing appetite. The theorised relationship between exports and external debt is discussed in Mishkin (2016) and Mankiw (2012).

Imports – this variable is expected to have negative association with external debt. This is the direct opposite of the exports–external debt relationship, as attested to by Chee et al. (2015).

Foreign direct investment – this variable is expected to have positive association with debt because it increases productivity. FDI's impacts on economic growth, national income, and foreign currency reserves are confirmed in numerous studies (Addison et al., 2017; Behname, 2012; Saini et al., 2011).

Primary income on FDI – this variable is expected to have positive association with debt because it increases national income, inevitably increasing the country's obligations-servicing abilities. Positive association between market sentiment and economic growth is discussed in Richard Cantor (2015) and Saini et al. (2011).

International reserves – this variable is expected to have positive association with sovereign debt, as it provides exchange volatility hedging as discussed in Mishkin (2016). The impact on liquidity, total debt and maturity is found in Fukuda & Kon (2010).

Debt-service-to-GNI ratio – is expected to relate negatively with external debt. Increasing debt-service-to-GNI ratio implies looming indebtedness, which impacts on credit risk rating negatively. Lower rating has a negative effect on the sovereign access to debt markets (Ballester & González-Urteaga, 2017).

Interest arrears on long-term debt – should have a negative relationship with external debt. Interest arrears attract creditors' austerity and potentially impair economic growth (Block-Lieb, 2015; Pato, 2019), which associate negatively with productivity. Decreased productivity affects credit rating negatively, inevitably constraining access to debt markets (Mukherjee, 2015).

Short term-to-external debt – this variable is expected to have negative association with sovereign debt. Borrowing depletes fiscal space, rendering one maturity type increase mutually exclusive of another. So, short-term debt negatively impacts external debt as implied in Mustapha and Prizzon (2018).

Reserves-to-external debt – this variable is expected to have a positive association with sovereign debt. Reserves association with economic growth, macro-economic variables, and debt-markets-driven access to foreign currency are widely discussed in Akpan (2016); Kashif and Sridharan (2017); Obstfeld, Shambaugh and Taylor (2010).

A predictor variable of interest is the interest rate. This and other independent variables first serve the purpose of control variables. Their second purpose is explaining the behaviour of dependent variables similar to interest-rate. A number of regressions are run, introducing independent variables incrementally, to observe the change in the variable of interest— interest-rate. Preliminary results include all models to show any changes (or absence of change) in the interest-rate. The final model includes all variables that optimised the model fit after running the tests.

The Hausman test is carried out prior to preliminary results to determine a suitable approach between dynamic and fixed effects panel data analysis. Robustness checks on independent variables are run after the preliminary results, to determine their statistical significance. Both the correlation and variance inflation factor tests are run to check for multicollinearity. After controlling for existence for multicollinearity, the final model is presented. The final presented model consists of variables that are statistically significant, and less correlated since collinearity can only be minimised instead of complete correction (Schindler, 2014).

3.4 Sampling and data collection

Out of all Sub-Saharan African (SSA) countries, 36 were sampled subject to data availability for the period 2009–2017. Data about sovereign borrowing were collected from the World Bank's International Debt Statistics (IDS, 2019) publication. In the publication external debt and external debt-stocks have been used synonymously. Data about interest rates were also collected from IDS (2019), as well as data for other explanatory variables, namely: gross national income (GNI); exports; imports; foreign direct investment (FDI); primary income on FDI; international reserves; debt service; short-term; and interest arrears. Debt service-to-GNI, short term-to-external debt, and reserves-to-external debt have been computed for analysis.

IDS compilation covers external debt and financial flows of about 121 low- and middle-income countries. The information is extracted from the World Bank's Debtor Reporting System (DRS),

which commenced operations in 1951. The World Debt Tables publication was launched in 1973, and it includes DRS external data. The data comprises: borrower composition; private and non-guaranteed debt; creditor composition; private creditors; and loan terms and conditions (IBRD, 2019:3). IDS online tables are accessible from http://datatopics.worldbank.org/debt/ids, with a leading menu including Country, Region and Topic options (IBRD, 2019:x).

Specific country tables are accessed directly through http://datatopics.worldbank.org/debt/ids/ and the country code (e.g. http://datatopics.worldbank.org/debt/ids/DZA for Algeria). Regional tables are directly accessible by clicking on the Region tab and, from the dropdown menu selecting the region from the list. For example, to view South Asia, the direct link is http://datatopics.worldbank.org/debt/ids/region/SAS. Databank, an online web resource, is accessible from http://databank.worldbank.org. The link "provides simple and quick access to collections of time series data" (IBRD, 2019:xiii).

Data about all countries that contracted loans from any of the World Bank Group affiliates are documented. So is the case with other debts classified as 'external debts', because they are "owed to non-resident creditors and are repayable in both foreign and domestic currency", (IBRD, 2019:67). Data contained in the IDS publications are "the reports to the World Bank through the World Bank's Debtor Reporting System (DRS) from member countries that have received either International Bank for Reconstruction and Development (IBRD) loans or International Development Association (IDA)" (IBRD, 2019:64).

3.5 Data analysis

The main study objective was the determination of macro-economic external debt determinants—so debt is the dependent variable, and other variables are independent. To establish the relationship between dependent and independent variables, regression was carried out, using Stata 15 software. Due to substantial differences in number sizes between variables, some variables were transformed by conversion into logarithms and others into ratios. Final variables set in their logarithm form were: external debt-stocks, gross national income (GNI), and primary income on foreign direct investment (FDI). Variables in their ratio form were: interest-rate; exports-to-imports ratio; reserves-to-imports ratio; FDI-to-GNI ratio; debt service-to-GNI ratio; short term-to-total debt ratio; and reserves-to-debt ratio.

The Hausman test was carried out to determine a suitable approach between random and fixed effects. Robustness tests to establish statistical significance of variables were also carried out prior to regressions runs. Data was further tested for variable stationarity using unit root tests. Unit root tests were carried out using the Levin, Lin and Chu (2002) specification. Correlation tests were also carried out to establish preliminary relationships and their direction. Full regressions were run for all countries and for different country clusters.

3.6 Research criteria and limitations

This is a formal study, exploiting secondary data to establish potential relationships between variables. It is cross-sectional in nature, limited within the given duration and budget—two constraints that favoured the choice over longitudinal method. It seeks to shed light in another direction using the existing data. Data is not to be used for reasons similar to those for which it was collected and processed. An aspect of borrowing behaviour is examined along the lines of how it can be explained by the cost of debt and explanatory variables.

The explanatory variables are: interest rate; gross national income (GNI); exports; imports; foreign direct investment (FDI); primary income on FDI; international reserves; debt service to GNI ratio; interest arrears on long-term loan; short-term-to-external debt-stocks ratio; and reserves to external debt-stocks ratio. Secondary data was collected from existing World Bank data bank and International Debt Statistics (IDS) compilations. Data about individual countries was collected for the study's intended purpose, prepared and stored awaiting analysis. The data is accessed from database of international institution – the World Bank, which make it accessible to the public.

The researcher was handling data extracted from publications for use to establish other patterns. Two types of datasets were regressed to establish existence of relationships: debt as a dependent variable and a set of explanatory variables. Association of interest was between external-debt and interest-rate. It is that relationship (or none) which helps to answer the research question.

Regression analysis establishes the explanatory character of changes in the interest rate to changes in the external debt. Other independent variables are included to examine their explanatory nature of external debt. The study is causal, trying to examine the existence of a relationship between dependent and independent variables. As part of model validity checks,

explanatory power of independent variables is examined to establish the strength of a relationship. The study also employs an ex-post-facto design; the researcher was unable to manipulate predictor variables as is the case with experimental designs (Schindler, 2014).

The study has been carried out within a specified time and financial resources framework. Panel data has been collected from existing records once, prepared and analysed. The nature of the study demanded that execution be done within the academic ambits. The aim of the exercise was to test the research aspect of training on the part of the researcher. The researcher is a student executing research as partial requirement for completion of the degree programme.

This is a statistical study, since several sample subjects were investigated to help draw inferences. Scientific (experimental) methods have been applied according to the academic requirement to render the outcomes reliable for consumption. Hypotheses have been tested quantitatively, and generalisations are based on the sample of selected countries. Sampling is based on the availability of data for individual countries. Data used covers the period 2009–2017, examining the relationship between loan amounts contracted and interest-rates on debt from all creditors averaged.

Other variables serve the dual purpose of control and explanation. The study is confined to the Sub-Saharan African countries, using data compiled by the World Bank Group Debtor Reporting System (DRS). All activities were desktop based, from data collection to data preparation and analysis. No human elements or potentially sensitive items have been used for data collection, rendering participants' perceptions and biases irrelevant.

4. Results and findings

4.1 Contextual background of SSA and debt management

Debt markets in the SSA region are mostly under-developed, and not sophisticated enough to support sustainable development funding. Countries find it difficult to raise enough financing for development in their domestic markets, which are dominated by commercial banks. However, the SSA unavoidable developments financing gap (for infrastructure, housing, education, health, poverty-reduction programmes) compels countries to seek loan funds beyond national borders.

Available options for finance have to date been official loans and capital market debt, with the latter getting more traction recently owing to historical limited access of SSA countries to capital markets. Official loan portfolios are, however, increasing in size and complexity, due to the emergence of non-Paris Club lenders, such as China and India. SSA countries differ in economic character, and in their respective debt situations.

During the 1980s and 1990s some countries in the region were in situations of unsustainable debt, almost driving them to a 1970s type of debt crisis. That led to the emergence of two main debt relief initiatives: the Heavily Indebted Poor Countries (HIPC) Initiative that started in 1996, and the Multilateral Debt Relief Initiative (MDRI) that took off in 2005. Some countries currently in difficult debt situations (distress or crisis) have benefitted from these initiatives. Differences in debt situations and economic characteristics have led to the classification of countries (in this study) in order to examine fundamental differences in the analysis results. The country groups are all SSA countries: SSA countries excluding South Africa (SA); SSA excluding Nigeria; SSA excluding Nigeria and SA; SSA excluding debt-distressed countries; SSA excluding countries at high risk of distress; countries with low to moderate risk of distress; HIPC post-completion recipient countries; low-income countries; middle-income countries; oil-exporting countries; other resource-intensive countries; and non-resource-intensive countries.

This section presents data analysis results, together with tests to establish the most fitting model. External debt (dependent variable) is regressed with interest rate and other control predictor variables. The interest rate is the reported interest rate in International Debt Statistics, labelled "All creditors interest (%)"[iii]. The study seeks to establish the extent to which changes in sovereign borrowing (external debt) can be explained by changes in the cost of borrowing (interest-rate) and other independent variables also used as control variables.

4.2 Data summary and description

Table 4.1: Key to variables used

Variable	Meaning
Y	Debt (total external debt stocks)
x1	Interest rate - all creditors (%)
x2	GNI
x3	Exports
x4	Imports
x5	Primary income on FDI
x6	International reserves

Variable	Meaning
x7	FDI
x8	debt_service_to_gni (%)
x9	Interest arrears on long-term
x10	Short-term to external debt stocks (%)
x11	Reserves to external debt stocks (%)

All values except interest (x1) are in millions of United States dollars (US$).

Table 4.2: SSA countries' external debt data

Country	Year	Y	x1	x2	x3	x4	x5	x6	x7	x8	x9	x10	x11
	2009	17014.3	5	68669.2	41582.5	48783.8	6130.1	13664.1	2743.2	5.18	84.5	15.2	80.3
	2010	16949.1	3.9	74439.3	51585.8	43642.1	7525.7	19678.7	3325.6	3.10	67.6	1.1	116.1
	2011	19298.3	7.8	94418.5	68252.4	53805.5	9039.9	27039.8	4070.2	3.02	61.7	0.9	140.1
	2012	21106.5	4.2	103501.4	72133.1	56529.8	9722.1	31161.8	-7364.7	4.08	58.3	0.8	147.6
	2013	25003.9	3.7	115012.4	70380.5	60111.4	9330.7	31500.8	-6713.2	4.29	69.8	0.7	126
	2014	28902.8	4.1	117880.3	61496.8	63033.4	7850	27032.3	2530.4	5.46	57.8	0.6	93.5
	2015	27991	0.7	96713.7	34603.6	44042.7	4292	23790.5	9453.3	5.59	50.7	0.6	85
	2016	35364.6	0.7	90077.7	28640.6	31271.5	3027.8	23672.2	-121.6	7.97	49.5	0.4	66.9
Angola	2017	37201.2	5.4	117793.3	35837.5	36001.6	4883.3	17286.9	-7293.2	4.06	24.1	0.3	46.5
Benin	2009	1309.3	1.4	7064.2	1488.6	2309.7	31.5	1229.8	-32.1	0.75	32	16.3	93.9
	2010	1582	1.1	6916.8	1707.4	2392.8	54.8	1200.1	-25.7	0.81	25.4	21.5	75.9
	2011	1851.3	1.3	7798.6	1765.5	2423.3	65.6	887.4	149	0.91	27.8	26.8	47.9
	2012	2042	1	8085.8	1968.8	2746.2	91.4	712.8	197.6	1.05	47	26.5	34.9
	2013	2003.8	2	9088.4	2650.5	3578	128.3	694.9	178.2	0.91	54.2	9.4	34.7
	2014	2037	2.7	9646.3	3197.4	4375.8	143.6	726	176.3	0.82	24.8	2.8	35.6
	2015	2183	2.3	8264.1	2129.6	3017.2	64.4	731.6	96.6	0.93	48.6	3.7	33.5
	2016	2316	1.7	8576.4	2238.7	3256.8	7.2		31.1	1.09	43	2.7	
	2017	2897.1	1.6	9260.6	2529.8	3665.8	0		184.4	1.14	43.8	2.4	
Botswana	2009	1643.3	0.8	10029.1	4474.8	5975.6	471.5	8704	212.6	0.47	0	9.6	529.7
	2010	1806.9	1	12237.1	5601.1	7330.2	730.9	7885.2	222.1	0.65	0	19.9	436.4
	2011	2395.2	0.6	15570.6	7602.9	8554.2	285.3	8081.9	1412.6	0.51	0	17	337.4
	2012	2517.1	4	14729.8	7576.7	10018.4	129.1	7628	748	0.4	0	16.5	303.1
	2013	2379.3	0	14540.2	9056.6	9648.3	536.3	7726.1	639.7	1.33	0	16.7	324.7
	2014	2545.6	0.3	15905.2	9743.3	9331.3	512	8322.8	415.7	0.41	0	18.6	327
	2015	2221.5	0	14191.3	7456.9	8316.5	376.6	7546.1	210.8	1.74	0	17.1	339.7
	2016	2099.5	0	15394.8	8416.6	7445.9	727.1	7188.8	52.3	1.08	0	17.6	342.4
	2017	1740.1	2	17040.5	7145.4	6673.3	712.3	7490.5	130.7	1.04	0	7.4	430.5
Burkina Faso	2009	1916.7	0.9	8342.7	1140.4	2034.7	34.7	1295.8	9.1	0.52	0	0	67.6
	2010	2148.4	1.3	8744.7	1980.8	2654.9	26.4	1068.2	-32.4	0.56	0	0	49.7
	2011	2290.3	1.6	10328.9	2913.2	3618.1	59.8	957	132.3	0.65	0	0	41.8
	2012	2519.2	1.2	10946.5	3393.2	4055.6	82.2	1024.5	118.1	0.65	0	0	40.7
	2013	2564.6	2.1	11695.9	3280.5	5064.7	178.1	628.5	266.4	0.67	0	0	24.5
	2014	2542.9	2.1	11883	3366.5	4841.6	384.5	297.1	241	0.78	0	0	11.7
	2015	2622	1.1	9978.2	2912.1	4265.8	377.8	259.6	107.6	1.12	0	0	9.9
	2016	2818.1	0.7	11150.5	3445.7	4631.9	415.7		165.4	1.09	0	0	
	2017	3119.3	1.1	12471.2	3626.2	4602.2	0		485.9	1.08	0	0	
Burundi	2009	607.2	0.4	1722.8	119.7	538	0	322	0.3	1.16	0	1.2	53
	2010	620.9	0	2014.8	181.9	618.7	0	330.7	0.8	0.22	0.7	2.5	53.3
	2011	604.4	0.2	2338.2	243.1	790.3	0	294	3.4	0.44	0.4	0.1	48.6
	2012	667.3	0	2463.3	235.6	943.3	8.5	307.2	0.6	0.85	0.3	1.1	46
	2013	683.6	0	2716.3	235	925.9	4.8	328.2	116.7	1.19	0.3	4.6	48
	2014	690.2	0	3086.9	218.2	945.2	12.9	316	81.7	0.98	0.3	7	45.8
	2015	626	0	3065	193.5	849.6	5.8	135.1	49.6	0.88	0.3	0	21.6
	2016	602.8	0	3006.2	208.5	753.7	3.1	94.1	0.1	1.11	0.3	0	15.6
	2017	613.4	0.8	3473.6	249.8	873.1	2.9	96.1	0.3	1.04	0.3	0	15.7

Country	Year	Y	x1	x2	x3	x4	x5	x6	x7	x8	x9	x10	x11
Cabo Verde	2009	726.7	1.4	1668.5	585.1	1139.1	26.1	397.9	122.8	2.01	1.5	0.2	54.8
	2010	892.4	1.5	1591.1	643.5	1206.5	55.7	382.2	95.3	2.25	1.5	0.2	42.8
	2011	1038.6	0.9	1791.7	796.6	1460.2	41.6	338.6	91	2.20	1.5	0.1	32.6
	2012	1244.9	0.8	1676.8	783.8	1285.3	32.1	375.8	163	2.15	1.5	0.1	30.2
	2013	1488	0.9	1786.3	855.1	1237.2	16.5	475.3	121	2.22	1.5	0.1	31.9
	2014	1543.5	0.4	1765.6	907.9	1341.4	35.5	510.9	173.1	2.49	1.5	0.1	33.1
	2015	1542.5	1.2	1537	672.4	977.2	15.5	494.5	99.9	2.75	1.5	0.1	32.1
	2016	1542.6	0.8	1576.2	754.2	1079.4	28.4	572.7	124.5	2.80	1.5	0.1	37.1
	2017	1761.7	0.7	1687.5	861.5	1280.1	28.7	617.4	118.3	3.00	1.5	0.1	35
Cameroon	2009	3237.3	1.3	25904.2	5444.6	6841.8	435.8	3675.5	813.9	1.55	2.5	0.1	113.5
	2010	3190.7	0.9	25879.8	5700.8	6703.1	165.5	3642.6	525.4	0.78	8.7	0.3	114.2
	2011	3094.9	1.6	29033.8	7674.1	8680	281.9	3198.7	137.9	1.14	0	2.2	103.4
	2012	3888.3	2	28659	7591	8810.3	503.4	3380.7	277.4	0.83	24.2	4	86.9
	2013	5172.2	1.8	31728.8	8193.3	9625.6	647.8	3472	143.4	0.86	60.5	8.6	67.1
	2014	5757.8	1	34653.5	8753	10512	660	3168.2	154.3	1.53	0.9	3.1	55
	2015	7252.2	4.6	30479.5	6915.2	8405.3	411.4	3536.3	64.8	1.67	0.3	3.7	48.8
	2016	8186.2	1	31581.7	6449.3	7833.8	421.5	2225.7	48.4	2.94	0	3.4	27.2
	2017	10396.5	1.8	34298.7	6739	8112.3	494.1	3196.8	219.3	2.1	3.2	5.1	30.7
Comoros	2009	286.8	0	522.9	80.9	258	1.7	150.3	13.8	2.28	4.7	1.7	52.4
	2010	278.4	0	529.6	90.7	275.4	1.8	145.3	8.3	0.81	4.4	1.6	52.2
	2011	275.7	0	585.5	103.4	311.6	2.4	155.2	23.1	0.67	4.7	1.7	56.3
	2012	252.3	0	569.2	93.3	327.1	2.2	194.1	4.9	2.16	4.1	1.6	76.9
	2013	147.5	0	618.9	109.2	354	0	173.4	4.2	0.1	1.6	1.1	117.5
	2014	141.8	0	649.2	120.8	308.7	0	170.5	4.7	0.12	1.6	1.1	120.3
	2015	130.6	1	569.5	103.1	268.3	0	199.9	5.1	1.32	1.5	1.1	153.1
	2016	159.4	0	622	115.7	270	0	158.7	8	0.82	1.5	1	99.6
	2017	165.6	0.8	654.9	132.9	305	0	207.1	8.6	0.38	0.9	0.5	125.1
DRC	2009	13102.3	1	17862.6	5046.9	7571.1	0	1035.4	-243.2	3.5	489	4.7	7.9
	2010	6145.4	1.1	20654.9	8914.8	11931	131.3	1299.7	2736	1.33	267.1	7.1	21.1
	2011	5507.6	1.2	24543.3	10379.5	13071	584.3	1267.5	1686.9	1.04	73	4.1	23
	2012	5624	0.1	27710	9049.3	12074.6	312.9	1632.6	3312.1	1.01	70.6	4.7	29
	2013	6177.1	0	29861.3	12053.9	16428.4	491.5	1678.5	2098.2	1.34	70.9	7.2	27.2
	2014	5522.9	0.9	32877	12745.4	16501	124.8	1557	1843.2	1.25	70.9	3.4	28.2
	2015	5388.2	1.3	35126.8	10600.7	13989.3	411.2	1215.9	1773.2	1.11	70.9	3.4	22.6
	2016	5077.9	0.8	34247.3	10124.5	12781.8	340.7	708.2	1095.3	1.42	105.4	4.6	13.9
	2017	5127.7	0.5	36499.7	13400.6	16071.9	574.1	695.4	1345.9	1.09	7.3	2.6	13.6
Cote D'Ivoire	2009	14896.2	3.4	23342.8	12561.6	10845.3	572.1	3266.8	399.7	4.85	98.4	3.2	21.9
	2010	11703.8	1.1	23972.2	12810.6	11906.7	561.8	3624.4	371	3.13	6.9	3.5	31
	2011	12791.4	7.1	24393.3	13859.4	10663.5	612.1	4316	322.4	3.00	4.5	3.7	33.7
	2012	9543.6	2.1	26178.1	13315.9	13115.8	578.4	3928.1	154.7	2.75	0.8	7.7	41.2
	2013	9852	2	29861.8	13191.6	13174.9	651.3	4242.7	133.6	3.53	0	0	43.1
	2014	9790.2	1.7	34463	14106.5	13302.3	679.4	4478.5	271.3	2.93	0	0	45.7
	2015	11373.8	3.6	32137.8	12722.1	12579	685.6	4715.7	377.8	2.52	0	0	41.5
	2016	11534.5	1.1	35328.6	12070.4	12069.4	755.7		530.8	4.43	0	3.2	
	2017	13432.9	4.2	39039.6	12715.9	12802.1	0		674.7	5.73	0	0	
Eswatini	2009	524.2	2.5	3504.9	2066.2	2672.4	352.5	958.9	53.1	1.57	6.5	3.9	182.9
	2010	699.5	0.9	4212.6	2275.3	3063.4	401.6	756.3	49.3	1.29	13.7	29.8	108.1
	2011	606.8	1	4789.4	1783.7	2118.5	66	600.5	38.7	1.05	13.8	26.8	99
	2012	464.4	2	4799.7	1917.9	2087.7	52.3	741	18.7	0.95	11.1	8.6	159.5
	2013	432	0	4603.8	2072.2	2052.9	71.8	762.5	46.8	0.84	11.3	9.9	176.5
	2014	396.7	0.3	4387.8	2140.5	2114.3	73.1	690.8	55.1	0.82	11	8.5	174.1
	2015	375.5	1.4	4060	1999.2	1892.9	58.4	548	34.2	0.85	9.5	6	145.9
	2016	487.2	0.9	3710.2	1826.3	1745.4	20.6	564.3	2.3	1.11	11.2	13	115.8
	2017	651	2.8	4422.5	2099.3	2146.5	83.1	563.1	43.3	1.05	5.7	28.4	86.5
Ethiopia	2009	5360.2	1.9	32395.7	3436.4	9086.1	17.7	1780.9	221.5	0.30	32	4.3	33.2
	2010	7286.2	1.9	29825.6	4652.4	9982.5	35.1	2241.2	288.3	0.59	30.1	4.1	30.8

Country	Year	Y	x1	x2	x3	x4	x5	x6	x7	x8	x9	x10	x11
	2011	8606.4	1.6	31883.3	5823.6	11736.3	22.5	2837.3	626.5	1.08	30	2.1	33
	2012	10463.9	0.9	43214.5	6002.6	14235.4	5.9	2301.7	278.6	0.98	26.1	0.3	22
	2013	12584.3	2.7	47541.4	6124	14355.1	6.2	2363.5	1343.9	1.38	27.8	1.6	18.8
	2014	16945	3	55459.4	6396.1	18345.7	27.2	3525.2	1855.1	1.37	27.8	1.7	20.8
	2015	21021.1	0.6	64202.6	6018.5	20109.2	12	3826.8	2626.5	1.62	27.7	2.6	18.2
	2016	23793.7	1.2	72758.4	5919.7	20332.6	20.2	3021.8	3989	1.69	27.7	3.9	12.7
	2017	26562.1	2.2	80063.8	6679.8	19649.5	36.7	3035.2	3586.4	1.73	27.7	2	11.4
Gambia, The	2009	528.5	0.6	872.6	285.2	362.1	6.8	224.2	39.4	2.23	2.3	8.2	42.4
	2010	550.5	1.6	921.9	280.1	340.3	6.7	201.6	37.1	2.61	2.7	8.1	36.6
	2011	513.2	1.5	866.4	257.8	418.4	6.6	223.2	36.1	3.10	1.4	0.3	43.5
	2012	548.8	1.1	880.8	279.5	442	6.1	236.2	41.2	2.99	1.6	4.1	43
	2013	558.3	1	876.5	265.9	398.3	7.6	210.6	68.3	3.33	1.8	2.1	37.7
	2014	530.6	1.6	809.7	271.1	479	4.1	159.3	33.7	5.88	3.6	2.6	30
	2015	535	1.4	878.8	266.1	489.2	5.8	111	7.9	4.36	2.9	2.2	20.8
	2016	516	0.9	935	245.5	504	5.6	87.6	7.9	4.03	1.3	3.6	17
	2017	650.1	0.7	986.6	262.6	576.1	5.3	170	12.3	4.49	1.3	1.8	26.1
Ghana	2009	7385	1.5	25883.8	7734.6	11709.8	495.3	3386.2	1939.5	1.12	50	20.9	45.9
	2010	9110.1	1.7	31641	9490.3	14560.1	395.6	4763.2	2527.4	1.21	27.7	23	52.3
	2011	11220.5	1.7	38336.2	14650.9	20789.6	1062	5483.4	3247.6	0.92	104	24.6	48.9
	2012	12833.2	1.8	39809.8	16867.3	24184.3	1960.5	5367.5	3294.5	1.35	143.5	21.1	41.8
	2013	16637.9	6.2	46453.7	16490.5	24134	1219.4	5249.3	3227	2.12	230.8	21.9	31.6
	2014	18369.5	6.3	37348.3	15372.2	21075.3	1341	5224.8	3363.4	2.25	171	16.8	28.4
	2015	20633.3	6.8	36686.5	16857.8	22279.2	792.4	5444.8	3192.3	2.89	163.4	16	26.4
	2016	21371.5	4.9	41755.4	17707.8	21996.5	458.6	5544.7	3485.3	4.52	154.6	13.1	25.9
	2017	22022.4	2.7	45763.6	20746.2	25173	1919	6650.9	3255	4.71	279.2	13.6	30.2
Guinea-Bissau	2009	1150	0	816.6	163.4	309	5.6	168.6	18.9	1.25	147.5	13.4	14.7
	2010	1109	0	847	183.8	314.7	5.7	156.4	26.2	2.07	105.1	9.6	14.1
	2011	283.7	0	1105.8	297.9	373.7	31.8	220	25	0.46	33.1	11.7	77.6
	2012	279.5	0	995.3	156.3	290.5	31.2	164.6	6.6	0.69	33.1	12.2	58.9
	2013	277.4	0	1025.8	201.2	288.3	8.2	186.3	19.6	0.15	33.1	11.9	67.1
	2014	271.4	0.8	1090.8	275.8	356.2	3.1	287	28.9	0.3	32.9	12.1	105.7
	2015	314.9	0.7	1073.4	342.3	366	1.2	332.1	18.6	0.33	32.6	16.9	105.5
	2016	295	4.3	1207.9	312.3	368.8	2.7		14.2	0.56	32.6	11	
	2017	328.4	0.7	1349.7	373.8	541.5	0		16.6	0.66	32.7	10.3	
Kenya	2009	8549.3	1.3	36976.9	7567	11514	60.3	3849	31.6	1.05	72.6	11.2	45
	2010	8847.6	1	39852.5	9127.3	13823.2	60.4	4320.2	89.4	1.01	80.4	11.8	48.8
	2011	10162.7	1.4	41961.9	10241.8	16732.2	224.5	4264.4	1066	1.04	99.6	12.7	42
	2012	11893.7	1.6	50187.3	11551.9	18577.7	417.9	5711	1170.3	1.12	92.7	13.3	48
	2013	13836	1.3	54496.8	11311.6	19229.7	540.8	6598.2	675.4	1.03	111.2	17.5	47.7
	2014	16969.4	4.5	60579.8	11739.5	21643.3	715.4	7910.5	237.3	2.07	83.6	11.8	46.6
	2015	19764	3.1	63323.2	11112.4	18854.2	596.9	7547.8	89.6	1.44	89.3	13.2	38.2
	2016	22326	2.5	70191.4	10335.5	17262.7	553.3	7599.9	146.1	1.62	119	10	34
	2017	26423.6	3.5	74117.9	10838.3	20304.6	447.9	7352.7	197.9	2.16	183.6	8.5	27.8
Lesotho	2009	766.5	1	2418.1	1473.7	2138.5	116.6	1179.8	85.6	1.58	0	0.4	153.9
	2010	788.1	5.6	3023.1	1667.7	2499.5	76.6	1071	46.6	1.15	0	0	135.9
	2011	813.6	1.6	3297.6	1947.8	2839.4	187.2	919.1	-60.2	1.23	0	0.5	113
	2012	877.1	2	3093.5	1632	2888.2	173.4	1027.9	-55.7	1.29	0	0	117.2
	2013	902.1	0.9	2877.5	1420.1	2423.9	154.3	1055.2	-49.6	1.45	0	0	117
	2014	890.5	1.4	2893.2	1378.1	2306.8	142.4	1070.8	2.2	1.47	0.2	0	120.3
	2015	888.4	0.8	2785.3	1429.1	2187.9	125.7	997.4	-40.4	1.89	0.1	0	112.3
	2016	883.2	1.8	2591.1	1364.4	2040	108.7	925.2	-35	2.21	0.1	0	104.8
	2017	935.6	1.6	2957.4	1540.7	2301.1	119.7	657.7	-34	1.89	0.1	0	70.3
Liberia	2009	1850.3	0	1010.5	472.2	1850	5.8	372.5	2.9	2.71	91.6	5	20.1
	2010	418.9	0.8	1113.3	359.2	2008.3	1083.6	465.9	1768.7	0.55	0.4	0.1	111.2
	2011	448.4	0.8	1420.6	429.9	2636.2	1157.3	512.8	1787.7	0.23	12.2	2.7	114.4
	2012	487.2	0.9	1473.5	392.8	2781	833.4	497.2	1988.4	0.31	12	2.5	102.1

Country	Year	Y	x1	x2	x3	x4	x5	x6	x7	x8	x9	x10	x11
	2013	530.5	1.2	1645	685.8	2423.9	528.5	493.1	1527.8	0.39	11.4	2.1	93
	2014	680.5	0.8	1680	729.1	2411.3	-145.4	499	409.1	1.04	0	0	73.3
	2015	836.8	0.8	1754	521.3	1772.7	-125.4	522.6	53.1	2.59	0	0	62.4
	2016	951.6	1.3	1820	396.9	1623.5	141.7	529.7	141.7	0.67	0	0	55.7
	2017	1137.3	0.7	1855.1	449.8	1487.5	188.4	475.3	188.4	0.85	0	0	41.8
Madagascar	2009	2846.9	1	8458.9	1949	4058.4	107.6	982.1	72.4	0.59	188.7	22.8	34.5
	2010	2756	0	8636.9	2169.8	3627.4	148.7	1023	65.4	0.72	188.1	15.4	37.1
	2011	2867.4	0.8	9737.4	2742.8	4101.8	185.2	1134.6	43.4	0.52	188.1	15	39.6
	2012	2993.5	0.6	9605.5	2860.6	4333.6	309.2	1052.8	60.4	0.75	197.3	15.6	35.2
	2013	2939.3	0.8	10266	3217.5	4533.8	307.9	776.1	36.7	0.72	52	11.7	26.4
	2014	2962.3	0.7	10374.5	3531.6	4377.3	269.2	773.8	38.1	0.96	42.8	9.6	26.1
	2015	3006.7	0.4	9368.2	3134.9	3946.3	346.9	832	20	1.5	35.3	6.8	27.7
	2016	2975.7	0.9	9593.7	3362.7	4032.8	401.5	1183.7	31.5	1.28	9.7	6.9	39.8
	2017	3376.3	0.8	11146	4109.2	4904.5	350.1	1600.2	29.7	1.18	8.4	5.1	47.4
Malawi	2009	1144.3	1.3	6132.1	1347.8	2360.1	102.8	149.4	69.2	0.63	0	5.9	13.1
	2010	1020.6	0.8	6851.2	1224.4	2834.8	173.2	307.4	132.8	0.31	0	4.2	30.1
	2011	1213.4	1.3	7887.7	1606	3261.6	362.2	197.4	441.5	0.29	0	3.1	16.3
	2012	1329	1.1	5892.7	1384.8	2599.3	23.1	223.2	-219.7	0.48	0.5	1.6	16.8
	2013	1560.3	1.5	5356.9	1397.6	3226.1	244.8	413.1	256.5	0.82	0	1.3	26.5
	2014	1658.2	0.8	5884.7	1645.5	3317	276.1	602.4	378.3	1.15	0.5	1.3	36.3
	2015	1734.4	0.8	6170.4	1551.1	2879.2	297.6	678.7	279.2	1.12	0	1.5	39.1
	2016	1846.5	1.2	5292.8	1220.9	2575.6	180.8		194	1.43	0	2.4	
	2017	2160.1	0.7	6160.9	1249	2668.4	171.7		154.1	1.16	5.1	2.5	
Mali	2009	2210.3	1.1	9943.8	2209.6	3350.9	459.4	1604.5	645	0.69	0.7	1.1	72.6
	2010	2455.8	0.9	10259.8	2508.1	4235.5	402.1	1344.4	373.2	0.60	0.1	0.2	54.7
	2011	2921.9	1	12516.3	2859	4371.2	407.5	1378.6	392.9	0.55	18.2	6.6	47.2
	2012	3059.2	1.6	11941.1	3427.2	4494.8	445.2	1341.4	188.5	0.50	25.8	1.3	43.8
	2013	3445.7	1.2	12813.9	3384.1	5794.1	393.1	1305.7	94.7	0.80	29.2	2	37.9
	2014	3458.3	1.4	14004.1	3330	5941.9	367.2	860.8	120.8	0.71	29	1.7	24.9
	2015	3690.4	1.3	12804.4	3236.9	5563.6	0	624	90.1	0.83	30.3	2.2	16.9
	2016	3790.4	1.4	13660.5	3442.8	6234.8	0		225.5	0.88	32	2.2	
	2017	4367.8	0.8	14916.2	3423.2	6118.8	0		265.6	1.03	33.8	2	
Mauritania	2009	2296.5	4.8	3722.5	1641	2176.4	0	225.4	-3.1	2.10	133.7	8.3	9.8
	2010	2684.1	2.2	4274.7	2306.2	2787.4	0	271.7	130.5	2.65	76.3	8.8	10.1
	2011	2814.8	2.6	5024.1	3123.5	3522.4	0	484.7	588.7	2.49	76.8	5.4	17.2
	2012	3314.1	1.6	5034.9	2911.2	4448.3	0	949.5	1386.1	2.95	76.2	6.3	28.6
	2013	3516.7	2	5555.5	2957.5	4360	0	984.1	1126	3.04	75	5.7	28
	2014	3513.1	1.6	5249	2235.2	3822.2	0	621.5	502.6	4.23	72.7	5	17.7
	2015	3801.7	2.5	4663.8	1712.1	2846.2	0	810.1	501.7	4.66	70.5	6.3	21.3
	2016	3929.7	2.3	4622.8	1729.9	2681.3	71.8	835.3	271.1	5.03	69.9	4.7	21.3
	2017	4230.8	2.1	4967.3	2041.3	3001.4	33.8	858.9	588.2	5.44	70.8	4.7	20.3
Mauritius	2009	7309	1.2	9089.2	4635.1	5513.8	194.7	2178.8	256.7	21.81	0	17.7	29.8
	2010	7920.9	1.3	10123.2	10188.5	11377.6	4638.6	2441.8	430	21.84	0	18.7	30.8
	2011	9955.6	0.4	11549.9	6982.9	8663.6	600.7	2582.7	433.4	12.46	0	17.1	25.9
	2012	10633.2	1.6	11708.4	8047.7	9017.2	1074.2	2836.7	589	28.13	0.8	26.7	26.7
	2013	12423.7	2.4	12153.4	12267.9	12926.1	4330.9	3340.2	293.3	20.51	0.3	23.4	26.9
	2014	11029.4	0.9	12479.2	14388.9	14728.9	5940.3	3614.7	418.4	49.71	1.1	32.6	32.8
	2015	9022.2	1.3	11606.8	13073.2	13165.9	5566.1	3957	208.3	36.81	1.1	38.2	43.9
	2016	10447.1	2.1	12167.9	14022.6	14185.8	6385	4504.2	349.4	14.78	2.2	44.1	43.1
	2017	10483.4	0	13510.4	14845	15186	6657.7	5465.9	292.7	21.72	2.8	49.7	52.1
Mozambique	2009	4138.4	2.2	10634.8	2909.1	4898.4	239.9	2099.3	242.4	0.38	465.1	15.3	50.7
	2010	4130.8	0.7	9813.3	2712.9	5220.2	217.7	2159.4	410.1	0.90	504.4	14.6	52.3
	2011	4648.5	1.2	12941.2	3668.3	8001.3	272.1	2468.8	1402	0.56	133.1	5.6	53.1
	2012	5489.8	2.4	14462.4	4780.7	12609.4	46.1	2770.2	216	0.60	174.4	6.3	50.5
	2013	8517.4	2.1	15960.3	4902.4	12576.7	54.4	3142.3	959	1.10	330.1	8.4	36.9
	2014	9450	0.8	16759.2	4769.2	11938.7	49.3	3010	553.2	1.47	133	4.6	31.9

Country	Year	Y	x1	x2	x3	x4	x5	x6	x7	x8	x9	x10	x11
	2015	10344.7	0.3	14501.6	4248.4	11018.2	60	2411.4	1128.1	1.93	212.7	7.3	23.3
	2016	10705.3	0.7	10754.2	3873.9	8240.4	46.5	2022.5	805	2.43	213	6.2	18.9
	2017	12009.9	0.5	11913.9	5548.3	8771.4	67.5	3179.2	668	2.32	319.1	8.6	26.5
Niger	2009	1257.5	1.2	5362.5	1185.7	2656.6	83.5	655.5	-6.4	0.71	16.6	10.4	52.1
	2010	1545.6	1.5	5674.4	1331.7	2916.1	17.5	760.3	0.2	0.42	23.4	11.2	49.2
	2011	2232.1	1	6359.5	1433.4	3207.5	60.4	673	1061.7	0.55	20.4	7	30.2
	2012	2347.9	1.5	6806.9	1664.8	3015.1	179.4	1014.5	516.3	0.64	23.1	4.2	43.2
	2013	2517.4	3.2	7483.2	1819.6	3265.3	181	1166.6	446.5	1.50	25.1	2.9	46.3
	2014	2465.1	2	8078	1847.4	3501.5	109.4	1281.5	409.5	2.44	31.5	2.8	52
	2015	2652.5	1.7	7098.3	1422.8	3205.3	122.4	1039	228.2	1.75	19.3	1	39.2
	2016	2887.1	1.2	7443.6	1338.7	2797.6	136.2		146	2.36	27.8	1	
	2017	3323.1	1	7941.8	1298.4	2738.8	0		334.3	2.56	35.2	3.1	
Nigeria	2009	15942.1	0.7	154918.5	59319.9	64814	15041.4	44762.7	8534.3	0.49	0	0	280.8
	2010	15484.2	1.7	349548.1	83696.7	91290.5	19957.8	34919.3	5966.4	0.36	0	0	225.5
	2011	17663.3	3.8	389088.6	103335.6	114473.9	23070.1	35211.9	8588.8	0.13	0	0	199.4
	2012	18127.3	1.7	438868.5	99480.7	103916.5	22276.6	46405.2	7002.6	0.30	0	0	256
	2013	21143.7	1.8	489445.3	100300.1	103055.6	25257.1	45427.3	5534.3	0.10	0.5	0	214.9
	2014	24756	1.3	549528.1	85447.8	106262.8	19490.8	36668.7	4638.5	0.83	0.2	0	148.1
	2015	28943	1.2	468409.3	51330.3	88021.3	12793.3	28283.2	3133.1	0.31	0.2	0	97.7
	2016	31151.5	1.4	395953.8	39662.7	56818	8667.9	27233	4444.2	0.63	0.2	0	87.4
	2017	40238.5	5.7	364278.1	52327	63905.1	11651	39608.5	3494.9	0.98	0.2	0	98.4
Rwanda	2009	861.4	1.8	5342	602.2	1584.9	4.7	742.7	118.7	0.22	0.1	1.2	86.2
	2010	906.3	1.2	5730.2	700.4	1707.9	14.9	812.8	105.2	0.25	0.1	1.6	89.7
	2011	1215.7	0.8	6506.7	998.4	2264.8	14.8	1050	30.3	0.30	0	9.2	86.4
	2012	1262.5	1.2	7238.9	1117.2	2496.4	30.6	847.8	126.7	0.31	0	6.8	67.2
	2013	1693.6	4	7485.8	1293.9	2591.2	21.6	1070.5	113.2	0.53	0	0.7	63.2
	2014	1899.9	0.7	7837.7	1331.6	2853.1	45	1066	147.1	0.71	0	1.3	56.1
	2015	2180.2	0.9	8077.9	1511.5	3249.2	77.3	1029.8	88.3	0.74	0	0.5	47.2
	2016	2783.2	1	8264.8	1570.4	3430.4	126.2	1103.8	171	0.86	0	8.1	39.7
	2017	3338.1	1.1	8935.9	2068.5	3286.4	136.5		188.4	0.90	0	6.8	
Sao Tome and Principe	2009	157	0.6	187.5	21.3	104.7	0	66.7	15.5	1.12	5.4	10.5	42.5
	2010	181.1	1.9	198	26.2	122.8	0	48.2	50.6	0.86	5.9	11	26.6
	2011	231	0.5	234	31.2	149.4	0	52.1	32.2	0.73	5.9	11.2	22.6
	2012	201.6	1.9	247.9	34	147	0	51.6	22.5	4.60	7.9	7.9	25.6
	2013	214.4	0	305.5	54.4	180.2	0	63.8	8.8	1.96	8.1	6.6	29.8
	2014	212.9	0.3	354.6	99.6	235	0.2	63.5	16.5	3.89	6.6	5.4	29.8
	2015	249.4	1.3	314.5	96.9	190.1	1	72.9	24.8	0.89	6.5	4.2	29.2
	2016	248	2	355.2	102.8	188.3	0.1	63.2	23.3	0.82	6.4	3.8	25.5
	2017	261.9	1	393.1	94.8	197.2	0.1	59	32.9	0.81	6.6	2.9	22.5
Senegal	2009	3720.9	3.1	12644.7	3285.9	5612.9	147.1	2123.2	244.3	1.56	0	0	57.1
	2010	3909.5	1	12798.7	3418	5556.8	134.6	2047.5	272.3	2.38	0	0	52.4
	2011	4325.5	5.2	14109	4055.2	6969.3	208.7	1945.7	296.1	2.56	0	0	45
	2012	4905.7	1.3	13923.8	4209.8	7496	243.9	2081.6	293.4	2.29	0	0	42.4
	2013	5225.6	0.6	14528.2	4493.1	7906.6	306	2253.1	331.4	2.76	0	0	43.1
	2014	5619.7	3.2	14926.5	4592.8	7900.4	341.7	2038.1	351.3	2.41	0	0	36.3
	2015	5893.2	2.3	13249.2	4222.3	6835.4	0	2011.8	246.5	2.85	0	0	34.1
	2016	6678.1	1.9	14185.6	4187.1	6650.3	0		267.1	2.81	0	0	
	2017	8886	3.2	15805.1	4179.4	7194.4	0		532.3	3.75	0	0	
South Africa	2009	79017.4	2.7	290560.6	87745	92967.4	5278.7	35237.4	4956.6	1.80	0	26.9	44.6
	2010	108391.6	2.2	367295.2	112386.7	115600.8	6164.6	38175	-4193.7	1.73	0	20	35.2
	2011	116929.5	4.8	406216.4	132169.7	139516.4	8374.8	42595.2	2903.4	1.55	0	17.6	36.4
	2012	144958.6	4.3	385572.9	123784	140297.8	8485.9	43995.5	1671.3	2.52	0	19.2	30.4
	2013	139789.8	5.8	357214.3	120214.4	138298.9	8052.7	44863.7	2698.9	3.57	0	19.5	32.1
	2014	141598.6	4.3	341540.9	117904.6	132552.4	8707.5	44267.4	1291.7	2.28	0	19.8	31.3
	2015	138077.5	2.9	309869.7	103985.2	115837.3	7061.9	41619.5	-596.3	2.61	0	21.1	30.1
	2016	146041	4.2	287572.3	97182.7	103409.4	6072.3	42565.6	364.4	4.43	0	20.4	29.1

Country	Year	Y	x1	x2	x3	x4	x5	x6	x7	x8	x9	x10	x11
	2017	176334.7	5	338936	109962.7	115417.6	6395	45499.3	-265	3.95	0	18.7	25.8
Sudan	2009	21112.6	3.1	49161.2	8617.9	14760.8	2112.4	1094.2	-845.9	1.00	6,523.00	31.6	5.2
	2010	22322.8	2.8	60506.6	11785	15677.5	2392.9	1036.2	2063.7	0.82	6,771.60	32.2	4.6
	2011	21180.8	1.9	64564.3	11039.7	14822.3	2298.7	192.5	1734.4	0.83	4,891.00	25.5	0.9
	2012	21825	2.1	62417.2	5139.6	12270.2	424.3	192.6	2311.5	0.59	5,089.80	25	0.9
	2013	22501.9	2	44936.7	6056.9	13566.9	1144	193	1687.9	0.66	5,181.70	24.1	0.9
	2014	21784.9	1.3	74213.6	6059.9	11166.9	721.7	181.5	1251.3	0.35	5,102.70	24.1	0.8
	2015	21429.3	2.4	88341.6	4911.8	11325.4	393.6	173.5	1728.4	0.59	4,970.90	23.7	0.8
	2016	21119.9	2.5	86599.4	4639.4	9785.3	172.3	168.3	1063.8	0.34	4,958.00	23.8	0.8
	2017	21754.2	1.3	107383.9	5617.1	11403.5	196.1	177.9	1065.3	0.22	5,175.30	24.5	0.8
Tanzania	2009	7685.2	1	28276	5313.9	8015	341.8	3470.4	664.4	0.58	835.6	18.2	45.2
	2010	8892.1	0.7	31077.8	6530.1	9792	652.8	3904.7	1038.2	0.62	908.3	16	43.9
	2011	10010.9	2.1	33619.1	7582.4	12865.5	728.7	3726.2	999	0.42	988.6	16.8	37.2
	2012	11585.2	2.2	38509.6	8806.7	13383.1	560.2	4052.2	1399	0.41	1,054.10	18.3	35
	2013	13139.2	2.8	44001.9	8589.8	14353.4	617	4673.7	912.5	0.53	1,112.10	13.4	35.6
	2014	14331.4	2.1	47700.8	8708.5	14529.6	740.3	4390.4	1004.4	0.55	1,128.70	13.3	30.6
	2015	15451.1	1.3	44867.3	8924.1	13523.3	776.4	4072.9	1061.3	0.79	1,120.70	13.2	26.4
	2016	16192.3	1.3	46910.4	9367.2	11903.3	779.9		887.6	1.48	1,106.40	12.6	
	2017	18242.3	3.7	51569.4	8873	10908.7	928.6		976.2	1.44	1,146.40	10.4	
Togo	2009	1730.1	1.9	2803.4	1265	1777.3	41.5	703.2	32.6	1.92	30	2.7	40.6
	2010	1278.3	1.8	2761.6	1395.8	1951.3	67	714.9	78	1.31	9.9	3	55.9
	2011	622.1	1.7	3197.5	2079	2651.3	120.2	774.3	44.6	0.47	2.8	0.9	124.5
	2012	746.8	3	3282.2	2004.9	2541.2	180.4	441.6	109.4	0.70	3.6	6.6	59.1
	2013	896	0.4	3438.7	2318.2	3148.7	179.9	507.1	67	1.52	2.9	9.7	56.6
	2014	986.3	2	4032.3	2141.2	2918.9	191.6	507	97.2	1.49	1.3	9.1	51.4
	2015	1054.4	2.4	4228.3	1858.1	2635.5	121.2	574	88	1.41	1.4	5.1	54.4
	2016	1176	1.6	4530.7	1855.1	2632.7	141.2		28.4	1.96	1.1	5.5	
	2017	1631.4	0.7	4978.9	1539.8	2431.4	0		145.6	1.81	0.7	16.3	
Uganda	2009	2767.8	0.9	17862.8	3398.4	5638.1	247.1	2994.5	770.6	0.40	26.2	8.5	108.2
	2010	2979	0.6	19849.1	3528.1	6499.2	182.8	2706	248	0.32	26.2	0.9	90.8
	2011	3266.7	1.3	19864.5	4315.6	7877.6	262	2617.5	573	0.32	26.2	0.8	80.1
	2012	3779.9	0.9	22655.1	5011	8277.7	251.6	3167.2	921.7	0.30	26.2	0.7	83.8
	2013	8563.5	0.8	24081.7	4919.5	8018.8	343.8	3337.5	848.2	0.37	26.6	5.5	39
	2014	8654.7	1.7	26685.2	4933.4	8366.3	347.6	3316.4	741.4	0.77	26.2	6.2	38.3
	2015	9573.7	2.1	26613	4757.9	7800.7	229.4	2908.9	551.9	0.36	25.8	5.8	30.4
	2016	9510	0.8	23603.8	4851.9	7004.3	334		395.7	3.58	25.8	5.3	
	2017	11188.5	1.1	25280.6	5029.7	7701	330.9		485.1	0.75	25.9	4.2	
Zambia	2009	3774.4	0.7	14909.6	4905.9	4509.3	265.4	1892.1	471.6	1.15	154.4	12.6	50.1
	2010	4384.2	2.6	18902.5	8062.7	6969.4	1302.7	2093.8	1227.9	0.79	158.5	27	47.8
	2011	5099.2	1.3	22304.8	9430.1	8715.3	1092.5	2324	941.7	0.99	159.1	11	45.6
	2012	5857	3.7	25169.9	10521	9603	239.2	3042.2	-24.9	0.92	163.1	14.7	51.9
	2013	6429.6	2.9	26893.2	11606.7	12170.2	1019.6	2683.8	369.6	1.23	164.9	12.3	41.7
	2014	9338.7	5.8	26633.7	11077	11761.7	1321.6	3078.4	726.6	1.54	167.3	9.3	33
	2015	11754.2	6.3	20807.5	8231.7	9226	34.1	2967.6	309.2	2.65	168.8	5.3	25.2
	2016	15529.1	3.1	20495.6	7490.1	8655.9	279.9	2352.7	267.2	3.61	170	6.5	15.2
	2017	16308.8	4.5	25003.1	9090.5	10455.7	671.6	2082.1	455.8	6.60	227.9	5.2	12.8
Zimbabwe	2009	6002.7	0	7356.4	2001.2	4224.4	11	821.9	105	1.65	915.2	27.2	13.7
	2010	6607.3	4	8714.5	3651.6	6593.5	30.6	731.8	122.6	4.42	937.7	27.5	11.1
	2011	7313.8	3.2	10098.1	5095.9	9528.1	128.1	659.2	344.3	11.42	1,053.80	28.2	9
	2012	8659	2	12028.9	4647.5	8683.4	165.6	574.4	349.9	6.15	1,144.10	27.9	6.6
	2013	8199.9	0	13574.2	4390.8	8895.5	142.4	474.5	373.1	3.56	1,236.80	33.2	5.8
	2014	8039.2	0	14038.8	4246.6	8531.3	133.6	363.3	472.8	3.33	1,214.50	32.5	4.5
	2015	8738	0	14322.3	4174.9	7873.4	148.1	418.1	399.2	3.94	1,258.60	31.9	4.8
	2016	8843.7	0	14844.2	4279.9	6825.3	155	406.7	343	7.45	1,325.50	33.8	4.6
	2017	9330.2	0.8	15793.7	4945.8	6951	158.7		247.2	2.63	1,453.00	35.9	

Source: International Debt Statistics, 2019, The World Bank

Debt is panel regressed with all other variables – interest rate, gross national income (GNI), exports, imports, income from foreign direct investment (FDI), international reserves, and foreign direct investment. The figures are comparatively far larger than the interest rate and had to be normalised. Natural logarithm of debt was used, and quotient of other variables, e.g., export-to-import, reserves-to-imports, FDI-to-GNI, short term-to-total debt, and reserves to debt ratios.

4.3 Results

The first presentation comprises the Hausman test for determining the suitable model between fixed and random effects. Preliminary results comprise eleven regression models, differing by number of predictor variables, in increasing order. Gradual inclusion of independent variables in the model was to see if they have impact on the interest rate (variable of interest). Robustness checks have been carried out on the coefficients to determine their statistical significance. This test has been run for one data set comprising all SSA countries, and not repeated for different clusters.

The last test, collinearity, has been carried out to mitigate the risks of its damaging effect on the regression model. This effect manifests in the risky interpretation of coefficients as indicators of predictor variables' importance (Keller, 2012:713–714; Schindler, 2014:577). Correlation tests were run first, to establish the possibility of collinearity, especially correlation coefficient of 0.8 and above. Eliminating one of the correlating variables is one of the approaches to minimise the effect of multicollinearity. Another is creating a new variable made up of highly intercorrelated variables and using new variables in place of its components (Schindler, 2014:578).

Regressions are then carried out for various clusters and results presented in tables, with analysis immediately after the table. All countries' sample data analysis included thorough reporting on the specific changes in quantities of one variable as a response to the change in another variable. Analyses of various clusters mainly focused on the similarities of the model with all countries' regression model. Similarities indicate the overall phenomenon linking all clusters with all the countries' sample results. Differences highlight the uniqueness of specific country categories and economic imperatives matching their situation.

(i) Hausman tests

Table 4.3: Hausman test for model specification

Statistic	P-value
$\chi^2 = 22.42$	0.0213

Note: χ^2 and P-value are the Chi-square and probability, respectively
source: author data analysis

Results of the Hausman test give chi square value of 22.42, with probability of 0.0213. This p-value is very small (less than 0.05), so the null hypothesis—which represents consistency of the random effects model—can be rejected. This leads to the prudent conclusion that the difference between fixed and random estimates is insignificant. So, the fixed effects model is chosen over random effects model.

Table 4.4: Hausman test results

	(b) fixed	(B) random	(b-B) Difference	sqrt(diag(v_b-v_B)) S.E.
Debt (-1)	0.0000	0.0000	0.0000	0.0000
Interest rate	0.0064	0.0098	-0.0034	0.0024
GNI	0.3760	0.3676	0.0083	0.0754
Exports	-0.03427	-0.0321	-0.0021	0.0698
Imports	0.1429	0.2451	-0.1021	0.0675
Primary income on FDI	0.0040	-0.0184	0.0224	0.0092
International reserves	0.3682	0.3134	0.0549	0.0360
FDI to GNI	-0.1816	-0.2138	0.0322	0.0458
Debt service to GNI	0.0056	0.0126	-0.0070	0.0022
Interest arrears on long-term	-0.0001	0.0002	-0.0003	0.0001
Short-term/external indebtedness	-0.0072	-0.0032	-0.0040	0.0014
Reserves/external debt stocks	-0.0080	-0.0070	-0.0011	0.0004

Source: author's data analysis

(ii) Unit root testing

The panel was tested for stationarity among data variables over time, using unit root test. If variables non-stationary testing for cointegration is warranted—calling for multi-step integration until non-stationarity elements are removed (Hsiao, 2003). On the other hand, if regressed variables are stationary there is no need for further cointegration tests. Levin, Lin and Chu (LLC) specification, described in Baltagi (2015), Hsiao (2003) and Levin, Lin and Chu (2002), was employed in the panel root testing, and results are given in table 4.5. For LLC, the null hypothesis states that panels contain unit roots while the alternative hypothesis asserts that panels are stationary.

Table 4.5: Unit Root Testing - SSA Panel

	Debt	Interest	GNI	Exports / Imports	Primary_ income_FDI	Reserves / Imports	FDI/ GNI	Debt_service / GNI	Interest_arrears	Short-term / total_debt	Reserves/ debt
LLC t*-stat											
Levels	-8.44***	-11.17***	-19.13***	-10.44***	-50.31***	-12.15***	-19.13***	-20.45***	-60.58***	-2500.00***	-24.30***
p-value	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)

Note: *** = significant at 1%; ** = significant at 5%; * = significant at 10%; t-statistics in parentheses; variables in logarithm form: Debt, GNI and primary_income_FDI; variables in ratio form: interest rate, export/imports, reserves/imports, FDI/GNI, debt_service/GNI, short-term/total debt and reserves/debt.

Source: author, data analysis – OLS regression

From table 4.5, panels are stationary in levels (integration of order zero). At this stage, there are no further cointegration tests needed. The null hypothesis is rejected in favour of the alternative hypothesis. The panels are stationary. The LLC results for stationarity are accepted.

(iii) Preliminary results: dynamic fixed effects

Table 4.6: Regressions results – dynamic

Dependent variable: external debt stocks (debt)

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10	Model 11
Constant	7.881282***	1.743171**	1.912557**	1.778463*	1.500036	0.910997	1.415275	1.448941	1.512832	1.549275	1.489774*
	(189.64)	(1.96)	(2.11)	(1.87)	(1.38)	(0.80)	(1.25)	(1.29)	(1.34)	(1.37)	(1.81)
Debt (-1)	0.000026***	0.000023***	0.000022***	0.000022***	0.000022***	0.000020***	0.000020***	0.000019***	0.000019***	0.000019***	0.000011***
	(7.43)	(7.14)	(6.90)	(6.86)	(6.77)	(6.24)	(6.38)	(5.99)	(5.93)	(5.90)	(4.44)
Interest rate	0.013727	0.012639	0.015010	0.015032	0.015254	0.021346	0.021317	0.022338	0.022791	0.021554	0.006371
	(0.93)	(0.94)	(1.09)	(1.09)	(1.06)	(1.47)	(1.50)	(1.58)	(1.61)	(1.50)	(0.61)
GNI		0.662635***	0.710556***	0.695254***	0.670828***	0.670908***	0.537964***	0.553287***	0.561742***	0.556229***	0.375973***
		(6.89)	(6.58)	(6.16)	(5.57)	(5.40)	(4.17)	(4.29)	(4.34)	(4.28)	(3.93)
Exports			-0.076419	-0.108889	-0.018370	-0.161327	-0.290945**	-0.299995**	-0.312435**	-0.315660**	-0.034274
			(-0.98)	(-1.05)	(-0.14)	(-1.17)	(-2.06)	(-2.14)	(-2.21)	(-2.23)	(-0.33)
Imports				0.063184	0.042288	0.149490	0.350822**	0.336658**	0.345744**	0.347894**	0.142913
				(0.48)	(0.28)	(0.95)	(2.11)	(2.03)	(2.08)	(2.09)	(1.17)
Primary income on FDI					-0.008777	-0.020033	-0.005114	-0.006390	-0.009224	-0.006573	-0.004034
					(-0.34)	(-0.76)	(-0.19)	(-0.24)	(-0.35)	(-0.24)	(0.21)
International reserves						0.121647*	0.124671***	0.125589**	0.106523	0.110672*	0.368250***
						(1.91)	(3.10)	(2.02)	(1.62)	(1.67)	(7.08)
FDI to GNI							-0.544433	-0.529790***	-0.528083***	-0.531665***	-0.181644
							(1.25)	(-3.02)	(-3.01)	(-3.02)	(-1.39)
Debt service to GNI								0.010784	0.010927	0.010916	0.005641
								(1.62)	(1.64)	(1.63)	(1.15)
Interest arrears on long-term									0.000130	0.000137	0.000126
									(0.92)	(0.96)	(1.19)
Sort-term/external indebtedness										-0.002218	-0.000719**
										(-0.57)	(-2.53)
Reserves/external debt stocks											-0.008068***
											(-13.20)
R-sq.	0.4104	0.8598	0.8543	0.8569	0.8566	0.8577	0.8583	0.8684	0.8822	0.8807	0.8711
F-test (p-value)											
# of observations	288	288	288	288	257	243	243	243	243	243	275
# of countries	36	36	36	36	36	36	36	36	36	36	36

Note: *** = significant at 1%; ** = significant at 5%; * = significant at 10%; t-statistics in parentheses

Source: author's data analysis

(iv) Robustness checks

Summary
Number of observations = 243
F(12,230) = 2490.73
Prob > F = 0.0000

Table 4.7: Robustness checks on independent variables

	Coef.	Std. Err.	T	P>t
Interest rate	0.0187826	0.007585	2.48	0.014
Gross national income (GNI)	0.1163292	0.029354	3.96	0.000
Exports	0.0854855	0.037205	2.3	0.022
Imports	0.1758277	0.048557	3.62	0.000
Primary income on FDI	-0.0488617	0.009302	-5.25	0.000
International reserves	0.6105602	0.021245	28.74	0.000
FDI to GNI	0.0763323	0.0784	0.97	0.331
Debt service to GNI	0.0279742	0.002363	11.84	0.000
Interest arrears on long-term	0.0004462	0.000016	27.84	0.000
Short-term/external indebtedness	-0.0062681	0.001249	-5.02	0.000
Reserves/external debt stocks	-0.0125913	0.000186	-67.82	0.000
Constant	1.184757	0.089427	13.25	0.000

Source: author's data analysis

As explained, some of the values were transformed through computing their logarithms given their huge values. Natural logarithms were computed for the values of GNI, exports, imports, primary income on FDI and international reserves. For variables with confidence level including zero (for example, [-0.05, 0.05]), we fail to reject the null hypothesis that the predictor variable coefficient is zero. However, in this case the zero value is the natural logarithm of one for some variables mentioned above.

At the five per cent significant level ($\alpha = 0.05$), the following inferences are made:

The regression coefficient for interest rate is found to be statistically different from zero, given that all other explanatory variables are included in the model. The regression coefficients of other predictor variables, except FDI to GNI, are each found to be statistically different from zero, given that all other variables are included in the model. FDI to GNI has the t-statistic value of 0.97 and associated p-value of 0.331, so the null hypothesis is not rejected. We cannot

conclude that the regression coefficient of FDI to GNI has been found to be statistically different from zero, given the inclusion of other explanatory variables in the model. In all but one variable, the null hypothesis can be rejected since coefficients are statistically different from zero.

(v) Correlations

Table 4.8: Correlation coefficients (SSA countries)

	Total external debt	Intr.rate.all creditors	GNI	Exports	Imports	Primary FDI income.	Int. reserves	FDI	Debt.serv. to GNI	Long-term arrears interest	Short-term to ext.debt	Reserves to ext.debt
Total external debt	1.0000											
Intr.rate.all creditors	0.4171	1.0000										
GNI	0.7203	0.3188	1.0000									
Exports	0.8312	0.4241	0.9024	1.0000								
Imports	0.8456	0.4112	0.9367	0.9877	1.0000							
Primary FDI income.	0.4347	0.2633	0.8501	0.8179	0.8118	1.0000						
Int. reserves	0.7725	0.3902	0.9061	0.9641	0.9579	0.8450	1.0000					
FDI	0.1367	0.1052	0.4378	0.3286	0.3880	0.4807	0.3607	1.0000				
Debt.serv. to GNI	0.0669	0.0437	-0.0401	0.0533	0.0348	0.1340	0.0229	-0.0498	1.0000			
Long-term arrears intr	0.0852	0.0632	0.0441	-0.0412	-0.0126	-0.0256	-0.0958	0.0754	-0.0562	1.0000		
Short-term to ext.debt	0.2510	0.0544	0.0555	0.1126	0.1247	0.0279	0.0472	0.0297	0.3668	0.4336	1.0000	
Reserves to ext.debt	-0.0998	-0.0792	0.1329	0.1441	0.1148	0.2802	0.2634	0.1242	-0.1266	-0.1944	-0.0748	1.0000

Source: Author data analysis

Correlation coefficients of 0.8 or above are noted between exports, and GNI; imports; reserves; primary income on FDI; imports and GNI reserves; primary income on FDI; GNI and primary income on FDI reserves; and between reserves and primary income on FDI. These values potentially lead to risky interpretation of the coefficients (Keller, 2012:713).

(vi) Minimising multicollinearity: further transformations

Table 4.9: Adjusted variables correlation

	ln (debt)	Interest_rate	GNI	Exports/imports	ln (FDI primary income)	Reserves /imports	FDI/GNI	Debt service/GNI	Interest arrears	Short term/debt	Reserves/ debt
ln (debt)	1.0000										
Interest_rate	0.4867	1.0000									
GNI	0.9270	0.4436	1.0000								
Exports/imports	0.4093	0.3884	0.4628	1.0000							
ln (FDI primary income)	0.7133	0.3805	0.7742	0.5286	1.0000						
Reserves/imports	-0.2360	-0.0979	-0.1525	0.2094	-0.0175	1.0000					
FDI/GNI	-0.1714	-0.0758	-0.1940	-0.2772	0.0581	-0.1001	1.0000				
Debt service/GNI	0.1890	0.0437	0.0278	0.2419	0.2142	-0.0614	-0.0383	1.0000			
Interest arrears	0.2710	0.0632	0.2265	-0.0904	0.1275	-0.3241	-0.0403	-0.0562	1.0000		
Short term/debt	0.3091	0.0544	0.2121	0.2068	0.2435	-0.1284	-0.0787	0.3668	0.4336	1.0000	
Reserves/debt	-0.1667	-0.0792	0.0466	0.2813	0.2056	0.7421	0.0367	-0.1266	-0.1944	-0.0748	1.0000

Source: author, data analysis

From table 4.9 adjustments done on the variables set include replacing exports and imports with a single variable exports-to-imports ratio. Another change is replacing international reserves

(also reserves) with reserves-to-imports ratio. All correlation coefficients are less than 0.8, rendering further adjustments unnecessary. It is evident from the table that reserves-to-imports ratio, FDI-to-GNI ratio, and reserves-to-debt ratio are negatively correlated with external debt. Variables: interest rate; GNI; exports-to-imports; primary income; debt service-to-GNI; interest arrears; and short-term debt-to-total debt are positively correlated with external debt.

(vii) The models estimation results

The models for all SSA countries and different clusters are estimates using the panel least squares method. Advantages of panel data over cross-sectional and time-series data analyses include decreased possibility of collinearity among variables, increased degrees of freedom, and both detecting and measuring effects not observable with time-series and cross-sectional data (Hsiao, 2003). One shortcoming levelled against panel data for regression analysis, based on a large number of countries' data sets, is the parameter heterogeneity. To control for this, the sample was divided with country groupings, based on the debt situation and economic characteristics. The estimates of all SSA countries and those of different clusters are presented respectively in tables 4.11 and 4.13 respectively, with analysis under corresponding sub-headings.

a. All sampled SSA countries

Table 4.10: Model summary

R-square		Observation per group		Numbers		Checks	
Within	0.6190	Min	2	Observations	243	Chi2	947.93
Between	0.9418	Ave.	6.8	Groups	36	Prob>chi2	0.0000
Overall	0.9298	Max	8				

Source: author data analysis

Log-linear and log-log models

Data variables in their logarithmic form are debt, gross national income, and primary income on foreign direct investment (FDI). The rest, with the exception of interest arrears on long-term debt, are in ratio form as illustrated by naming. The log-linear model takes the form: $\log Y_i = \alpha + \beta X_i + \varepsilon_i$, and log-log model takes the form: $\log Y_i = \alpha + \beta \log X_i + \varepsilon_i$. From algebraic juggling and manipulations, for a log-linear model, a 1-unit change in X corresponds to approximately six per cent change in Y. For a log-log model 100β corresponds to a percentage increase in Y.

Table 4.11: Model coefficients: SSA countries

Variable	Coefficient
Debt (-1)	0.0000***
	(6.67)
Interest rate	0.0266***
	(2.67)
ln (GNI)	0.7362***
	(14.55)
Export/Import	-0.1321
	(-0.55)
ln (Primary income on FDI)	0.0373
	(1.43)
Reserves/imports	1.0574***
	(3.36)
FDI/GNI	-0.0142
	(-0.12)
Debt service/GNI	0.0151
	(1.51)
Interest arrears on long-term debt	0.0001**
	(2.20)
Short-term/debt	-0.0031
	(-0.90)
Reserves/debt	-0.0071***
	(-4.33)

Note: *** = significant at 1%; ** = significant at 5%; * = significant at 10%; t-statistics in parentheses
Dependent variable: ln (debt)
Source: author, data analysis – OLS regression

Interest rate is positively associated with external stock, and the relationship is statistically significant. A unit increase in the interest rate corresponds 2.67 per cent of debt increase. This relationship is contrary to the expected behaviour in table 2.11. Interest rate does not have a reducing effect on the external debt as theorised in finance (Mishkin, 2016). By implication, the benefits of raising debt outweighed the impact of increasing the cost of borrowing.

Gross national income (GNI) is positively associated with external debt, and the relationship is statistically significant. A ten percent increase in GNI corresponds to 1.07 per cent increase in external debt. This association contradicts expected behaviour posited in table 2.11. Increasing national income incentivised raising more debt. This reaffirms the notion that SSA's economic growth and investors' hunt for returns influenced debt levels in the region (Willem, 2014).

The exports-to-imports ratio is negatively associated with external debt, confirming the expected association in table 2.11. A one-unit increase in the ratio corresponds to 13 per cent decrease in

debt. This debt and exports-to-imports ratio relationship is not statistically significant. As discussed in earlier literature, exports have a reducing effect on external debt. This is because exports help in building international reserves, which are used for servicing debt (Waheed, 2017).

Primary income from FDI is positively associated with external debt. This outcome confirms the expectation in table 2.11, albeit not being statistically significant. A ten per cent increase in the primary income on FDI corresponds to one per cent increase in external debt. This result reaffirms a theorised and empirically proven impact of FDI on debt-raising ability. Strong and well established FDI affords the host country increased income in addition to other positive externalities in the form of royalties, fees, and taxation (Behname, 2012; Willem, 2014).

Change in reserves-to-imports ratio has explanatory power over change in external debt and the relationship is positive. This reaffirms the expected behaviour in table 2.11 since reserves move in the same but imports in the opposite direction to debt. Import cover ratio and debt relationship is also statistically significant. One unit increase in the ratio corresponds to 106 per cent increase in external debt, translating to one per cent change in reserves, corresponding to 1.06 per cent change in debt. Reserves afford sovereigns the ability to service foreign-currency-denominated debt and, inevitably, incentivise raising of external debt (Akpan, 2016; Fukuda & Kon, 2010).

FDI-to-GNI ratio is negatively associated with external debt. This result reaffirms the expected behaviour in table 2.11 (positive, divided by negative, yields negative). However, the relationship is not statistically significant. One unit increase in FDI-to-GNI ratio corresponds to 1.4 per cent decrease in external debt. The decreasing effect of FDI on the external debt is premised on local income increasing, and on its debt-raising, disincentivising nature.

The debt service-to-GNI ratio is positively associated with external debt, although the relationship is not statistically significant. This relationship is contrary to posited expected behaviour in table 2.11. One unit increase in the ratio corresponds to 1.5 per cent increase in external debt. Increased debt service may indicate affordability and increased creditworthiness. Lending to credit-worthy sovereigns becomes easier for investors, while for less credit-worthiness counterparts, there is evidence of increasing debt-service with increasing debt (Copelovitch, Gandrud & Hallerberg, 2018; Megliani, 2015).

Interest arrears on long-term debt have positive explanatory power over external debt. This is contrary to the expected behaviour in table 2.11. One unit of increase in interest arrears corresponds to 0.01 per cent increase in external debt. Interest arrears increasing effect on external debt is explained by the willingness to offer higher yields by SSA countries, making their Eurobonds the highest-paying on the planet (Haile, 2018). This apparently further explains the SSA Eurobonds rush post 2000 (Copelovitch et al., 2018).

Short-term-debt-to-total-debt ratio is negatively related to external debt, reaffirming the expected association in table 2.11, albeit the relationship not being statistically significant. A one unit increase in the ratio corresponds to 0.31 per cent decrease in external debt. Short-term debt has a reducing effect on the external debt, implying the sovereign's reduced incentive to borrow short-term externally. Short-term repayment periods are likely to be misaligned to duration of the project for which the funding is raised. Therefore, external debt is seemingly strategic for long-term investments to sovereigns.

International-reserves-to-debt ratio is negatively associated with external debt, and the relationship is statistically significant. This relationship is contrary to the expected behaviour in table 2.11. A one unit increase in the ratio corresponds to 0.7 per cent decrease in external debt. Healthy reserves indicate increased export trade and possible surpluses. The reducing effect of reserves-to-external-debt is explained by the use of reserves to service and retire maturing debt.

A summary of findings, considering only statistically significant relationships, is presented in table 4.12 below.

Table 4.12: Findings summary – SSA countries

Variable name	Association with external debt	Confirms or refutes expectation?
Interest rate	Positive	Refutes
Gross national income (GNI)	Positive	Refutes
International reserves-to-imports ratio	Positive	Confirms
Interest arrears on long-term debt	Positive	Refutes
International reserves-to-debt ratio	Negative	Refutes

Source: author - data analysis

Debt-based clusters

The sample has been modified through clustering countries based on their debt situation and the presence or absence of two regional economic powers—Nigeria and South Africa (SA). The categories are: SSA countries excluding SA; SSA excluding Nigeria; SSA excluding SA and Nigeria; SSA excluding debt-distressed countries; SSA excluding countries at high risk of distress; SSA countries with low to moderate risk of distress; and SSA Highly Indebted Poor Countries Initiative post-completion point recipients. This classification is partly based on the International Monetary Fund's categorisation in IMF, 2019:17. Another clustering factor is the economic influence of Nigeria and South Africa. South Africa's low private investment, including foreign direct investment, and Nigeria's oil-price-volatility-driven economic impediments attracted investigation into their sample results contribution.

Table 4.13: SSA countries debt-based clusters

Variable	SSA ex SA	SSA ex Nigeria	SSA ex Nig&SA	SSA ex distressed	SSA ex high distress risk	Low to moderate risk	HIPC recipients
Debt (-1)	0.0000***	0.0000***	0.0000***	0.0000***	0.0000***	0.0000*	0.0000***
	(6.27)	(3.61)	(6.83)	(2.94)	(2.79)	(1.93)	(1.98)
Interest rate	0.0212*	0.0241**	0.0247**	0.0210*	0.0111	0.0122	0.0067
	(2.01)	(2.28)	(2.47)	(1.87)	(0.91)	(0.98)	(0.60)
ln (GNI)	0.3708***	0.5540***	0.3330***	0.6545***	0.4184***	0.3871***	0.3691***
	(4.06)	(6.63)	(3.89)	(7.04)	(4.38)	(3.38)	(4.19)
Export/Import	-0.0405	-0.3279**	-0.1798	-0.1221	-0.0304	0.0438	-0.4465**
	(-0.25)	(-2.06)	(-1.19)	(-0.74)	(-0.17)	(0.23)	(-2.59)
ln (Primary income on FDI)	0.0295	0.0359*	0.0347**	0.0222	0.0447**	0.0908***	-0.0013
	(1.54)	(1.92)	(1.98)	(1.33)	(2.06)	(3.62)	(-0.08)
Reserves/imports	0.5386***	1.3569***	0.9830***	1.0730***	0.7235***	1.0368***	1.6615***
	(2.78)	(7.09)	(5.16)	(5.53)	(3.74)	(4.97)	(8.39)
FDI/GNI	-0.2386*	0.0385	-0.1269	-0.0415	-0.1821	-0.2243*	0.2343**
	(-1.85)	(0.31)	(-1.06)	(-0.33)	(-1.43)	(-1.81)	(2.16)
Debt service/GNI	0.0032	0.0081*	0.0021	0.0081	0.0038	0.0017	0.0495**
	(0.63)	(1.68)	(0.44)	(1.58)	(0.77)	(0.34)	(2.59)
Interest arrears on long-term debt	0.0001	0.0002*	0.0001	0.0014***	0.0001	0.0016***	-0.0001
	(0.91)	(1.66)	(0.97)	(3.46)	(0.86)	(3.72)	(-0.37)
Short-term/debt	-0.0034	-0.0075***	-0.0046*	-0.0043	-0.0024	-0.0027	-0.0058*
	(-1.14)	(-2.66)	(-1.69)	(-1.53)	(-0.77)	(-0.91)	(-1.76)
Reserves/debt	-0.0055***	-0.0101***	-0.0081***	-0.0073***	-0.0068***	-0.0070***	-0.0139***
	(-7.60)	(-13.36)	(-10.53)	(-11.25)	(-10.34)	(-10.72)	(-14.43)

Note: *** = significant at 1%; ** = significant at 5%; * = significant at 10%; t-statistics in parentheses
Source: author, data analysis – OLS regression
Dependent variable: ln (debt)

b. SSA countries excluding South Africa

Analysis results of SSA countries excluding South Africa are presented in table 4.13. For this category, changes in external debt can be explained, at ten per cent significant level or better, by interest rate; gross national income; reserves-to-imports ratio; and reserves-to-debt ratio. Similarities with the total sample results lie in the interest rate; national income; reserves-to-imports; and reserves-to-debt ratios. For this group, FDI-to-GNI ratio relationship with external

debt is statistically significant. Slow FDI in South Africa explains its increased significance in the sample once South Africa is excluded.

c. SSA countries excluding Nigeria

For this category, a statistically significant relationship exists between external debt and interest rate; national income; exports-to-imports ratio; reserves-to-imports ratio; debt-service-to-national-income ratio; interest arrears on long-term debt; short-term-to-total-debt ratio; and reserves-to-total-debt ratio. Results are similar to those of the total sample, except for exports-to-imports, debt-service-to-GNI and short-term-to-total-debt ratio. Excluding Nigeria from the sample gives three factors—exports-to-imports ratio, debt service-to-GNI ratio, and short-term-to-total-debt ratio—explanatory power over changes in debt. Volatility in oil prices can explain the impact of Nigeria's exclusion from the sample. Exports, debt- service and short-term borrowing have been negatively affected by this volatility.

d. SSA countries excluding Nigeria and South Africa

Results are similar to those of the total sample for interest rate, GNI, reserves-to-imports ratio and reserves-to-debt ratio. The difference lies in the statistically significant relationship between external debt and primary income on FDI and short-term-to-total-debt ratio. Slow private investment in South Africa and oil-price-volatility-driven decline in short-term debt for Nigeria, can explain this difference. Oil-exporting countries have surpluses and reserves affording them ability to service short-term liabilities (Waheed, 2017). Nigeria and South Africa are the largest economies in the region, and their exclusion in the sample (individually and collectively) becomes the source of difference.

e. SSA excluding debt-distressed countries

The results resemble those of the total sample in interest rate; GNI; reserves-to-imports ratio; interest arrears on long-term debt; and reserves-to-debt ratio. Excluding debt-distressed countries from the sample virtually makes no difference to the results. By implication, the contribution of these countries is not so substantial that it can cause a shift in the observation. The economic character of debt-distressed countries can explain this state of affairs—they are mostly poor with sizeable debts and borrowing capacities. This is different from the case of South Africa and Nigeria, whose exclusion caused some noticeable difference in the results.

f. SSA excluding countries at high risk of distress

The similarity of these results to those of the total sample lie in the GNI, reserves-to-imports ratio, and reserves-to-debt ratio. The difference is caused by the absence of interest rate and interest arrears on long-term debt, and the presence of primary income on FDI in the current results. Countries at high risk of distress are relatively larger in economic size (representing 16 per cent of regional GDP), and were able to increase borrowing, helping to explain differences in the results caused by their exclusion. By implication, their cost of borrowing had an increasing effect on the external debt: investors lent them more as yields on their debt increased. It is this increased borrowing against the increasing interest rate that landed them in the distress-risk situation.

g. Countries with low to moderate risk of distress

Results of this category are similar to those of the total sample in the GNI, reserves-to-imports ratio, interest arrears on long-term debt, and reserves-to-debt ratio explanatory relationship with external debt. Difference lies in the absence of interest rate, and presence of primary income on FDI and FDI-to-GNI ratio in the explanatory variables for this group. FDI has a vital developmental role in this category and evidently on the debt borrowing behaviour, instead of interest rate as expected (Mishkin, 2016). By implication, FDI is important to the economic health of countries in this category. Their borrowing behaviour is ignorant of the cost, explaining the cause of their current debt situation.

h. HIPC recipients (post-completion)

The similarities of this group to the total sample lie in the explanatory power of GNI, reserves-to-imports ratio, and reserves-to-debt ratio. In this category though, as opposed to the total sample, interest rates and interest arrears on long-term debt do not have explanatory power on debt. On the other hand, exports-to-imports ratio, FDI-to-GNI ratio, debt service-to-GNI ratio, and short-term-to-total-debt ratio have statistically significant relationships with external debt. Debt service had an increasing effect on external debt, explaining the increased borrowing after their debt levels were brought to sustainability by the HIPC Initiative. Exports and FDI play an important macroeconomic role for countries in this category—capable of affording them the ability to service their debt.

Summary: SSA debt-based clusters

Interest rate has increasing impact on external debt for SSA countries; SSA excluding South Africa (SA); SSA excluding Nigeria; SSA excluding SA and Nigeria; and SSA excluding debt-distressed countries. Interest rate has very limited or no explanatory power over external debt for SSA excluding countries at high risk of distress; countries with low to moderate risk of distress; and HIPC post-completion recipient countries. Slow FDI in South Africa and Nigeria's oil price volatility both have impact on the economy and have impact on the overall results. Both FDI and exports have explanatory power over external debt, once these two countries are excluded from the sample. The two countries represent the region's economic giants, with Nigeria's GDP leading and SA's infrastructure (telecoms, roads, energy), financial and capital markets very well developed.

Excluding debt-distressed countries from the sample does not have a noticeable impact on the results. This agrees with the small economic role they play in the region (they contribute three per cent of the region's GDP as shown in table 2.6). Regionally, the increasing interest rate enticed investors to lend to SSA, confirming the discussion in Haile (2018). Countries at high risk of distress mostly borrowed against their economic prospects and their willingness to borrow at increasing interest rates, leading to their current debt situation. This group represents the second largest contributor to the region's GDP (16 per cent) as shown in table 2.6.

Similar to countries at high risk of distress, FDI has macroeconomic imperative for countries with low to moderate risk of distress. This category represents the largest economic contributor in the region (81 per cent). For HIPC post-completion beneficiaries, FDI, exports and debt service have economic significance, meriting policy attention. Their debt burden situation, returned to sustainability by the HIPC initiative, improved their debt investment attractiveness—inevitably enticing them to incur more debt. Repeat of pre-HIPC initiative is the most undesired situation that these countries can find themselves in.

i. Economic categories

Table 4.14: Economic classes – coefficients

	Low income	Middle income	Oil exporters	Other resource intensive	Non-resource intensive

	Low income	Middle income	Oil exporters	Other resource intensive	Non-resource intensive
Debt (-1)	0.0000***	0.0000*	0.0000	0.0000	0.0000***
	(5.81)	(1.76)	(0.58)	(0.85)	(5.57)
Interest rate	-0.0113	0.0299**	0.0533*	0.0118	0.0001
	(-0.60)	(2.35)	(1.81)	(0.71)	(0.01)
ln (GNI)	0.2303**	0.3990***	-0.0079	0.0198	0.3034**
	(2.30)	(2.65)	(-0.04)	(0.12)	(2.25)
Export/Import	-0.2589	-0.3772*	0.5120	-0.6466**	-0.2086
	(-1.28)	(-1.73)	(1.13)	(-2.42)	(-0.93)
ln (Primary income on FDI)	-0.0001	0.0225	-0.0770	0.0021	0.0081
	(-0.04)	(0.76)	(-1.41)	(0.07)	(0.35)
Reserves/imports	1.5474***	0.9157***	-0.8789*	1.1571**	1.2188***
	(6.44)	(3.48)	(-1.74)	(2.35)	(4.84)
FDI/GNI	0.2019	-0.4431	0.0447	-0.1665	1.2193
	(1.66)	(-0.51)	(0.04)	(-1.15)	(1.27)
Debt service/GNI	0.0400**	0.0073	0.2150***	0.0356**	0.0003
	(2.42)	(1.34)	(4.16)	(2.10)	(0.06)
Interest arrears on long-term debt	0.0001	0.0024***	-0.00004	0.0016***	-0.0001
	(1.39)	(4.04)	(-0.26)	(4.70)	(-0.24)
Short-term/debt	-0.0088**	-0.0051	0.0121	-0.0249***	-0.0037
	(-2.17)	(-1.30)	(0.55)	(-3.86)	(-1.19)
Reserves/debt	-0.0141***	-0.0062***	-0.0048***	-0.0084***	-0.0112***
	(-11.70)	(-7.99)	(-2.83)	(-5.34)	(-10.34)

Note: *** = significant at 1%; ** = significant at 5%; * = significant at 10%; t-statistics in parentheses

Source: author, data analysis: OLS regression

The results of economic categories are presented in table 4.14. Though not statistically significant, interest rate is negatively associated with external debt for low-income countries. This agrees with the theory and expected association in table 2.11. It can be asserted that low-income countries are prudent in borrowing, reflecting debt burden concerns. This may also be the reflection of increased austerities by creditors, decreasing lending to low-income countries in the increasing interest rate regime.

Interest rate is positively associated with external debt in other economic categories: middle-income; oil exporters; other resource-intensive, and non-resource-intensive-countries. This result disagrees with expected association in table 2.11. The relationship is statistically significant at ten per cent and five per cent for middle-income and oil-exporting countries respectively. Middle-income sovereigns are likely to have based their loan capacity on their economic growth, while oil exporters may have relied on expected revenues from oil exports. Resource-intensive countries may have relied on their mineral-resource exports for loan repayments and non-resource-intensive countries may have largely been the subject of foreign direct investment and official loans.

The positive relationship between national incomes is statistically significant at ten per cent or better for low-income, middle-income and non-resource-intensive countries. Though not statistically significant, the relationship is negative for oil-exporting countries, and still positive

for other resource-intensive countries. Oil exporters' incentive for loan raising is likely to have been driven by expected revenues from oil, though the oil prices declined, effectively decreasing national income. As resource-intensive countries relied on their revenues from exports of mineral resources for loan repayments, prices for mineral resources did not generally fall enough to affect national incomes over the period.

Imports' and exports' relationships with external debt have been negative and positive respectively, as expected, in all categories except oil exporters. The relationship is statistically significant at ten per cent or better for middle-income and other resource-intensive countries. Oil exporters could have borrowed to import machinery and other inputs, hoping to pay with export revenues, but oil prices generally declined globally. Declining global oil prices increasingly had a substantial negative impact on the oil-exporting countries' budgets despite their relatively fast accumulation (Coulibaly, Brahima and Gandhi, 2019; Kapoor, Kararach, Odour, Odero, Sennogaand and Coulibaly, 2019). Indeed, external debt has been increasing with increasing exports—bringing up the possibility of having raised debt against oil resources in some instances.

The foreign direct investment primary income–external debt nexus is not statistically significant and has mixed results across all categories. Negative relationships for low-income and oil-exporting countries go against expectations in table 2.11, while positive relationships for other groups confirm it. These two categories should have largely been plagued by volatile portfolio flows and private investment (including foreign direct investment), capital flight, and sometimes corruption, as suggested in Kim, Ha and Kim (2017). Low-income countries' investment climates may be worsened by incurring more debt, since this potentially limits future government expenditure. The oil-exporting countries' display of weak investment climates is likely to have been due to the decline and instability of global oil prices.

Reserves are consistently associated with debt at the significance level of ten per cent or better across all categories—negative for oil-exporting countries and positive for the rest. Relationship consistency and statistical significance are exhibited by reserves-to-imports and reserves-to-debt ratios. The positive relationship confirms the expectation in table 2.11, derived from theory. The differing relationship direction (negative) for oil-exporting countries can be explained by high

loans that depleted reserves in the face of declining oil revenues. Increasing imports with debt also depleted reserves, yielding a negative relationship between reserves and debt.

Although not statistically significant, a relationship between foreign direct investment (FDI) and external debt is positive for low-income, oil-exporting and non-resource-intensive countries, confirming derived expectations in table 2.11. Contradictory results come from middle-income and other resource-intensive categories, implying that private investment, including FDI, has been slow in the middle-income countries, as evidenced by South Africa. Portfolio flows remained volatile for the same group—partly explaining the impact of slower- than-anticipated economic growth. External debt worked against investment climates in the resource-intensive countries, inevitably disincentivising FDI growth. Mineral resource price volatility and sluggish economic growth are partly responsible for this outcome.

Relationships between debt and debt-service are positive across all country groups, being statistically significant for-low income, oil-exporting and other resource-intensive countries. This contradicts the expectation in table 2.11, which was logically based on the increasing burden implication of rising debt-service-to-income (GNI) ratio. This result can be explained by the fact that increasing debt increases the debt-service amount. Conversely, servicing debt well entices creditors to extend more debt, inevitably increasing debt and debt-service amounts. By implication, changes in debt for middle-income and non-resource-intensive countries can be explained by elements other than changes in debt service.

Negative relationships between interest arrears on long-term debt and external debt is confirmed by the results of oil-exporting and non-resource-intensive-countries, but the relationship is not statistically significant. This contradicts positive association results from low-income, middle-income and other resource-intensive countries, though it is statistically significant for the latter two. Both middle-income and resource-intensive countries are prone to increased borrowing appetite, underpinned by positive growth prospects and mineral export revenues. Inability to mobilise domestic resources to repay debt, results in arrears for low- income countries. Arrears build up as revenues become unstable for resource-intensive countries, owing to volatility of prices of mineral resources.

The expected negative relationship between debt and short-term is confirmed by the results of all groups except oil-exporting countries. However, the relationship is statistically significant for other resource-intensive countries and low-income countries. Extended credit in the face of increasing short-term debt may have been based on the promise of oil. Oil-exporting countries, relative to their non-oil-exporting counterparts, have surpluses that potentially afford them the ability to service short-term debt (Waheed, 2017). Indeed, the debt-service effectiveness (higher response measured by coefficient) is highest for oil countries as shown in table 4.14.

Summary: Economic classification

Statistically significant relationships exist between interest rate and external debt for middle-income and oil-exporting Sub-Saharan African (SSA) countries. This is contrary to the expected association in table 2.11, and the expected negative relationship (albeit not statistically significant) that exists for low-income countries. National income and debt relationship is statistically significant, but contrary to the expected association in table 2.11, for low-income, middle-income, and non-resource-intensive countries. Expected negative relationships exist for oil-exporting countries though it is not statistically significant. Export-to-import ratio and debt relationship is statistically significant (and confirms the expected association) for middle-income, other resource-intensive and non-resource-intensive countries.

Results are contrary to expected association (but not statistically significant) for oil-exporting countries. Reserves have the explanatory power of changing debt across all groups, and effectively reducing debt for oil-exporting countries more than the rest. The reserves-to-debt ratio has a reduction impact on the external debt for all categories. Debt-service has explanatory power over changing debt for low-income, oil-exporting and other resource-intensive countries, though the association is positive, contradicting the expected association in table 2.11 across all groups. Interest arrears on long-term debt best explain changes in debt for middle-income and other resource-intensive countries, though contrary to the expectation.

Expected, though not statistically significant, relationships exist for oil-exporting and non-resource-intensive countries. Short-term debt can explain changes in external debt for low-income and other resource-intensive countries. This relationship confirms the expected association in table 2.11. Expected associations exist for all categories except oil-exporting

countries, though the relationship is not statistically significant. Short-term debt has a reducing effect on external debt.

4.4 Discussion of findings

In this section, the findings above are deliberated by drawing references from models and literature. Some predictor variables' relationship with external debt is not statistically significant. For that reason, their discussion is relatively limited. Discussion is limited to variables whose relationship with a dependent variable is statistically significant. Interest rate is the study's variable of interest and dominates the discussion in this study.

Analysis was done for all SSA countries, and for categories created, based on the debt situation and economic characteristics. Debt-based clusters are: SSA countries excluding South Africa (SA); SSA excluding Nigeria; SSA excluding SA and Nigeria; SSA excluding debt-distressed countries; SSA excluding countries at risk of distress; low to moderate distress risk countries; and Heavily Indebted Poor Country (HIPC) Initiative post-completion recipient countries. Economic characteristics-based clusters are: low-income countries; middle-income countries; oil-exporting countries; other resource-intensive countries; and non-resource-intensive countries. As illustrated, results for debt-based clusters are presented individually. On the other hand, economic cluster results are presented for all five groups in one table (Table 4.14).

For all SSA countries, interest rate; gross national income (GNI); international reserves-to-debt ratio; interest arrears on long-term debt and reserves-to-debt ratios have explanatory power over changes in external debt. Interest rate has an increasing, instead of the expected reducing effect on external debt, with the same being true for GNI and interest arrears on long-term debt. Reserves have an unexpected reducing effect on external debt. Reserves-to-imports ratio has an increasing impact on external debt, as expected. By implication, investors are willing to lend to SSA countries when interest rates, GNI reserves, and interest arrears on long-term debt increases.

For SSA excluding SA, interest rate; GNI; reserves-to-import ratio; foreign direct investment (FDI)-to-GNI ratio; and reserves-to-debt ratio have explanatory power over the changes in external debt. While increasing interest rate, GNI and reserves, entice investors to lend to this category, FDI has a reducing effect on external debt. For SSA excluding Nigeria, changes in

external debt can be explained by: changes in interest rate; GNI; exports-to-imports ratio; debt service-to-GNI ratio; interest arrears on long-term debt; short-term–to-total-debt ratio; and reserves-to-debt ratio. While increases in the interest rate; national income; reserves; debt service; and arrears in long-term repayments, all have increasing effect on external debt, exports and short-term debt do the opposite. Investors are willing to lend to countries in this group when interest rate; GNI; reserves; debt service; and arrears on long-term debt are on the rise, and refrain when exports and short-term debts are increasing.

For SSA excluding SA and Nigeria, changes in interest rate; GNI; primary income on FDI; reserves-to-imports ratio; short-term to total debt ratio; and reserves-to-total debt ratio, may explain changes in external debt. Short-term issuance has a reducing effect on external debt, while interest rate, GNI, primary income on FDI and reserves have an increasing effect. Investors are disincentivised to invest in short-term debt issued by countries in this category. They are willing to invest in this group's debt if there are increases in interest rate, FDI, GNI, and reserves. Major difference in all countries sampled lie in the FDI and short-term, reflecting retarded FDI and Nigeria's retarded short-term, because of oil price volatility.

For SSA excluding debt-distressed countries, changes in interest rate; GNI; reserves-to-imports ratio; interest arrears on long-term debt; and reserves-to-debt ratio, explain changes in external debt. This group has similar characteristics to all SSA countries in the sample. Excluding debt-distressed countries in the sample has not affected the results, in line with their small contribution to regional GDP (three per cent). All the predictor variables have increasing effect on external debt. By implication, investors are willing to invest in this country cluster's debt when interest rate, national income, reserves, and interest arrears on long-term debt increase.

For SSA, excluding countries at high risk of distress, GNI; primary income on FDI; reserves-to-imports ratio; and reserves-to-debt ratio have predictive power over changes in external debt. GNI, FDI, and reserves have increasing impact on external debt. Investors are enticed to buy this category's Eurobonds if national income, FDI, and reserves increase. Interest rate does not have explanatory power over changes in external debt. The main difference with all countries' sample results lies in the FDI which, by implication, has macroeconomic imperatives for this category.

For countries with low to moderate risk of distress, changes in GNI; primary income on FDI; reserves-to-imports ratio; FDI-to-GNI ratio; interest arrears on long-term debt; and reserves-to-debt ratio, explain changes in external debt. GNI, FDI, reserves and interest arrears on long-term debt have increasing effect on external debt. For HIPC post-completion recipients, changes in external debt is explained by changes in GNI; exports-to-imports ratio; reserves-to-imports ratio; FDI-to-GNI ratio; short-term-to-total-debt ratio; and reserves-to-debt ratio. For this group, similar to countries with low to moderate risk-of-distress, interest rate is not an external debt determinant. GNI, reserves, FDI, and debt-service have increasing effect on external debt, while exports, short-term debt and reserves have a reducing effect.

For low-income countries, GNI; reserves-to-imports ratio; debt-service-to-GNI ratio; short-term-to-total-debt ratio all have explanatory power over changes in external debt. While GNI, reserves and debt-service have increasing effects, short-term debt and reserves have a reducing effect on external debt. Investors are willing to lend to SSA low-income countries if national income, reserves and debt-service increase. They refrain from investing when reserves and short-term-bond issuance are on the rise. Interest rate is, again, not a determinant of external debt.

For middle-income countries, changes in interest rates; GNI; exports-to-imports ratio; reserves-to-imports ratio; interest arrears on long-term debt and reserves-to-debt, explain changes in external debt. GNI; reserves; exports; and interest arrears on long-term debt have increasing effects on external debt. SSA middle-income countries' Eurobonds become attractive to investors when interest rates, national income, exports and interest arrears on long-term debt increase. For oil-exporting countries interest rates; reserves-to-imports ratio; debt service-to-GNI ratio and reserves-to-debt ratio; have predictive power over changes in external debt. Reserves and debt-service have reducing, while interest rate has increasing effects on external debt—explaining investors' decisions determinant character.

For other resource-intensive countries, exports-to-imports ratio; reserves-to-imports ratio; debt service-to-GNI ratio; interest arrears on long-term debt; short-term total debt ratio; and reserves-to-debt ratio, have explanatory power over changes in external debt. Exports, reserves and short-term debt have reducing effects on external debt, while debt-service and interest arrears on long-term debt have increasing impact. Investors purchase SSA resource- intensive countries'

Eurobonds, when debt-service and interest arrears on long-term debt increases, and refrain from investing when exports, reserves and short-term-debt issue are on the rise. For non-resource-intensive countries, GNI, reserves-to-imports ratio and reserves-to-debt ratio have explanatory power over changes in external debt, but interest rate does not. Both GNI and reserves have increasing effect on external debt, implying creditors' willingness to lend to SSA non-resource-intensive countries, when national income and reserves increase.

Moral hazard perception is potentially driven by the fact that majority of SSA countries in debt distress or crisis benefited from debt relief initiatives (HIPC and MDRI). No credible, explicit evidence exists suggesting that individual countries' priority was placed on enhancing the ability to repay external loan liabilities as they emerge, particularly through strengthening institutions and economic performance. Strong institutions and improving economy have the pulling effect on the private foreign investment (Sean J Gossel & Biekpe, 2017; Kodongo, 2011). Heightened enterprising discipline to ensure that investment projects repay the funds borrowed specifically for them should not be left to chance – but unsustainable debt levels in the SSA region imply otherwise. Repaying external loans from national budgets requires that domestic resource mobilization programs are developed, implemented and strengthened, in line with adequate taxing of the growing economy.

4.5 Further research directions

There are two main research directions found worthy of pursuing, drawing from the insights shared in this study. The current study's focus is the demand side of the borrowing transaction. Examining the supply side, exploring quantitative factors informing the funds disbursement, could shed more light on sovereign creditor behaviour. Specifically, records of funds disbursed, and other macroeconomic fundamentals of creditors' other capital markets, could be critical for analysis. Capital markets' quantitative assessments of debt issuers may contribute immensely to the existing body of literature.

Existing literature documents qualitative determinants of external debt, but in a more discrete and coherent manner. Moreover, a number of determinants in examined literature appeared in discussions and barely in the empirical analysis. Furthermore, the determinants are never all discussed in one publication, let alone analysed collectively. Lack of a dedicated study of

qualitative determinants of sovereign debt at any country, regional, or global level created an invaluable research gap. Collective qualitative determinants' association with external debt forms another research direction recommendation.

5 Conclusions and recommendations

Existing literature examined shed light on the qualitative determinants of sovereign borrowing albeit in a fragmented manner. Furthermore, empirical evidence (of qualitative determinants) is less coherent and substantive, let alone exhaustive on the subject. Most of the reported determinants emerged in the literature discussions of the scholars mentioned. Quantitative determinants of external sovereign debt, through specific establishment of the relationship between debt and interest rate, as well as other macroeconomic fundamentals in SSA region, established an interesting topic to pursue. This study attempted filling this noticeable research gap—investigating the explanatory nature of interest rates on the external debt, not the other round.

The study explored the determinants of sovereign borrowing decisions, with specific interest in whether changes in the cost of debt can explain changes in external debt. Further, it also investigates the relationship across different country clusters, based on debt situation and economic characteristics. The investigation has been extended to explore whether other control variables, proxied by selected macroeconomic fundamentals, have explanatory power on external debt amounts. These variables are included to check whether their presence has any impact on the behaviour of interest rates. Panel data from SSA countries, collected annually for the 2009–2017 period, was used for the study.

All the three null hypotheses are rejected in favour of alternative hypotheses. For the first hypothesis, the relationship does exist between external debt and cost of borrowing. However, not all country clusters exhibit this, and the direction of relationships is not the same across all clusters. For the second hypothesis, a relationship does exist between external debt and chosen control variables. For the third hypothesis, results of various country clusters are different from each other in terms of the combination of predictor variables and their relationship direction with external debt.

Interest rate is found to have a positive determining impact on external debt for all SSA countries aggregated: SSA countries excluding South Africa (SA); SSA excluding Nigeria; SSA excluding Nigeria and SA; SSA excluding debt-distressed countries, middle-income and oil-exporting countries. It does not have predictive power over changes in external debt for: SSA excluding countries at high risk of distress; countries with low to moderate risk of distress; HIPC post-implementation recipient countries; low-income; other resource-intensive, and non-resource-intensive countries. External debt is also found to respond to changes in gross national income (GNI); exports-to-imports ratio; primary income on foreign direct investment (FDI); reserves-to-imports ratio; FDI-to-GNI ratio; debt-service-to-GNI ratio; interest arrears on long-term debt; short-term-to-total-debt ratio; and reserves-to-debt ratio for different country groupings. For the SSA excluding SA category, external debt is found to respond to changes in interest rate; GNI; reserves-to-imports ratio; FDI-to-GNI ratio; and reserves-to-debt ratio. For SSA excluding Nigeria, external debt responds to changes in interest rate; GNI; exports-to-imports ratio; debt-service-to-GNI ratio; interest arrears on long-term debt; reserves-to-imports ratio; short-term-to-total-debt ratio; and reserves-to-debt ratio.

For SSA excluding SA and Nigeria, changes in external debt can be explained by: changes in the interest rate; GNI; primary income on FDI; reserves-to-imports ratio; short-term-to-total- debt ratio; and reserves-to-debt ratio. Changes in the interest rate; GNI; reserves-to-imports ratio; interest arrears on long-term debt; and reserves-to-debt ratio have explanatory power over changes in external debt for SSA excluding debt-distressed countries. Determinants of external debt for SSA excluding countries at high risk of distress are: GNI; primary income on FDI; reserves-to-imports ratio; and reserves-to-debt ratio. In the case of low- to moderate- risk countries, debt determinants are found to be: GNI; primary income on FDI; reserves-to-imports ratio; FDI-to-GNI ratio; interest arrears on long-term debt; and reserves-to-debt ratio. Sovereign borrowing is found to be responsive to: GNI; exports-to-imports ratio; reserves-to-imports ratio; FDI-to-GNI ratio; debt-service-to-GNI ratio; short-term-to-total-debt ratio; and reserves-to-debt ratio for Heavily Indebted Poor Country (HIPC) initiative post-completion recipient countries.

External debt flow to low-income countries is responsive to: changes in GNI; reserves-to-imports ratio; debt-service-to-GNI ratio; short-term-to-total-debt ratio; and reserves-to-debt ratio. For middle-income countries, external debt is determined by: interest rate; GNI; exports-to-imports

ratio; reserves-to-imports ratio; interest arrears on long-term debt; and reserves-to-debt ratio. External debt in oil-exporting countries responds to: changes in interest rate; reserves-to-imports ratio; debt-service-to-GNI ratio; and reserves-to-debt ratio. For other resource-intensive countries, external debt is influenced by: changes in exports-to-imports ratio; reserves-to-imports ratio; debt-service-to-GNI ratio; interest arrears on long-term debt; short-term-to-total-debt ratio; and reserves-to-debt ratio. GNI, reserves-to-imports ratio and reserves-to-debt ratio have a determinant character to external debt for non-resource-intensive countries. Debt is, therefore, influenced by other heterogenous factors explored in this study, apart from interest rate – which are also unique for each country or cluster of countries.

Instead of increasing interest rates to entice external debt, policy-makers may focus on increasing GNI and external reserves for SSA countries aggregated. This is also the case for SSA excluding SA and SSA excluding distressed countries. SSA excluding Nigeria should increase activities that increase GNI and reserves; improve debt service; and desist from issuing short-term debt in the external-debt market. For SSA excluding Nigeria and SA, policy-makers should focus on increasing GNI, FDI and reserves; and discontinue issuing short-term debt in the external debt market. For SSA excluding countries at high risk of distress, boosting FDI and reserves should be given priority.

For countries with low to moderate risk of distress, their macroeconomic management programmes should give GNI, FDI and reserves priority. For HIPC post-completion recipient countries, improving GNI, FDI and debt service should be given high consideration to entice external debt. For low-income countries, focus should be on increasing national income and reserves to entice external debt. For middle-income countries, increasing national income and exports is imperative for inviting external debt. Improving debt service and reserves by oil-exporting countries should be given consideration, to maintain and improve relationships with the external debt market.

Improving debt service and discontinuing short-term debt issuance in the external market are important for other resource-intensive countries and should be considered. Increasing national income and reserves is important for non-resource-intensive countries, for attracting external debt. It is important that countries in SSA should increase efforts to encourage the development

and deepening of capital markets, to enhance sustainable sovereign domestic borrowing. Proceeds from external debt should consistently be used for profitable projects with sustainable revenues, to be used for servicing debt. Policy makers in the SSA are further challenged to consider improving attempts aimed at increasing domestic resource mobilisation, including taxation.

Minerals rich and oil producing countries' budget projections often get affected by commodities' prices movements in the market. Use of derivative contracts can help in the risk mitigation of this and other cross-border financial risks. Innovations in the external loans, especially bilateral loan arrangements, are emerging – often exhibiting increasing elements of flexibility. The flexibilities take various forms from irregular payments to barter system. Under competent monitoring and good faith arrangements, these avenues can be exploited in the effort to efficient debt management.

References

Abdullahi, M. M., Bakar, N. A. B. A. & Hassan, S. B. (2015). Determining the macroeconomic factors of external debt accumulation in Nigeria: An ARDL Bound Test approach. *Procedia: Social and Behavioral Sciences*, *211*, 745–752. https://doi.org/10.1016/j.sbspro.2015.11.098

Abedian, I. (2016). *Avoiding SA's junk-grade sovereign credit eating.* Johannesburg: The Helen Suzman Foundation, April (78), 20–27.

Abor, J. (2011). *Micro-enterprises finance*. Accra: Africagrowth Institute.

Abu-Hijleh, K. A. & B. (2017). Critical success factors for public–private partnerships in the UAE construction industry: A comparative analysis between the UAE and the UK. *Journal of Engineering, Project, and Production Management*, *7*(1), 21–32.

Addison, T., Pikkarainen, V., Rönkkö, R. & Tarp, F. (2017). *Development and poverty in sub-Saharan Africa* (No. 2017/169). Retrieved from: http://dx.doi.org/10.35188/UNU-WIDER/2017/395-0

Afonso, A., Gomes, P. & Rother, P. (2010). Short-and long-run determinants of sovereign debt credit ratings. *International Journal of Finance and Economics, 16(1): 1–15* ISSN1076-9307. Retrieved from*:* http://eprints.bbk.ac.uk/20043

Akanbi, O. A. (2016). External debt accumulation in sub-Saharan African countries: How fast is safe? *International Journal of Sustainable Economy*, *8*(2), 93. Retrieved from: https://doi.org/10.1504/ijse.2016.075916

Akpan, A. U. (2016). Foreign reserves accumulation and macroeconomic environment: The Nigerian experience (2004–2014). *International Journal of Economics and Finance Studies*, *8*(1), 26–47.

Alagidede, P. (2012). *Masters in development finance: Topics in public sector finance* (2012 Ed.). Cape Town: Africagrowth Institute.

Al-Fawwaz, T. M. (2016). Determinants of external debt in Jordan: An empirical study (1990–2014). *International Business Research, 9*(7), 116. Retrieved from: https://doi.org/10.5539/ibr.v9n7p116

Ali, R.U.M. (2012). External debt accumulation and its impact on economic growth in Pakistan. *The Pakistan Development Review, 51*(4), 79–95. Retrieved from https://www.jstor.org/stable/23734739

Amadeo, K. (2019). Sovereign debt crisis with examples. June 12, 2019. Retrieved from: *The Balance* website: https://www.thebalance.com/what-is-a-sovereign-debt-crisis-with-examples-3305748

Arif, A. & Hussain, M. (2018). Economic, political and institutional determinants of budget deficits volatility: A panel data analysis. *International Journal of Economics & Business Administration*, *VI*(3), 98–114. Retrieved from: https://ijeba.com/journal/166#

Asteriou, D., Masatci, K. & Keith, P. (2016). Exchange rate volatility and international trade : International evidence from the MINT countries. *Economic Modelling*, *58* (November, 2013), 133–140. Retrieved from: https://doi.org/10.1016/j.econmod.2016.05.006

Awan, R., Anjum, A. & Rahim, S. (2015). An econometric analysis of determinants of external debt in Pakistan. *British Journal of Economics, Management & Trade*, *5*(4), 382–391. Retrieved from: https://doi.org/10.9734/bjemt/2015/8837

Ballester, L. & González-Urteaga, A. (2017). How credit ratings affect sovereign credit risk: Cross-border evidence in Latin American emerging markets ☆. *Emerging Markets Review*, *30*, 200–214. From: https://doi.org/10.1016/j.ememar.2016.09.004

Barhoumi, K., Vu, H., Nikaein Towfighian S. & Maino, R. (2018). Public investment efficiency in Sub-Saharan African countries. *Department Papers/Policy Papers 18(09)* Washington DC: IMF. Retrieved from: http://doi.org/10.5089/9781484360019.087

Baltagi, B. H. (2015). *The Oxford handbook of panel data* (1st ed.) L. R. Michael Szenberg, Ed.). New York: Oxford University Press.

Bastos, F. & Pineda, E. (2013). Fiscal space of Brazilian states. *Urban Public Economic Review*. 19: 44–63. ISSN 1697–6223. Retrieved from: http://www.redalyc.org/articulo.oa?id=50430343003 (No. IDB-DP-310). Washington DC.

Bedendo, M., Cathcart, L. & El-Jahel, L. (2018). Reputational shocks and the information content of credit ratings. *Journal of Financial Stability*, *34*, 44–60. Retrieved from: https://doi.org/10.1016/j.jfs.2017.12.003

Behname, M. (2012). Foreign direct investment and economic growth : Evidence from southern Asia. *Atlantic Review of Economics*, *2*(2012), 1–14.

Belguith, S. O. (2017). Macroeconomic determinants of public debt growth: A case study for Tunisia. *Theoretical and Applied Economics*, *24*(4), 161–168.

Bharath, S. T., Dahiya, S., Saunders, A. & Srinivasan, A. (2011). Lending relationships and loan contract terms. *The Review of Financial Studies*, *24*(4), 1141–1203. Retrieved from: https://doi.org/10.1093/rfs/hhp064

Binici, M. & Hutchison, M. (2018). Do credit rating agencies provide valuable information in market evaluation of sovereign default risk? *Journal of International Money and Finance*, *85*, 58–75. Retrieved from: https://doi.org/10.1016/j.jimonfin.2018.04.001

Bittencourt, M. (2012). *Economic growth and government debt: Evidence from the young*

democracies of Latin America. University of Pretoria, Working Paper (No. 2012–03). Pretoria

Bittencourt, M. (2015). Determinants of government and external debt: Evidence from the young democracies of South America. *Emerging markets finance and trade*, *51*(3), 463–472. Retrieved from: https://doi.org/10.1080/1540496X.2015.1025667

Blankenburg, S. & Kozul-Wright, R. (2016). Sovereign debt restructurings in the contemporary global economy: The UNCTAD approach. *The Yale Journalof International Law Online*, *41*(2), 1–7. Retrieved from: https://cpb-us-w2.wpmucdn.com/campuspress.yale.edu/dist/8/1581/files/2016/10/C-Preface-Special-Edition-1o3cdt9.pdf

Block-Lieb, S. (2015). Austerity, debt overhang, and the design of international standards on sovereign, corporate and consumer debt restructuring. *Indiana Journal of Global Legal Studies*, *22*(2), 487–541. Retrieved from: https://doi.org/10.2979/indjglolegstu.22.2.487

Boone, B. P. & Johnson, S. (2019). Forty years of leverage: What have we learned about sovereign debt? *American Economic Association*, *104*(5). Retrieved from https://www.jstor.org/stable/42920948

Boumparis, P., Milas, C. & Panagiotidis, T. (2017). Economic policy uncertainty and sovereign credit rating decisions: Panel quantile evidence for the Eurozone. *Journal of International Money and Finance*, *79*, 39–71. Retrieved from: https://doi.org/10.1016/j.jimonfin.2017.08.007

Brue, M. (2008). *Macroeconomics: Principles, problems, and policies* (17th ed.; R. H. Brent Gordon, Douglas Reiner, Ed.). New York: McGraw-Hill/Irwin.

Bruno Bonizzi, J. T. (2017). Debt vulnerabilities in developing countries: A new debt trap? In *UNCTAD/GDS/MDP/2017/4 (Vol I)*. Retrieved from United Nations Conference on Trade and Development website: https://unctad.org/en/PublicationsLibrary/gdsmdp2017d4v1_en.pdf

Bunte, J. B. (2013). *Debt and coalitions: Domestic politics and sovereign borrowing*. Twin Cities: University of Minnesota.

Buthelezi, E. M. (2018). *Government debt and economic growth : Evidence from ECOWAS and SADC*. *4562*, 7–28.

Cai, P., Gan, Q. & Kim, S. (2018). Do sovereign credit ratings matter for foreign direct investments? *Journal of International Financial Markets, Institutions & Money*. Retrieved from: https://doi.org/10.1016/j.intfin.2018.01.003

Carlos Oliveira Cruz, (2018). The price of project finance loans for highways. *Research in Transportation Economics*, (November 2016), 1–12. Retrieved from: https://doi.org/10.1016/j.retrec.2017.09.006

Cassimon, D., Verbeke, K. & Essers, D. (2017). The IMF-WB debt sustainability framework: Procedures, applications and criticisms. *Development Finance Agenda (DEFA), 3*(1),4–6.

Chee, S. W., Fah, C. F. & Nassir, A. (2015). Macroeconomics determinants of sovereign credit ratings. *International Business Research*, *8*(2), 42–50. Retrieved from: https://doi.org/10.5539/ibr.v8n2p42

Chen, S., Chen, H., Chang, C. & Yang, S. (2013). How do sovereign credit rating changes affect private investment? *Journal of Banking and Finance*, *37*(12), 4820–4833. Retrieved from: https://doi.org/10.1016/j.jbankfin.2013.09.002

Claessens, S. (1993). Alternative forms of external finance : A survey. *The World Bank Research Observer*, *8*(1), 91–117. Retrieved from http://www.jstor.org/stable/3986489

Copelovitch, M., Gandrud, C. & Hallerberg, M. (2018). Financial data transparency, international institutions and sovereign borrowing costs. *International Studies Quarterly*, *62*(1), 23–41. Retrieved from: https://doi.org/10.1093/isq/sqx082

Coulibaly, B.S., Gandhi, D. & Senbet, L.W. (2019). Is sub-Saharan Africa facing another systemic sovereign debt crisis? In *Africa Growth Initiative*. Retrieved from https://www.brookings.edu/wp-content/uploads/2019/04/africa_sovereign_debt _sustainability.pdf

Cruces, B. J. J. & Trebesch, C. (2013). Defaults: The price of haircuts. *American Economic Association*, *5*(3), 85–117. Retrieved from; https://www.jstor.org/stable/43189553

Cyrus, R. (2018). *Restoring debt sustainability in African heavilyindebted poor countries* (No. 133). Retrieved from; https://www.cigionline.org/sites/default/files/documents/PB no.133_0.pdf

Dancho, P. (2015). Determinants of choosing sources of financingfor municipal project. *International Journal: Vallis aurea*, *1*(1), 1–10.

Dawson, C. (2009). *Introduction to research methods. A practical guide for anyone undertaking a research project* (4th Ed.); Catherin Dawson, (Ed.). Retrieved from: www.howtobooks.co.uk

De Groot, O. , Holm-Hadulla, F. & Leiner-killinger, N. (2015). Cost of borrowing shocks and fiscal adjustment. *Journal of International Money and Finance*, *59*, 23–48.

https://doi.org/10.1016/j.jimonfin.2015.09.005

De Nahlik, F. J. F. & C. F. (2012). *Project financing* (8th Ed.; F. J. F. and C. F. de Nahlik, Ed.). Retrieved from: www.euromoneybooks.com

De Vries, J. R. & F. (1999). Short term reactions to changes in fuel prices: A panel data analysis. *Accademia Editoriale SHORT*, *26*(3), 331–350. Retrieved from: https://www.jstor.org/stable/42747407

Diallo, B., Tchana Tchana, F. & Zeufack, A. G. (2016). *Sovereign wealth funds and long-term investments in Sub-Saharan Africa* (No. 7903). Retrieved from http://econ.worldbank.org.

Eichengreen, B., El-Ganainy, A., Esteves, R. P. & Mitchener, K. J. (2019). *Public debt through the ages* (No. WP/19/6). Washington DC.

Ewaida, H. Y. M. (2017). The impact of sovereign debt on growth: An empirical study on GIIPS versus JUUSD countries. *European Research Studies Journal*, *XX*(2), 607–633.

Fabozzi, F. & DeNahlik, F.J.F. (2012). *Project financing.* (8th Ed.) London: Eurmoney Books.

Fabozzi, F.J. & Peterson-Drake, P. (2010) *The basics of fiance.* New Jersey: John Wiley.

Fatás, A., Ghosh, A. R., Panizza, U. & Presbitero, A. F. (2019). *The motives to borrow* (No. WP/19/101). New York.

Fiagbe, A. K. (2015). *The effect of external debt on economic growth in Sub-Saharan Africa* (10279579)

Fiagbe, A. K., Senadza, B., Codjoe, E. A. (2017).Financial development and economic growth: Additional evidence from Ghana. *Ghanaian Journal of Economics*, *5*(1), 56–81. Retrieved from: https://doi.org/10.4236/me.2017.82020

Fischer, T. (2015). Market structure and rating strategies in credit rating markets: A dynamic model with matching of heterogeneous bond issuers and rating agencies. *Journal of Banking Finance*, *58*, 39–56.

Fukuda, S. & Kon, Y. (2010). *Macroeconomic impacts of foreign exchange reserve accumulation: Theory and international evidence* (No. 197). Retrieved from: www.adbi.org

Gevorkyan, A. V. & Kvangraven, I. H. (2016). Assessing recent determinants of borrowing costs in Sub-Saharan Africa. *Review of Development Economics*, *20*(4), 721–738. Retrieved

from: https://doi.org/10.1111/rode.12195

González, R. L., Lopez, J. A., González, R. L. & Lopez, J. A. (2007). *Determinants of access to external finance: Evidence from Spanish firms* (No. 2007–22). Retrieved from http://www.frbsf.org/publications/economics/papers/2007/wp07-22bk.pdf%0AThe

Group, W. B. (2017). *Domestic resource mobilization (DRM) and illicit financial flows (IFFs)*. The World Bank. Washington DC.

Gulati, L.C.B. & G.M. (2010a). Responsible sovereign lending and borrowing (No. UNCTAD/OSG/DP/2010/2). Retrieved from http://www.unctad.org.

Gulati, L.C.B. & G.M. (2010b). *Responsible sovereign lending and borrowing* No. UNCTAD/OSG/DP/2010/2). Retrieved from http://www.unctad.org.

Habib, M.M., Mileva, E. & Stracca, L. (2017). The real exchange rate and economic growth: Revisiting the case using external instruments. *Journal of International Money and Finance*, *73*(1), 386–398. From: https://doi.org/10.1016/j.jimonfin.2017.02.014

Haile, T. (2018). Determinants of sovereign rating in Sub-Saharan African countries: 2000–2018. *Progress in Economic Sciences*, *5*(5), 0–1. Retrieved from: https://doi.org/10.14595/PES/05/011

Hall, S., Hondroyiannis, G., Swamy, P.A.V.B., Tavlas, G. & Ulan, M. (2010). Exchange–rate volatility and export performance: Do emerging market economies resemble industrial countries or other developing countries? ☆. *Economic Modelling*, *27*(6), 1514–1521. Retrieved from: https://doi.org/10.1016/j.econmod.2010.01.014

Hemraj, M. (2015). *Credit rating agencies: Self-regulation, statutory regulation and case law Regulation in the United States and European Union* (M. Hemraj, Ed.). Retrieved from: https://doi.org/10.1007/978-3-319-17927-8

Herwig Langohr, P. L. (2008). *The rating agencies and their credit ratings: What they are, how they work, and why they are relevant*. West Sussex: John Wiley

Hill, P., Bissoondoyal-Bheenick, E. & Faff, R. (2018). New evidence on sovereign to corporate credit rating spill-overs. *International Review of Financial Analysis*, *55*, 209–225. Retrieved from: https://doi.org/10.1016/j.irfa.2017.09.004

Hill, P., Brooks, R. & Faff, R. (2010). Variations in sovereign credit quality assessments across rating agencies. *Journal of Banking and Finance*, *34*(6), 1327–1343. Retrieved from: https://doi.org/10.1016/j.jbankfin.2009.11.028

Holler, J. (2012). Funding strategies of sovereign debt management : A risk focus. *Monetary Policy & the Economy*, *Q2*(13), 51–74.

Hoogduin, L., Öztürk, B., Wierts, P. (2011) Public debt managers' behaviour interactions with macro policies. *Revue Économique*, *62*(6), 1105–1122. Retrieved from: https://www.jstor.org/stable/41307977

Hsiao, C. (2003). *Analysis of Panel Data* (2nd Ed.). M.O.J. Andrew Chesher, Ed.). Retrieved from: www.cambridge.org/9780521818551

Humphrey, C. & Michaelowa, K. (2013). Shopping for development: Multilateral lending , shareholder composition and borrower preferences. *World Development*, *44*, 142–155. Retrieved from: https://doi.org/10.1016/j.worlddev.2012.12.007

Hunt, J.E. (2014). *Essays on sovereign debt and default*. Houston, TX: University of Houston.

Ibrahim, & Halima. (2015). *Effect of external public debt on economic growth: An empirical analysis of east African countries*. Nairobi: University of Nairobi.

IBRD. (2019a). *International debt statistics 2019*. Washington DC: Retrieved from: www.worldbank.org

IBRD. (2019b). *International debt statistics 2019*. Washington, DC: Retrieved from www.worldbank.org

IMF. (2019). *Regional economic outlook. Sub-Saharan Africa: navigating uncertainty.* (October 20; Staff, Ed.). Washington DC: International Monetary Fund.

Jaros, J. & Bartosova, V. (2015). To the capital structure choice: Miller and Modigliani model. *Procedia Economics and Finance*, *26*(15), 351–358. Retrieved from: https://doi.org/10.1016/S2212-5671(15)00864-3

Jonasson, T. & Papaioannou, M. (2018). *A primer on managing sovereign debt-portfolio risks.* IMF. (No. 18). New York.

Kapoor, K., Kararach, G., Odour, J., Odero, W., Sennoga, E., Brahima Coulibaly, R. N. (2019). *Fiscal and debt sustainability in Africa*. Retrieved from: https://www.afdb.org/fileadmin/uploads/afdb/Documents/Publications/WPS_No_227_Public_Debt_Su

Karangizi, S. (2019). *Understanding sovereign debt, options and opportunities for Africa* (No. 1). Retrieved from www.aflsf.org

Kashif, M. & Sridharan, P. (2017). Impact of economic growth on international reserve holdings

in Brazil. *Brazilian Journal of Political Economy*, *37*(148), 605–614. https://doi.org/10.1590/0101-31572017v37n03a08

Kazuo, O., Elmer, S. & Ichiro, T. (2016) *Public debt, economic growth and the real interest rate: A panel VAR spproach to EU and OECD countries. ISER Discussion Paper No. 955.* Osaka: Osaka University Institute of Social and Economic Research. (ISER) Retrieved from: http://hdl.handle.net/10419/148183

Keller, G. (2018) *Statistics for management and economics.* (11th Ed.) Boston: Cengage Learning.

Kenny, C., Kalow, J., Leo, B. & Ramachandran, V. (2018). *CGD Policy Paper 1.16 January, 2018*. Washington DC

Khasipe, T. (2007). *Firm productivity: A study of Lesotho garment manufacturing industry in the post Multi-Fibre-Agreement era.* Bloemfontein: University of the Free State.

Kim, E., Ha, Y. & Kim, S. (2017). Public debt, corruption and sustainable economic growth. *Sustainability (Switzerland)*, *9*(433), 1–30. Retrieved from: https://doi.org/10.3390/su9030433

Kingombe, C., Massa, I. & Willem, D. (2011). *Comparing development finance institutions literature review* (Vol. 44). London.

Kleimeier, S. & Versteeg, R. (2010). Project finance as a driver of economic growth in low-income countries. *Review of Financial Economics*, *19*(2), 49–59. Retrieved from: https://doi.org/10.1016/j.rfe.2010.01.002

Kodongo, C. O. (2011). *Foreign exchange risk and the flow of international portfolio capital: Evidence from Africa's capital markets*. Johannesburg: University of the Witwatersrand.

Kouvelis, J., Ducham, C. (Ed.) *Business research methods* (12th Ed.) New York: McGraw-Hill/Irwin.

Kregel, J. (2004). *External financing for development and international financial instability* (No. UNCTAD/GDS/MDPB/G24/2004/8). New York & Geneva: United Nations

Kruck, A. (2011). *Private ratings, public regulations: Credit rating agencies and global financial governance* (A. Kruck, Ed.). Hampshire: Palgrave Macmillan.

Lau, E., Lee, A. S-Y. & Arip, M. A. (2015). Macroeconomics determinants of external debt in Malaysia. *International Journal of Economic Sciences, IV*(4), 14–26. Retrieved from: https://doi.org/10.20472/es.2015.4.4.002

Levin, A., Lin, C. F. & Chu, C. S. J. (2002). Unit root tests in panel data: Asymptotic and finite-sample properties. *Journal of Econometrics*, *108*(1), 1–24. Retrieved from: https://doi.org/10.1016/S0304-4076(01)00098-7

Liang, Y. & Jia, H. (2018). Key success indicators for PPP projects: Evidence from Hong Kong. *Advances in Civil Engineering*, *2018*(2018), 1–10. Retrieved from https://doi.org/10.1155/2018/9576496

Luitel, P., Vanpée, R. & De Moor, L. (2016). Business and finance pernicious effects: How the credit rating agencies disadvantage emerging markets. *Research in International Business and Finance*, *38*, 286–298. From: https://doi.org/10.1016/j.ribaf.2016.04.009

Luo, J. & Wang, C. (2018). Optimal sovereign lending and default. *Journal of International Economics*, (February). From: https://doi.org/10.1016/j.jinteco.2018.01.006

Makhlouf, H. H. (2014). The causes and consequences of sovereign debt. University of the District of Columbia. *International Journal of Business, Humanities and Technology*, *4*(6), 5–10.

Mankiw, N. G. (2012). *Principles of economics* (6th Ed.) (S. Morgan, Ed.). Mason, Ohio: Cengage Learning.

Ma rtins-da-rocha, V. F. & Vailakis, Y. (2016). Dynamics borrowing in excess of natural ability to repay ☆. *Review of Economic Dynamics*, *23*, 42–59. Retrieved from: https://doi.org/10.1016/j.red.2016.09.006

Matovu, J. M. (2010). *Domestic resource mobilization in Sub-Saharan Africa: The case of Uganda*. Ottawa: North-South Institute.

Mattarocci, G. (2013). *The independence of credit rating agencies: How business models and regulators interact* (1st Ed.). New York: Academic Press.

Mbo, M. (2017). *Drivers of organisational performance: A state-owned enterprise perspective.* Stellenbosch: Stellenbosch University. Retrieved from: https://scholar.sun.ac.za/handle/10019.1/100877

Mbu, J. (2016). Why Eurobonds are an important source of finance for Africa. Retrieved April 13, 2020, from: *World Economic Forum website:* https://www.weforum.org/agenda/2016/02/overview-of-the-sub-saharan-african-eurobond-market/

McConnell, C.R., Brue, S.L. & Flynn, S.M. (2012) *Microeconimcs: principles, problems and politics* (19th ed.) New York: McGraw Hill

Megliani, M. (2015). *Sovereign debt: Genesis, restructuring, litigation* (1ST Ed.). Retrieved from: https://doi.org/10.1002/9781118267073

Mensah, L., Bokpin, G. & Boachie-Yiadom, E. (2018). External debts, institutions and growth in SSA. *Journal of African Business*, *19*(4), 475–490. Retrieved from: https://doi.org/10.1080/15228916.2018.1452466

Mishkin, F.S. (2016). *The economics of money, banking and financial markets* (11th Ed.) (D. C. Christina Masturzo, Ed.). New York: Pearson

Mpapalika, J. & Malikane, C. (2019). The determinants of sovereign risk premium in African countries. *Journal of Risk and Financial Management*, *12*(1), 29. https://doi.org/10.3390/jrfm12010029

Mukherjee, M. (2015). *Essays on sovereign debt and default*.Graduate Program in Economics. Ohio State University: Ohio

Mustapha, S. (2014). *What lessons can we learn from the 1980's and 1990's debt crises for developing countries and how are today's conditions similar, how are they different?* London: Overseas Development Institute

Mustapha, S. & Prizzon, A. (2018). *Africa' s rising debt: How to avoid a new crisis*. London: ODI

Nakamura, K. & Yagi, T. **(**2015) *Fiscal Conditions and Long-Term Interest Rates* (No. 15-E-10. Vol. 35). Tokyo: Bank of Japan.

Ndieupa, H. (2018). How does public debt affect economic growth? Further evidence from CEMAC zone. *Asian Research Journal of Arts & Social Sciences*, *5*(1), 1–8. Retrieved from: https://doi.org/10.9734/arjass/2018/39080

Ntsalaze, Z., Boako, G. & Alagidede, P. (2017). The impact of sovereign credit ratings on corporate credit ratings in South Africa. *African Journal of Economic and Management Studies*, *8*(2), 126–146. Retrieved from: https://doi.org/10.1108/AJEMS-07-2016-0100

Ntsaluba, S. S. (2014). Comparative analysis of financing instruments used by development finance institutions: Lessons for BRICS Development Bank. Cape Town: University of Cape Town.

Nyambuu, U. & Semmler, W. (2017). Emerging markets' resource booms and busts, borrowing risk and regime change. *Structural Change and Economic Dynamics*, *41*, 29–42. Retrieved from: https://doi.org/10.1016/j.strueco.2017.02.001

Obstfeld, M., Shambaugh, J. C. & Taylor, A. M. (2010). Financial stability, the trilemma, and international reserves. *American Economic Journal: Macroeconomics*, *2*(2), 57–94. Retrieved from: https://www.jstor.org/stable/25760297

Ocran, M. (2012). *Masters in development finance:.Issues in development finance* (M. Ocran, Ed.). Cape Town: Africagrowth Institute.

Ogawa, K., Elmer Sterken, I. T. (2016). *Public debt, economic growth and the real interest rate: A panel VAR approach to EU and OECD countries* (No. 955). Retrieved from http://hdl.handle.net/10419/148183

Olabisi, M. & Stein, H. (2015). Sovereign bond issues: Do African countries pay more to borrow? ☆. *Journal of African Trade*, *2*(1–2), 87–109. Retrieved from: https://doi.org/10.1016/j.joat.2015.08.003

Oosterlinck, K. (2013). Sovereign debt defaults: Insights from history. *Oxford Review of Economic Policy*, *29*(4), 697–714. https://doi.org/10.1093/oxrep/grt040

Oyedele, L. O. (2013). Avoiding performance failure payment deductions in PFI/PPP projects: Model of critical success factors. *Journal of Performance of Constructed Facilities, 27*(3), 283–295. Retrievedfrom: https://doi.org/10.1061/(ASCE)CF.1943-5509.0000367.

Schindler, P.S. (2014). *Business research methods* (12th Ed.; J. Kouvelis, C. Ducham, Ed.). New York: McGraw-Hill/Irwin.

Pankaj Sinha, V. A. & V. B. (2011). Determinants of public debt for middle income and high income group countries using Panel Data regression. *Munich Personal RePEc Archive*, *1*(2116), 0–33. Retrieved from: https://doi.org/10.1227/01.NEU.0000349921.14519.2A

Park, G. & Lee, H. (2018). Opportunistic behaviors of credit rating agencies and bond issuers. *Pacific-Basin Finance Journal*, *47*(October 2017), 39–59. Retrievedfrom: https://doi.org/10.1016/j.pacfin.2017.11.003

Pato, L. (2019). External indebtedness nexus fiscal imbalances: Where and how Africa is losing? *Africa Growth Agenda*, *16*(3), 2019.

Paudyn, B. (2014). *Credit Ratings and Sovereign Debt* (T. M. Shaw, Ed.). Hampshire: Palgrave Macmillan.

Peters, S. (2017). Sovereign wealth funds and long-term investments in infrastructure. In P. T.

Malan Rietveld (Ed.), *The new frontiers of sovereign investment* (202–228). Retrieved from: https://www.jstor.org/stable/10.7312/riet17750.16

Petrovic, K. (2013). *Government debt: An analysis of what factors influences the long-term interest rate*. Karlstads University. Retrieved from www.hhk.kau.se

Pham, T. H. H. (2015). *Determinants of bank lending*. Retrieved from https://hal.archives-ouvertes.fr/hal-01158241

Prizzon, A., Greenhill, S. M. (2017). An 'age of choice' for external development finance? Evidence from country case studies. *Development Policy Review*, *35*(April), 29–45. https://doi.org/10.1111/dpr.12268

Quartey, J. D. J. A. Q. (2019). Towards survival of state owned enterprises in Sub-Saharan Africa : Do fiscal benefits matter? *International Journal of Economics, Commerce and Management*, *VII*(May), 29. Retrieved from http://ijecm.co.uk/

Rao, P. K. (2003). *Development finance* (1st Ed.). Retrieved from http://www.springer.de

Junquera-Varela, R.F., Verhoeven, M., Shukla, G.P., Haven, B. Awasthi, R. & B. M.-D. (2017). *Strengthening domestic resource mobilization: Moving from theory to practice in low-and middle-income countries.* (and B. M.-D. Junquera-Varela, Raul Felix, Marijn Verhoeven, Gangadhar P. Shukla, Bernard Haven, Rajul Awasthi, Ed.). Retrieved from: https://doi.org/10.1596/978-1-4648-1073–2

Husakova, R.. (2018). *Additionality in the EBRD: Review of concept and application*. Retrieved from www.ebrd.com

Cantor, R.F.P. (2015). Determinants of sovereign credit ratings. *FRBNY economic policy review*, *October 19*(January 1996), 37–53.

Rajan Annamalai, T. & Jain, N. (2013). Project finance and investments in risky environments: Evidence from the infrastructure sector. *Journal of Financial Management of Property and Construction*, *18*(3), 251–267. Retrieved from: https://doi.org/10.1108/JFMPC-08-2012-0033

Robbins, M.D., & Simonsen, B. (2019). Do debt levels influence state borrowing costs? *Public Administration Review*, *72*(4), 498–505. Retrieved from https://www.jstor.org/stable/41506800

Roos, J. (2019). *Why not default? The political economy of sovereign debt* (J. Roos, Ed.). New Jersey: Princeton University Press.

Sagasti, F., Bezanson, K., Prada, F., Blockus, K., Lima, A. T. & Salop, J. (2004). *The future of development financing: Challenges, scenarios and strategic choices* (Vol. 2004). Retrieved from: http://www.ids.ac.uk/ids

Saggar, R. J. & M. K. (2001). Determinants of sovereign borrowings from IMF. E*conomic and Political Weekly*, *36*(36), 3467–3471.
Retrieved from: http://www.jstor.org/stable/4411089

Saini, A., Madan, P. & Batra, S. K. (2011). Empirical relationship between foreign direct investment and economic variables of Pakistan. *IOSR Journal of Business and Management*, *12*(Special Issue-AETM'16), 69–76.

Schiller, B. R. (1991). *The economy today* (5th ed.); (E. R. Jim Bittker, Scott D. Stratford, Ed.). New York: McGraw-Hill

Senadza, B., Fiagbe, A. K. & Quartey, P. (2018). The effects of external debt on economic growth in sub-Saharan Africa. *International Journal of Business and Economic Sciences Applied Research (IJBESARJ, 11(1):61–69.*

Senga, C. (2019). *African eurobonds:Opportunities and challenges for sustainable economic growth after the HIPC initiative*. Antwerp: University of Antwerp.

Senga, C., Cassimon, D. & Essers, D. (2018). Sub-Saharan African eurobond yields: What really matters beyond global factors ? *Review of development economics*, *8*(1), 49–62. Retrieved from: https://doi.org/10.1016/j.rdf.2018.05.005

Sercu, P. (2000). *Exchange rate volatility , trade , and capital flows under alternative exchange rate regimes* (2nd Ed.) R. U. (University of B. C.) Piet Sercu (Catholic University of Leuven), Ed.. New York: Cambridge University Press.

Sercu, P., & Vanhulle, C. (1992). Exchange rate volatility, international trade, and the value of exporting firms *. *Journal of Banking and Finance*, *16*(1992), 155–182.

Serenis, D., & Tsounis, N. (2014). Does exchange rate variation effect African trade flows ? *Procedia Economics and Finance*, *14*(14), 565–574.
Retrieved from: https://doi.org/10.1016/S2212-5671(14)00757-6

Spilioti, S. (2015). The relationship between the government debt and GDP growth: Evidence of the Euro area countries. *Investment Management and Financial Innovations*, *12*(1), 174–178. Retrieved from businessperspectives.org

Stiglitz, J. E. (2010). *The Stiglitz report* (J. E. Stiglitz, Ed.). New York: The New Press.

Storkey, I.A.N. (2001). Sovereign debt management: A risk management focus. *The Finance Na Treasure Professiona*, (May), 7–10.

Sy, A. N. R., & Sow, M. (2016). *Domestic resource mobilization and external financing: When does governance matter ? Evidence from sub-Saharan Africa* (No. 19). Retrieved from: https://www.brookings.edu/about-us/annual-report/

Teixeira, J. C. A., Silva, F. J. F., Ferreira, M. B. S. & Vieira, J. A. C. (2018). Sovereign credit rating determinants under financial crises. *Global Finance Journal*, *36* (January) 1–13. Retrieved from: https://doi.org/10.1016/j.gfj.2018.01.003

UNCTAD. (2012a). Guidelines on rsponsible sovereign lending and borrowing. *UNCTAD project on promoting responsible lending and borrowing*, (January), 1–13. Retrieved from: http://www.unctad.info/upload/Debt Portal/RSLB Guidelines/RSLB Guidelines 25 Aug 2014.pdf

UNCTAD. (2012b). Sovereign debt crisis: From relief to resolution. In Y. Li (Ed.), *Policy Brief* (Vol. 3, 1–4). Washington DC: UNCTAD.

Kolmar, M. (2017). *The SDG Investment Case*. Principles for Responsible Investment. New York: UNEP Finance Initiative and United Nations Global Compact

Van der Wansem, P. B. G., Jessen, L. & Rivetti, D. (2019). Issuing international bonds. In *Issuing International Bonds* (No. 13). Retrieved from: https://doi.org/10.1596/31569

Waheed, A. (2017). Determinants of external debt: A panel data analysis for oil and gas exporting and importing countries. *International Journal of Economics and Financial Issues*, *7*(1), 234–240.

Willem, D. (2014). *Sovereign bonds in Sub-Saharan Africa. Good for growth or ahead of time?* (No. 87). Retrieved from http://www.dallasfed.org/assets/documents/institute/wpapers/2008/0019.pdf

Williams, C. (2007). *Research Methods*. Journal of Business and Economic Research, *5*(3), 65–72.

Williams, G., Alsakka, R. & Gwilym, O. (2013). The impact of sovereign rating actions on bank ratings in emerging markets. *Journal of Banking and Finance, 37*(2), 563–577. Retrieved from: https://doi.org/10.1016/j.jbankfin.2012.09.021

Winters, M. S. (2010). Choosing to target: What types of countries get different types of World Bank projects. *World Politics*, *62*(3), 422–458. Retrieved from: https://doi.org/10.1017/S0043887110000092

World Bank (2017) *Board update: Domestic resource mobilization (DRM) and illicit financial flows* (IFFs) 1–41.

Yan, W. (2013). Using trend data to evaluate the differential response of state borrowing to revenue volatility. *Public Budgeting & Finance*, *1*(Summer 2013), 75–93.

Yared, P. (2019). Rising government debt: Causes and solutions for a decades-old trend. *Journal of Economic Perspectives*, *33*(2), 115–140. Retrieved from: https://doi.org/10.1257/jep.33.2.115

Zampolli, F. (2012). *Sovereign debt management as an instrument of monetary policy: An overview, BIS Papers chapters.* Bank for International Settlements (ed.), Threat of fiscal dominance?, *65: 97 - 118* . Washington DC: Bank for International Settlements

Zeufack, A.G. (2018). *Africa's pulse: An analysis of issues shaping Africa's economic future* (Vol. 18). Retrieved from: www.worldbank.org

Zou, P.X.W., Wang, S., Fang, D., Zou, P. X. W., Wang, S. & Fang, D. (2008). A life-cycle risk management framework for PPP infrastructure projects. *Journal of Financial Management of Property and Construction*, *13*(2), 123–142. Retrieved from: https://doi.org/10.1108/13664380810898131

Zulkhibri, M. (2015). Interest burden and external finance choices in emerging markets: Firm-level data evidence from Malaysia. *International Economics*, *141*, 15–33. Retrieved from: https://doi.org/10.1016/j.inteco.2014.11.002

Appendices

Appendix 1 – List of SSA countries sampled

Angola	Cameroon	The Gambia	Madagascar	Niger	Sudan
Benin	Comoros	Ghana	Malawi	Nigeria	Tanzania
Botswana	DRC	Guinea-Bissau	Mali	Rwanda	Togo

Burkina Faso	Cote D'Ivoire	Kenya	Mauritania	Sao Tome and Principe	Uganda
Burundi	Eswatini	Lesotho	Mauritius	Senegal	Zambia
Cabo Verde	Ethiopia	Liberia	Mozambique	South Africa	Zimbabwe

Source: International Debt Statistics, 2019, The World Bank

Appendix 2 – Descriptive statistics: SSA countries (2009 – 2017)

Descriptive statistics

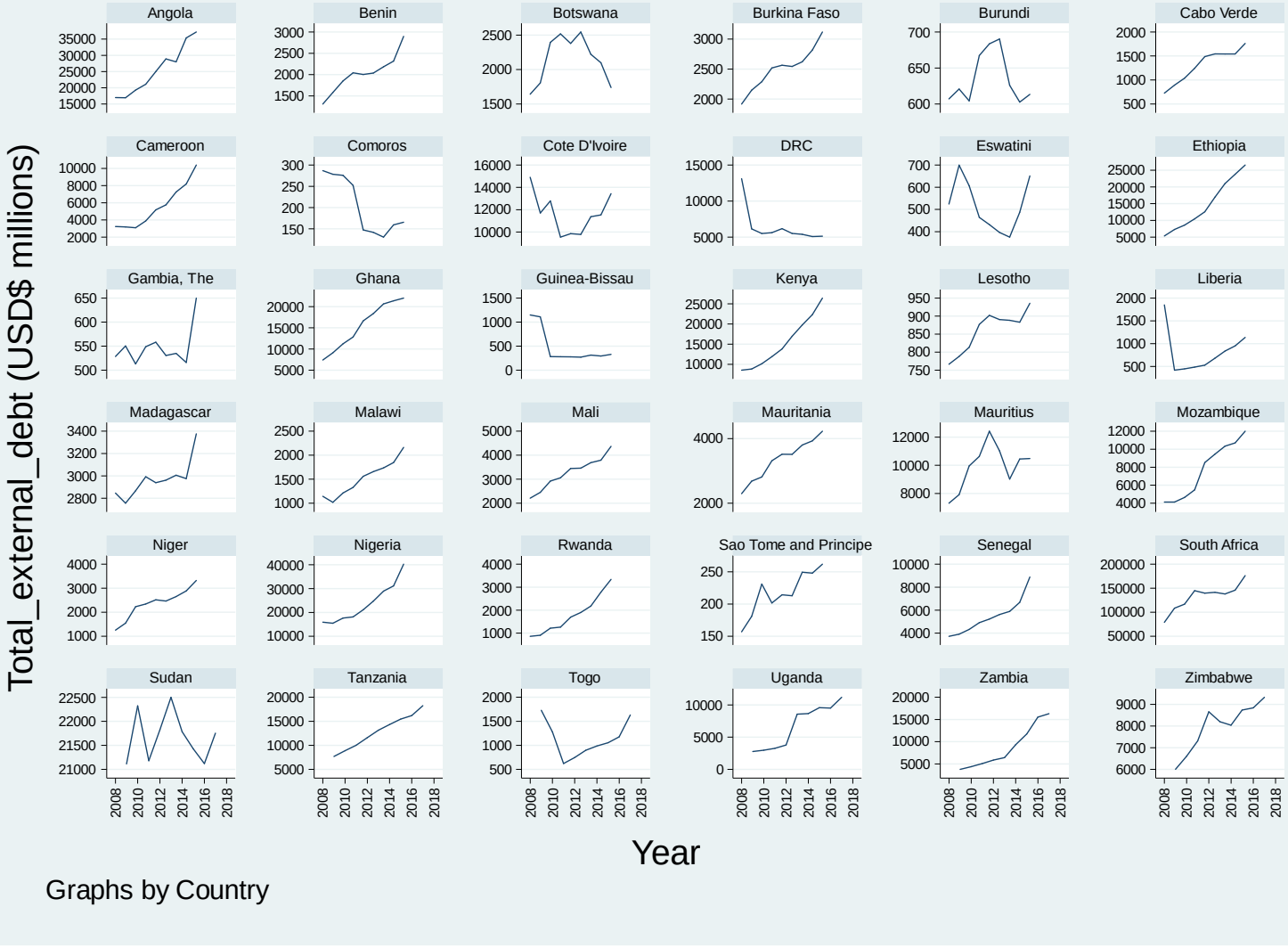
Variable		Mean	Std. Dev.	Min	Max	Observations
Total external debt (USD$ million)	Overall	10011.71	22438.81	130.60	176334.70	N = 324
	Between		22096.57	204.23	132348.70	n = 36
	Within		5228.25	-43319.63	53997.67	T = 9
Interest rate paid (all creditors)	Overall	1.67	1.42	0.00	7.80	N = 324
	Between		0.97	0.16	4.02	n = 36
	Within		1.04	-1.57	5.85	T = 9
Gross national income (GNI)	Overall	38363.92	86242.37	187.50	549528.10	N = 324
	Between		85006.03	287.81	400004.30	n = 36
	Within		19766.02	-206721.80	187887.80	T = 9
Exports	Overall	10678.32	22926.34	21.30	132169.70	N = 324
	Between		22583.02	62.36	111703.90	n = 36
	Within		5315.61	-24647.96	39024.95	T = 9
Imports	Overall	13096.20	24708.86	104.70	140297.80	N = 324
	Between		24525.48	168.30	121544.20	n = 36
	Within		4891.47	-18147.76	39508.14	T = 9
Primary income on FDI	Overall	1222.72	3412.97	-145.40	25257.10	N = 324
	Between		3269.84	0.16	17578.44	n = 36
	Within		1105.12	-7687.82	8901.38	T = 9
International reserves	Overall	4784.20	9970.29	48.20	46405.20	N = 300
	Between		9619.30	60.11	42090.96	n = 36
	Within		1681.93	-5596.11	13576.09	T = 8.33333
Foreign direct investment (FDI)	Overall	635.27	1557.19	-7364.70	9453.30	N = 324
	Between		1073.03	-15.61	5704.12	n = 36
	Within		1141.04	-6799.43	10018.57	T = 9
Debt service to GNI	Overall	2.33	4.54	0.10	49.71	N = 324
	Between		4.11	0.46	25.31	n = 36
	Within		2.03	-10.51	26.74	T = 9
Interest arrears on long-term debt	Overall	248.84	917.32	0.00	6771.60	N = 324
	Between		920.46	0.00	5407.11	n = 36
	Within		123.28	-267.27	1613.33	T = 9
Short-term to external debt stocks	Overall	8.38	9.33	0.00	49.70	N = 324
	Between		8.50	0.00	30.90	n = 36
	Within		4.07	-4.32	28.28	T = 9
Reserves to external debt stocks	Overall	62.06	70.67	0.80	529.70	N = 300
	Between		64.78	1.74	374.54	n = 36
	Within		24.74	-29.23	217.21	T = 8.33333

Source: Author data analysis. Data source: International Debt Statistics, 2019, The World Bank

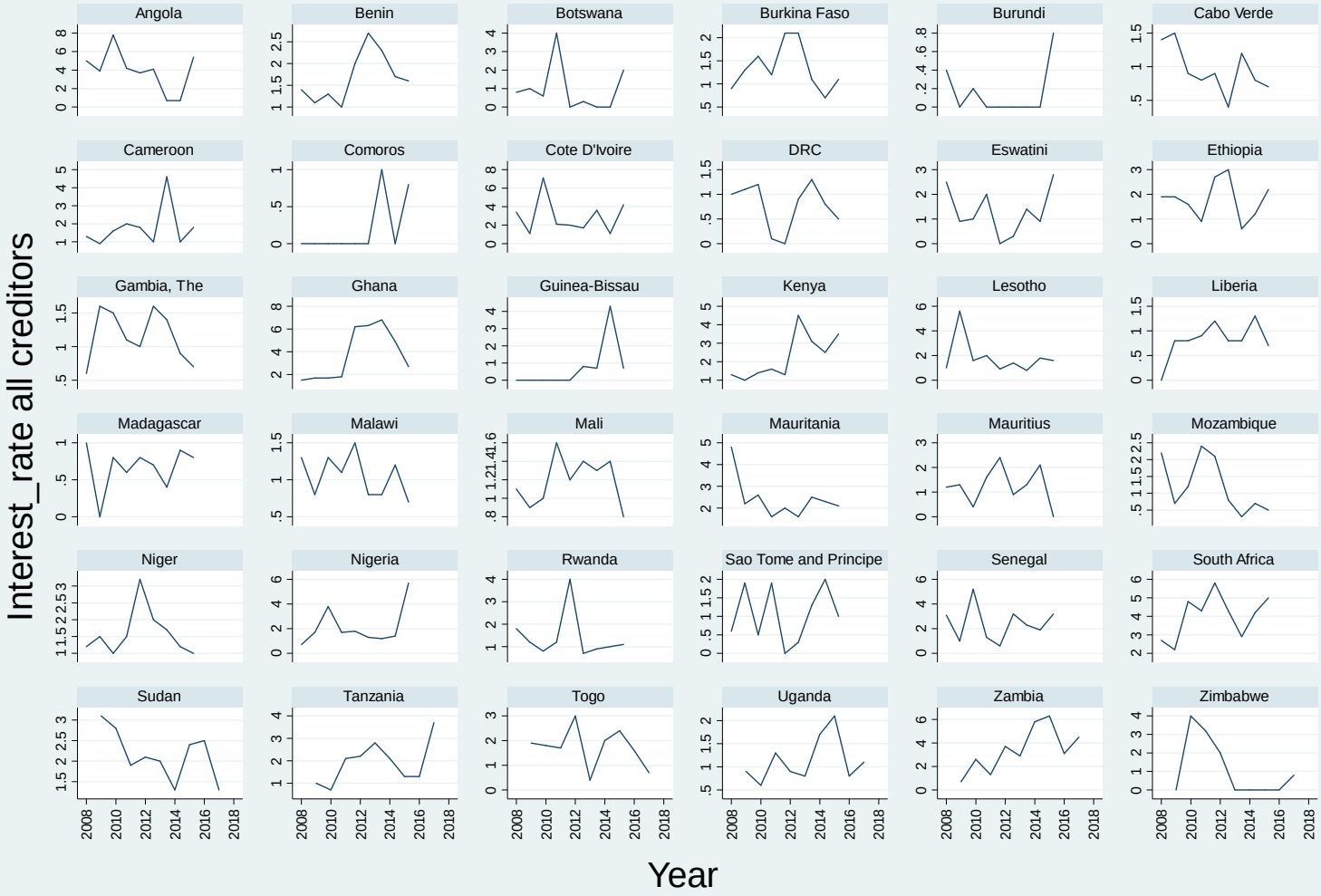
Appendix 3 – Trends: SSA countries (2009 – 2017)

(a) Trends for Total external debt

Source: Author – data analysis

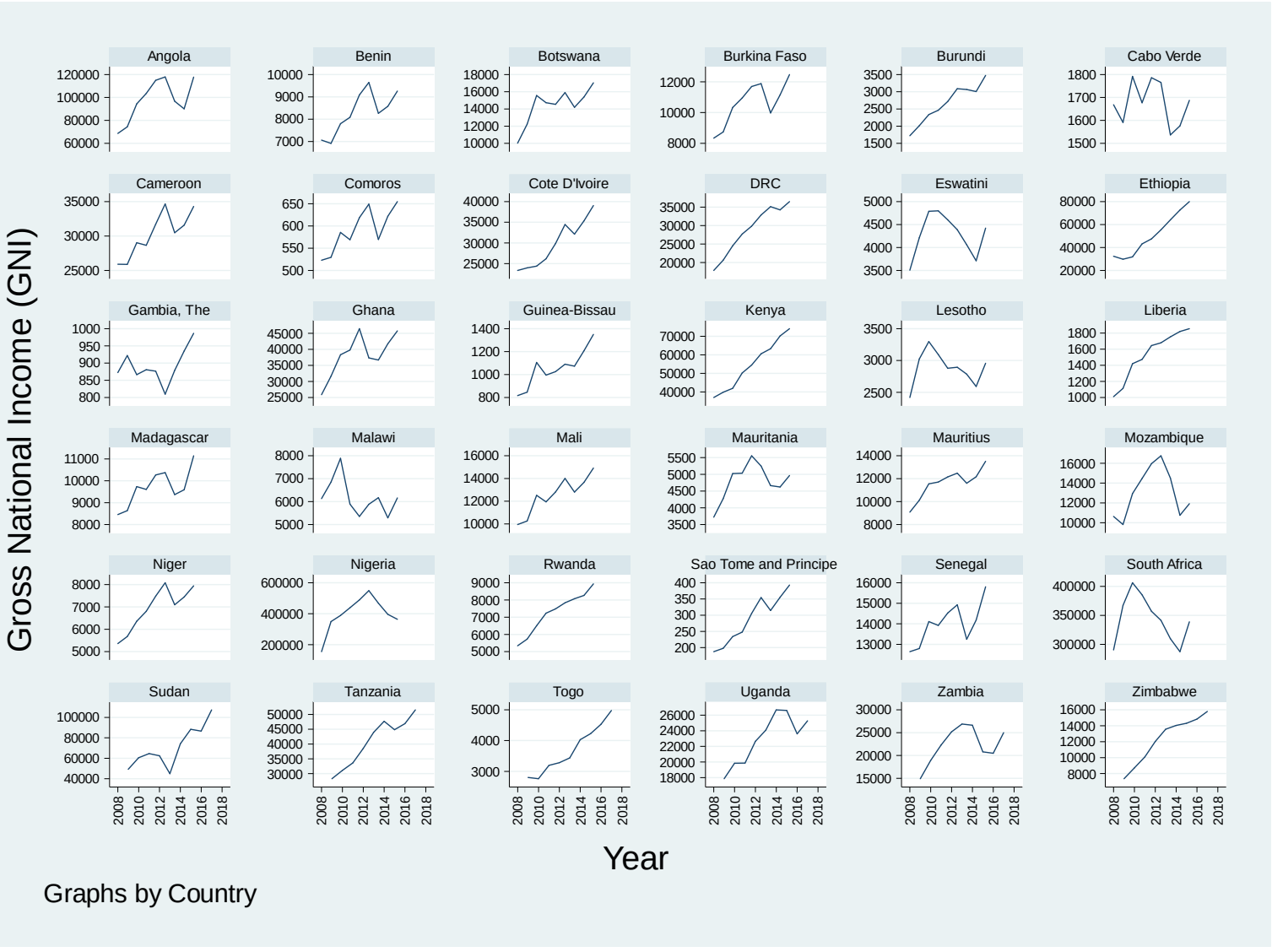


(b) Trends for Interest rate – all creditors



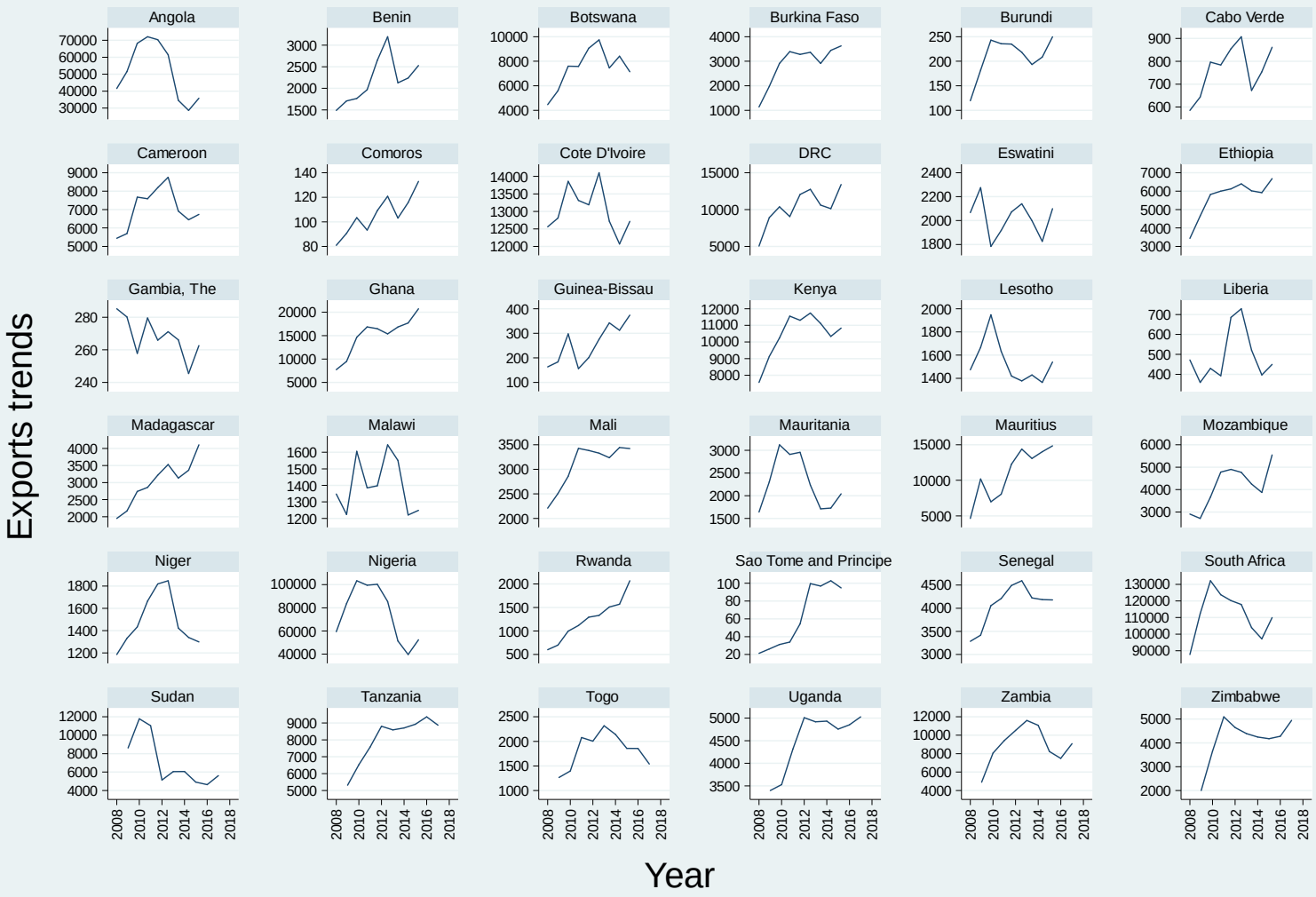
Source: Author – data analysis

(c) Trends for Gross national income (GNI



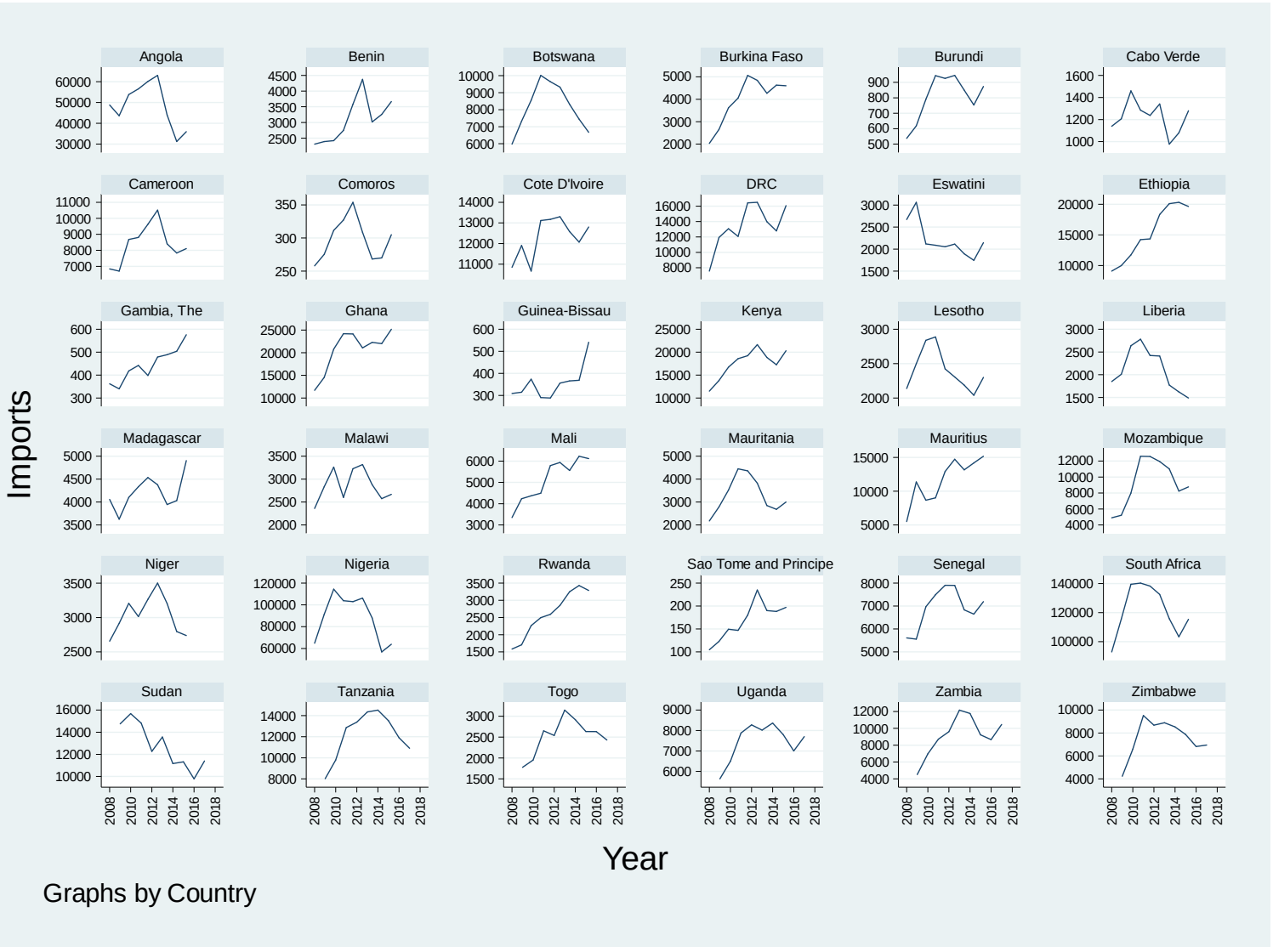
Source: Author – data analysis

(d) Trends for Exports



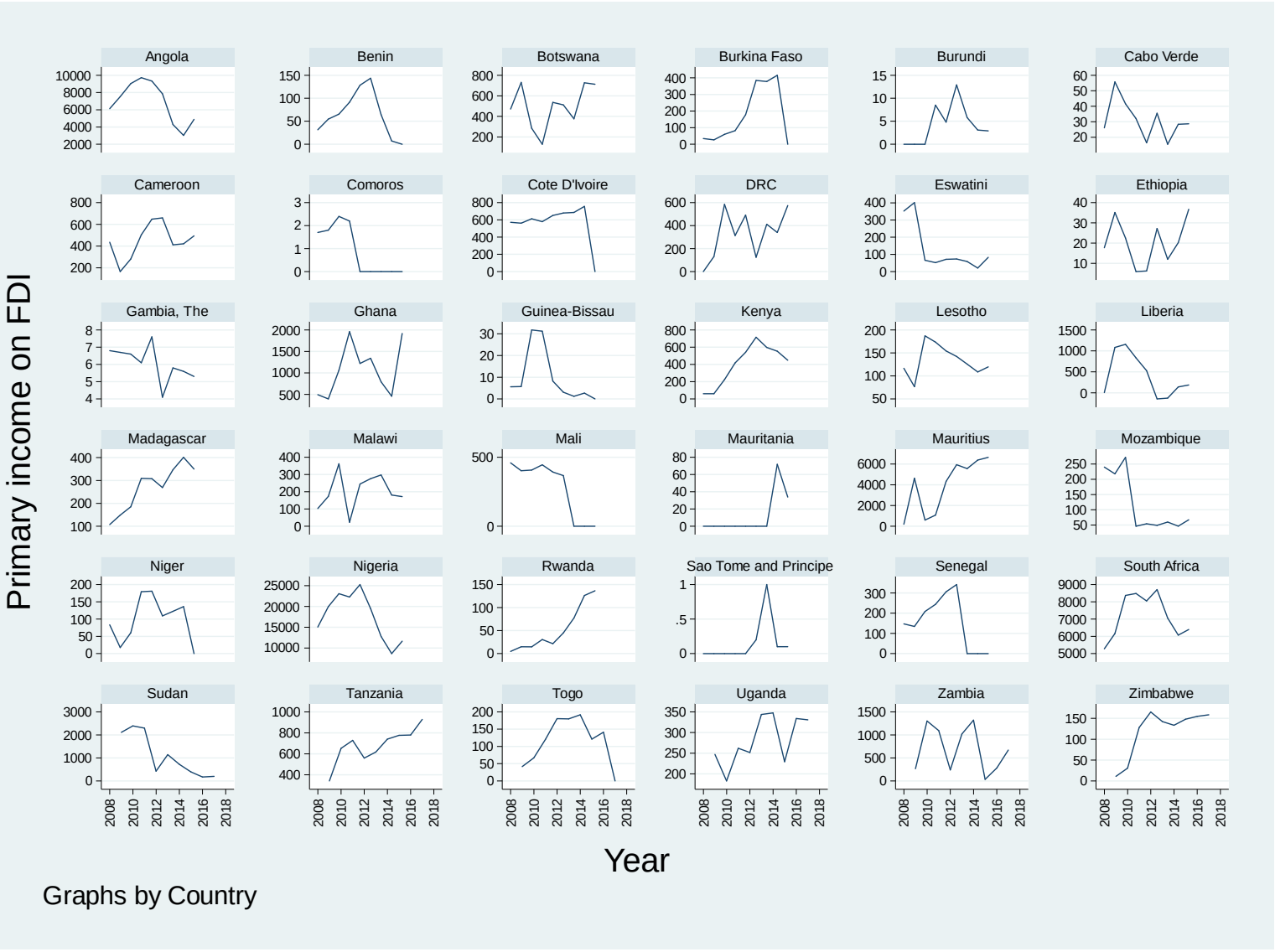
Source: Author – data analysis

(e) Trends for Imports

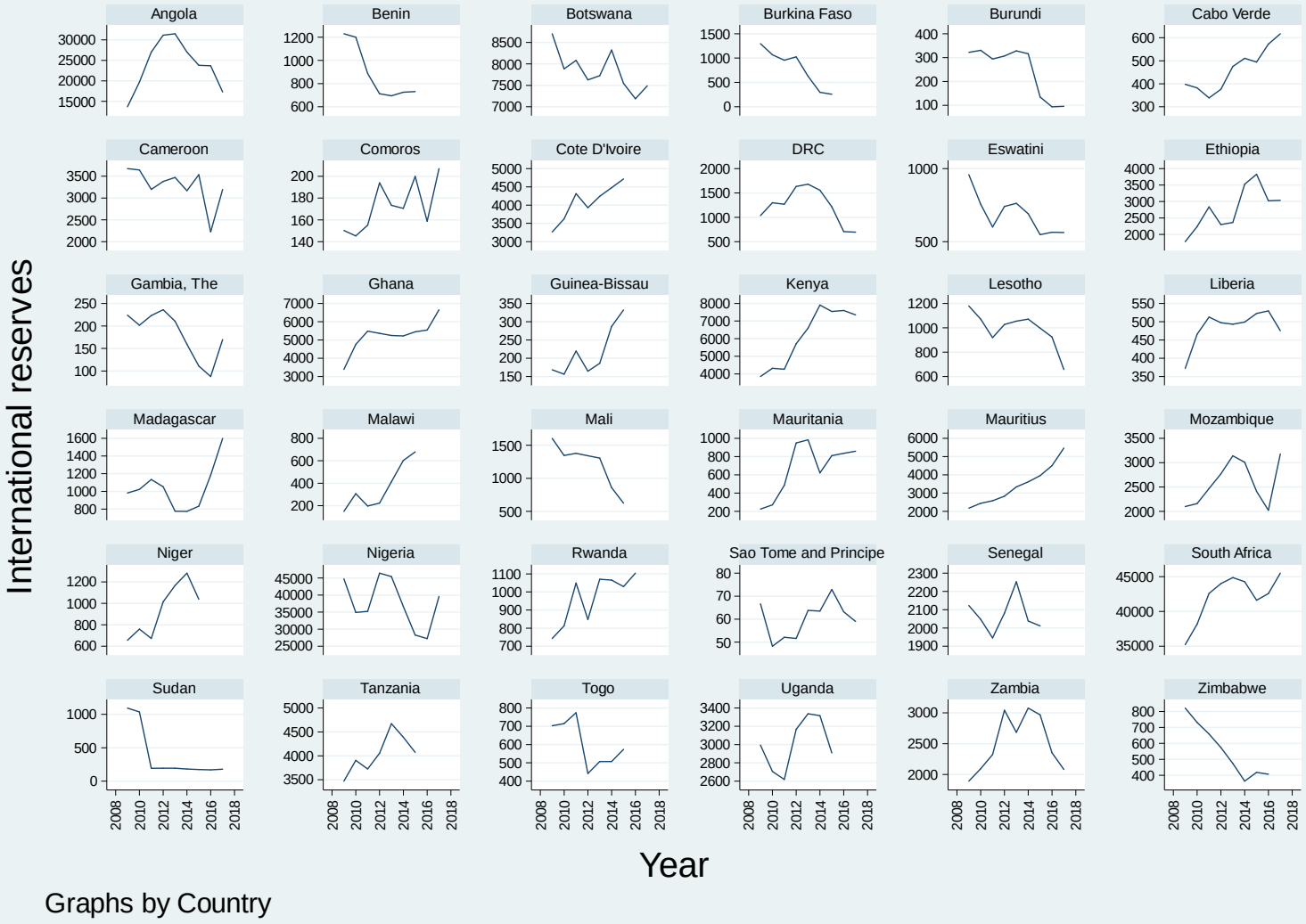


Source: Author – data analysis

(a) Trends for Primary income on foreign direct investment (FDI)

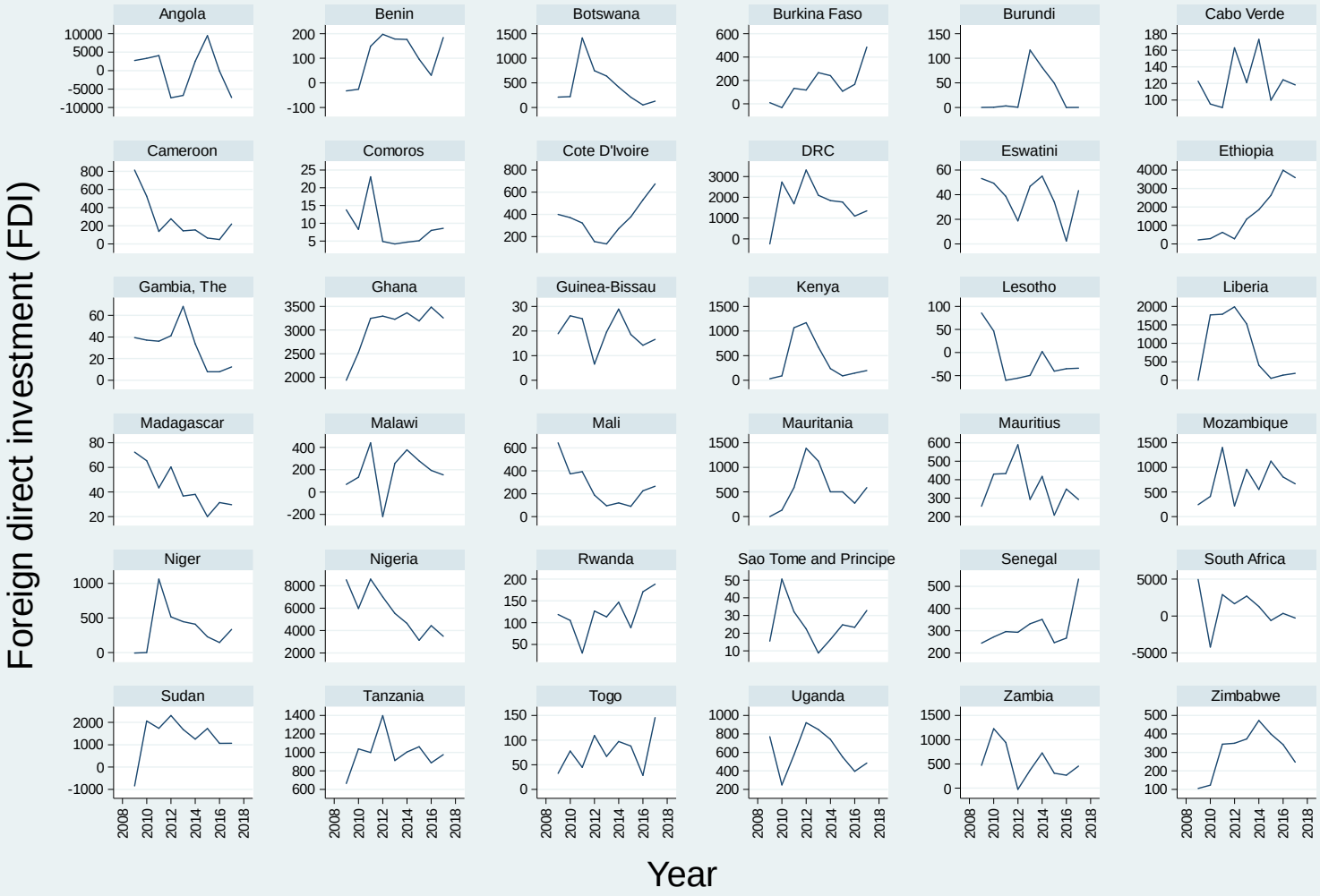


(b) Trends for International reserves



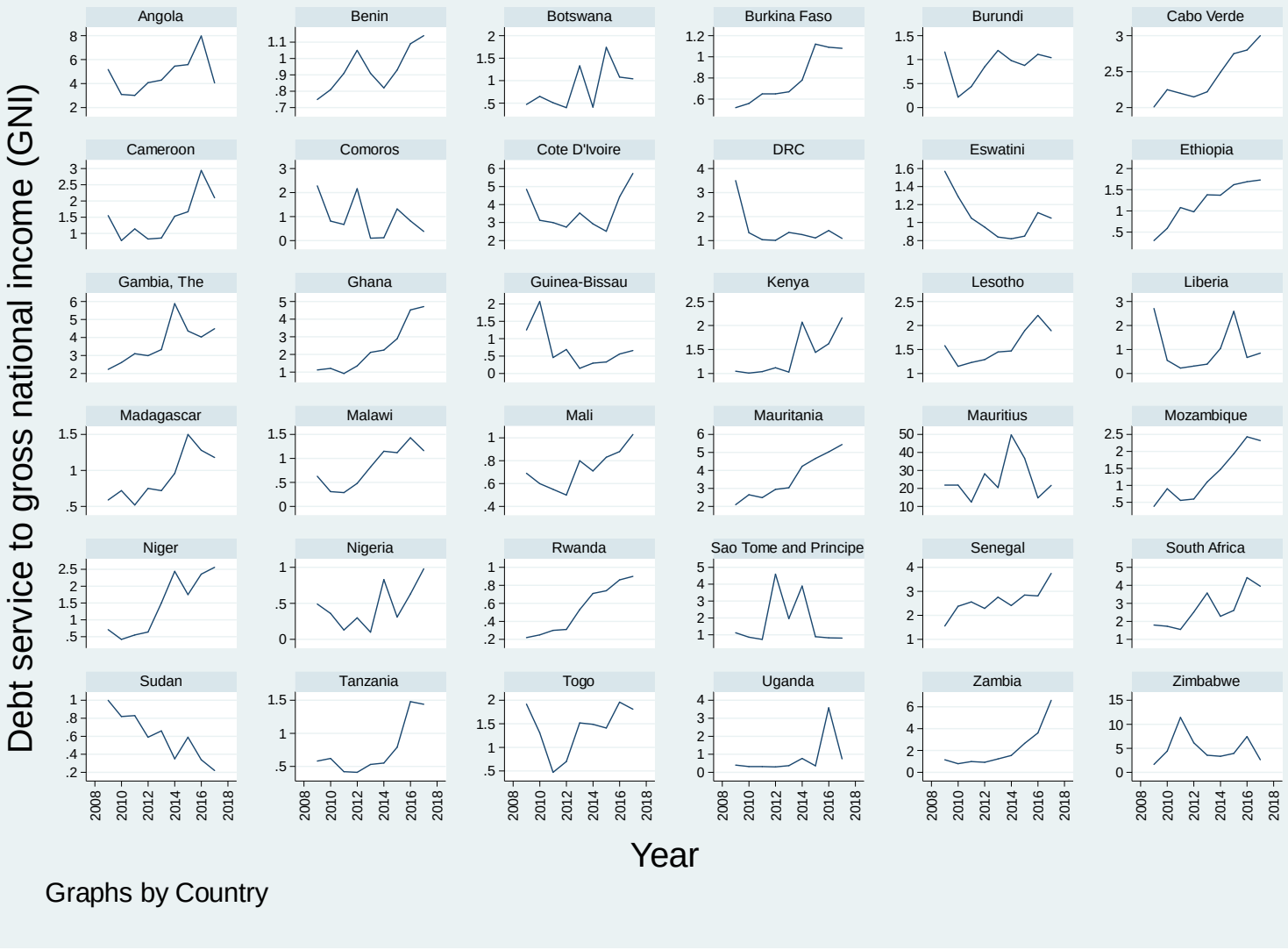
Source: Author – data analysis

(c) Trends for foreign direct investments (FDI)

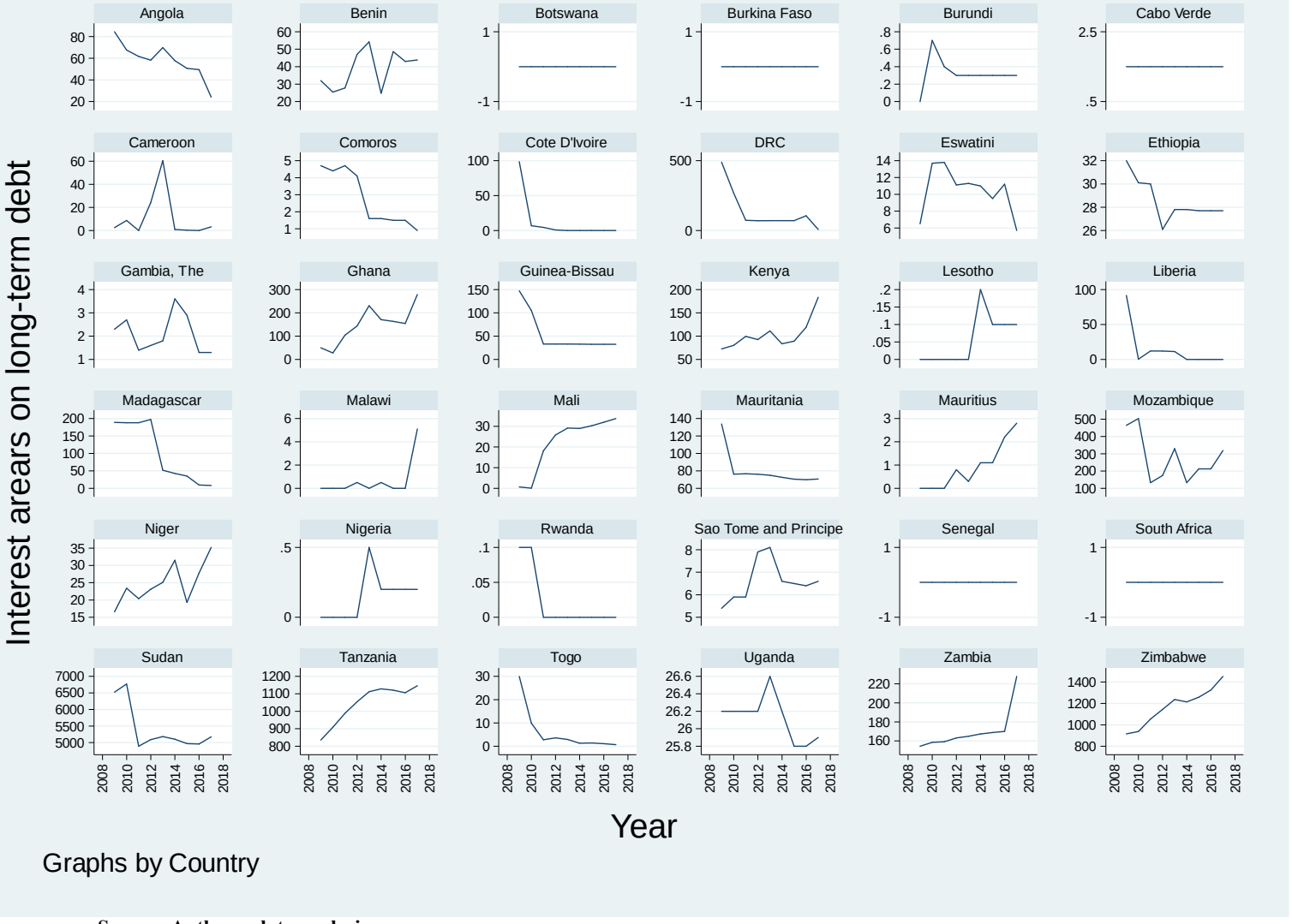


(d) Trends for debt service to gross national income (GNI) ratio

Source: Author – data analysis

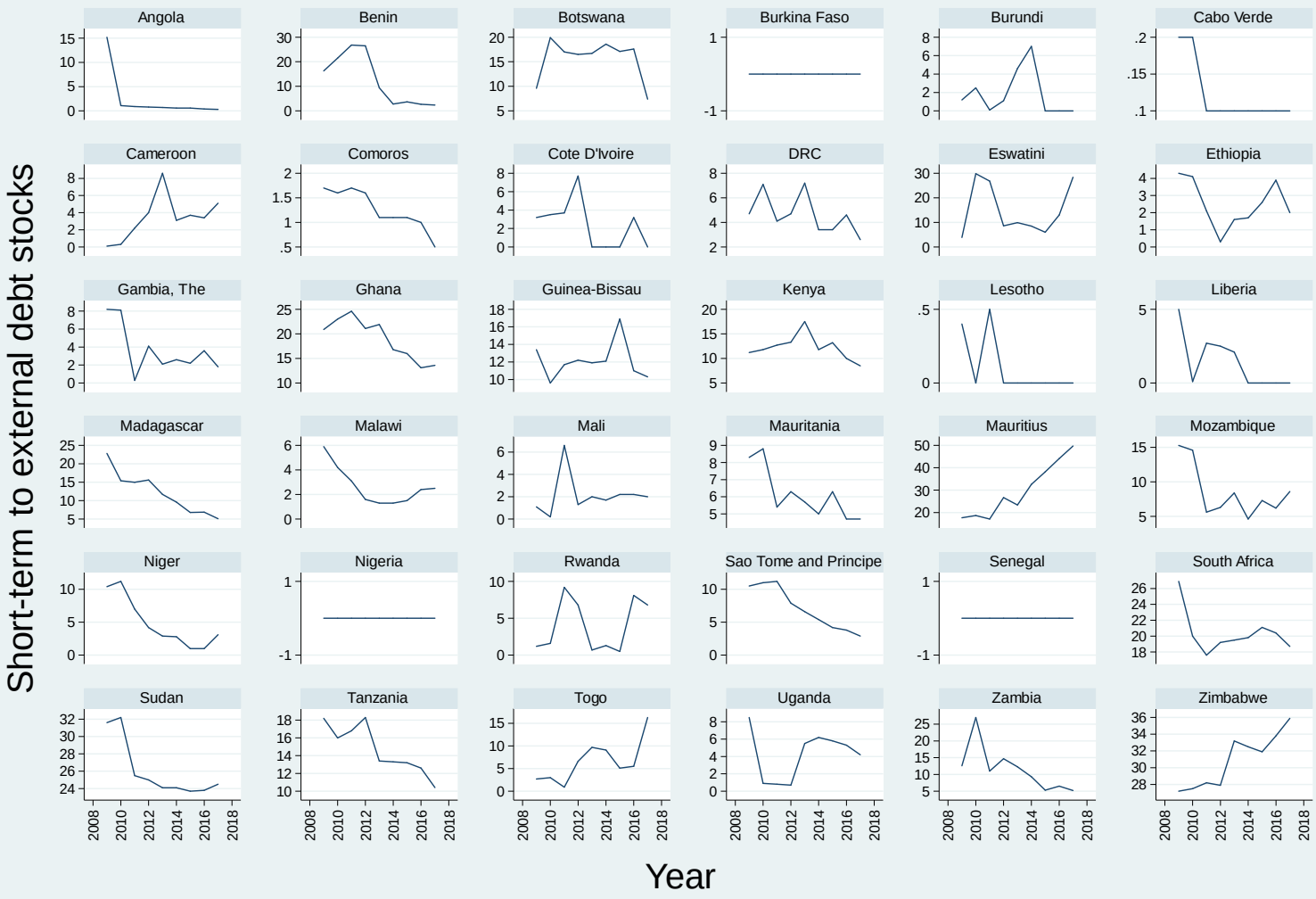


(e) Trends for interest arrears on long-term debt



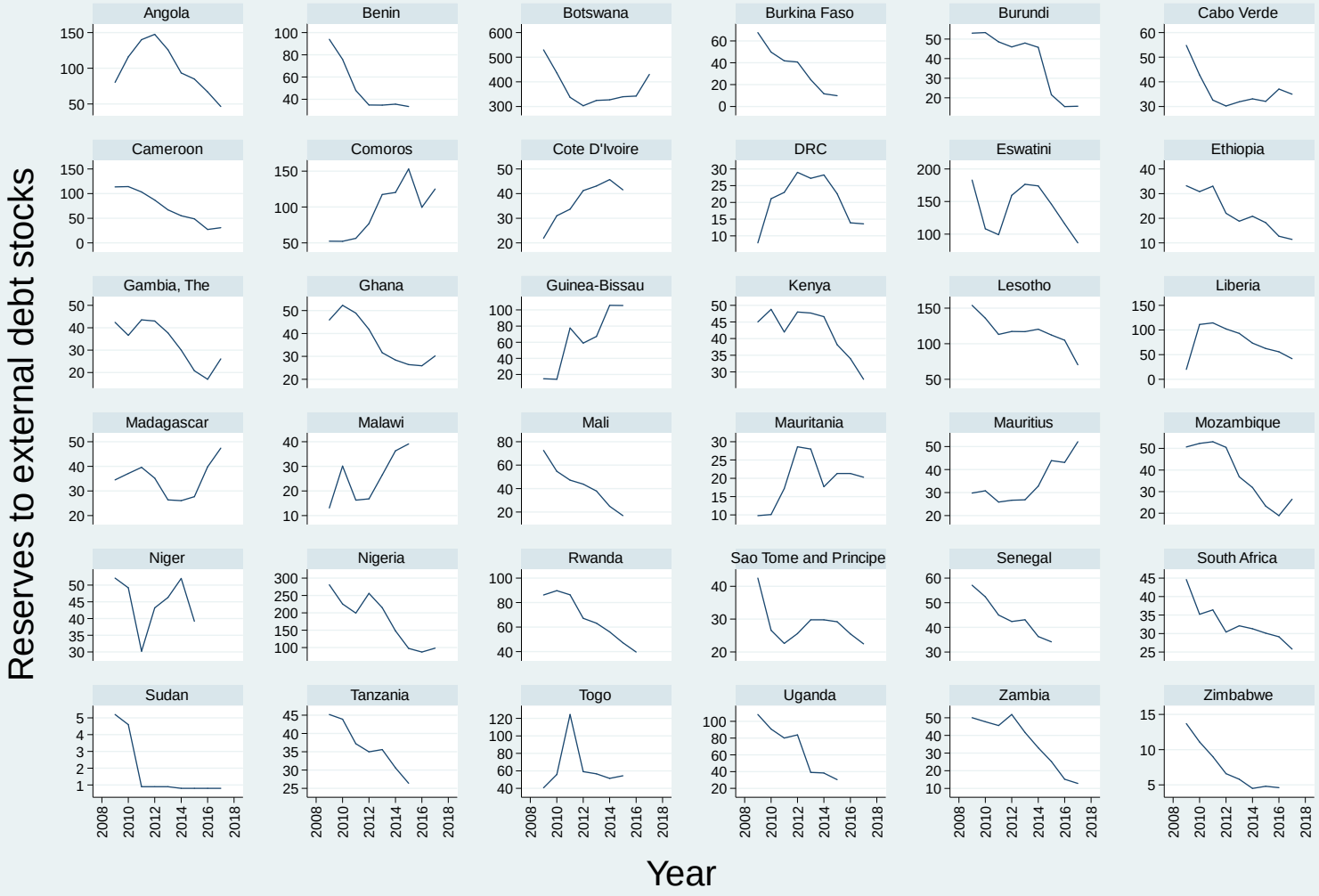
Source: Author – data analysis

(f) Trends for short-term to external debt stocks ratio



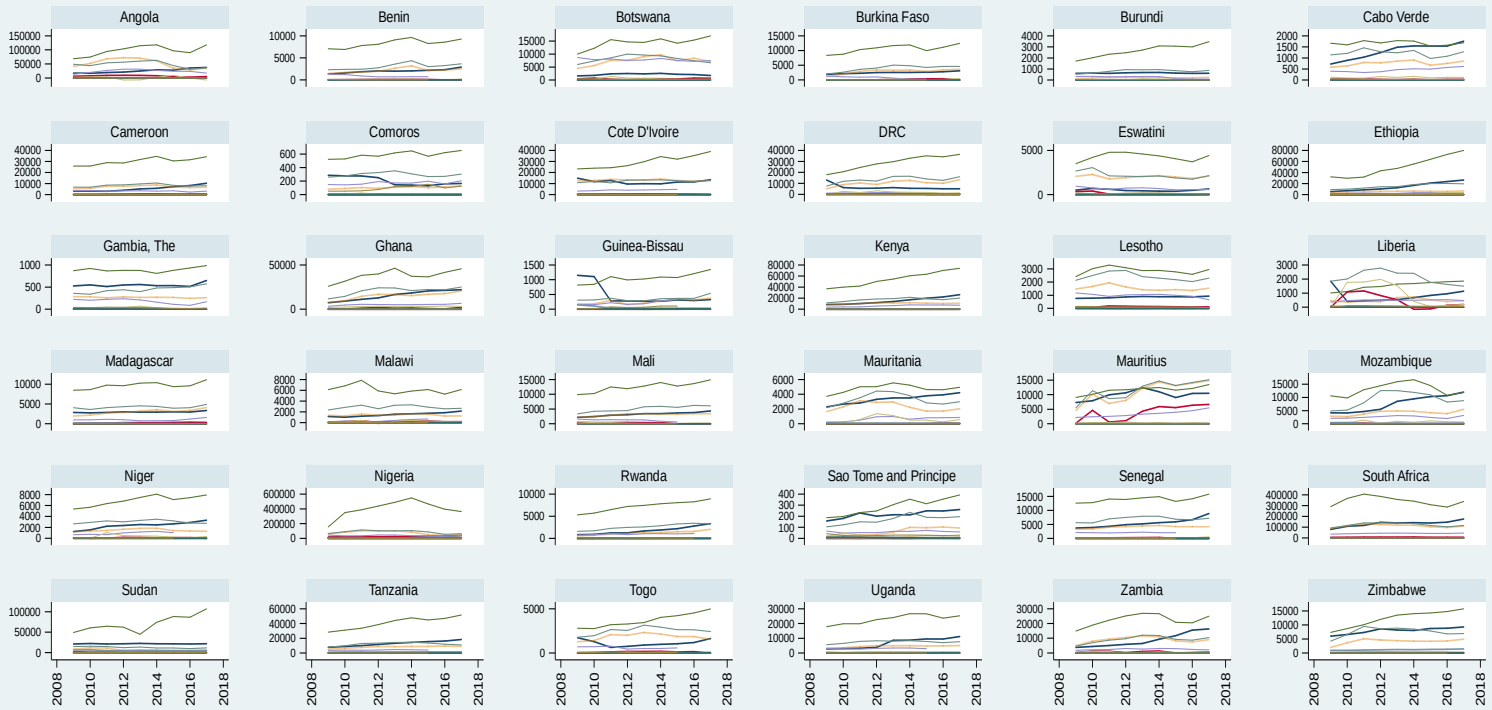
Source: Author – data analysis

(g) Trends for reserves to external debt stocks



Source: Author – data analysis

(h) Trends for all variables



Appendix 4 – Regional debt ratios for 2010 – 2018 period

Sub-Saharan Africa

	Debt/GNI	Debt/Exports	Debt service/Exports	Short-term/Debt	Multilateral/Debt	Reserves/Debt
2010	23.7	75.2	4.7	16.2	19.6	52
2011	23	68.8	4	14.4	19.1	52
2012	24.9	80.1	5.8	15.9	17.6	50.5
2013	26	86.6	6.6	15.5	17.8	46.9
2014	25.8	96.5	8.2	14.1	17.8	41.3
2015	29.2	128.8	9.4	14.1	17.9	35.3
2016	32.9	145.6	12.6	12.6	18.1	30.1
2017	34.8	144	12	12.6	18.8	29.1
2018	36.2	134.5	14.1	11.7	18.9	28

Source: International Debt Statistics, 2020, The World Bank

Latin America and Caribbean

	Debt/GNI	Debt/Exports	Debt service/Exports	Short-term/Debt	Multilateral/Debt	Reserves/Debt
2010	22.6	116.6	15.2	16.8	11.9	54.6
2011	22.8	108.7	15	14.7	10.4	54.9
2012	25.2	120	17.1	14.6	9.8	53.3
2013	27.1	132.3	17.6	15.1	9.2	48.4
2014	29.3	148.7	17.5	15.2	8.7	45.4
2015	34.8	173.1	24.4	15.6	9.1	43.1
2016	36.4	177.3	30.3	13.7	9.2	43.7
2017	34.2	165.2	25.9	13.6	9	43.3
2018	37.6	159.6	22.4	15.3	9	41.5

Source: International Debt Statistics, 2020, The World Bank

South Asia

	Debt/GNI	Debt/Exports	Debt service/Exports	Short-term/Debt	Multilateral/Debt	Reserves/Debt
2010	19.9	96	7.4	16.3	24.5	76.9
2011	20.2	85.5	6.6	19.1	22.7	67.4
2012	23	98.7	7.4	20.1	20.2	58.8
2013	24	100.3	8.9	19.1	18.9	56.3
2014	23.4	102.8	18.1	17.1	17.6	59.4
2015	23.5	119.3	11.2	16.2	16.8	63.2
2016	21.4	116.4	16.2	17.2	17.5	66.4
2017	21.1	117	10.8	17.8	16.7	65.5
2018	21.1	109.8	12.1	17.9	16.6	59.2

Source: International Debt Statistics, 2020, The World Bank

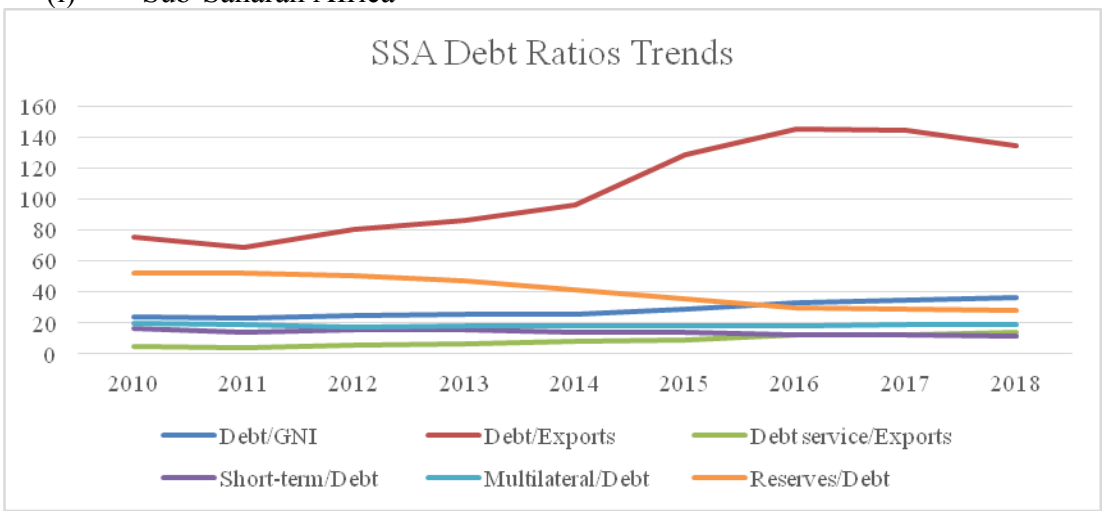
East Asia and Pacific

	Debt/GNI	Debt/Exports	Debt service/Exports	Short-term/Debt	Multilateral/Debt	Reserves/Debt
2010	15.6	51	4.7	52.1	7.3	271.3
2011	16.8	54.3	4.2	57.1	5.7	231.4
2012	16.7	56.1	4.5	53.6	5.3	216.1
2013	18.4	63.3	4.4	58.3	4.4	201.8
2014	19.7	69.8	5.3	56.6	3.8	174.3
2015	15.6	59.8	6.8	47.3	4.9	186
2016	16.2	66	8.4	43.9	4.7	162.4
2017	17.5	68.8	8.6	47.6	4.3	145.7
2018	17.6	72.1	9.1	49	3.9	127.5

Source: International Debt Statistics, 2020, The World Bank

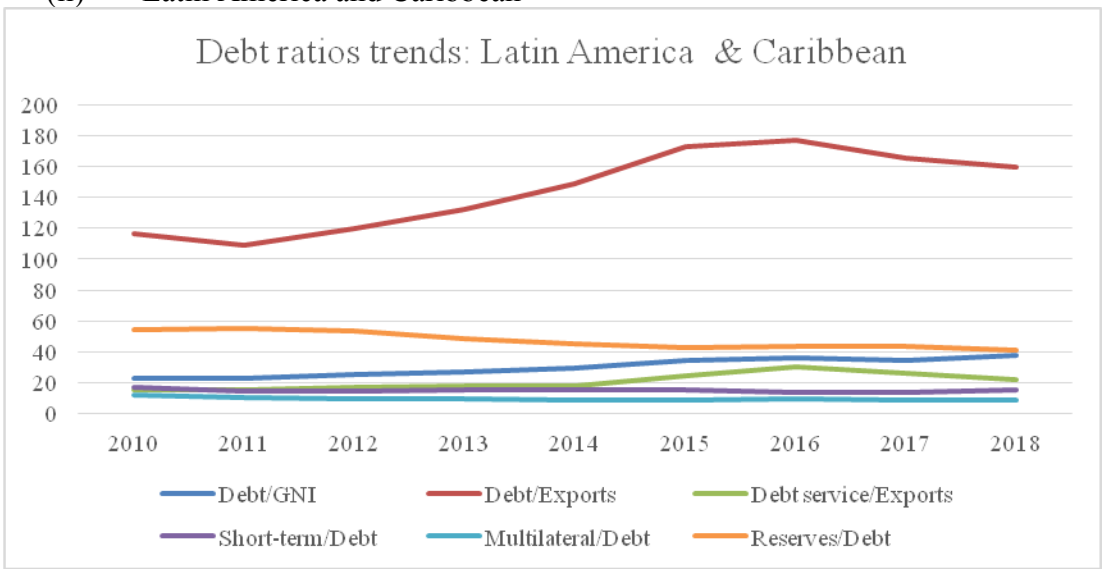
Appendix 5 – Regional tend analysis graphs (2010 – 2018 debt ratios): SSA & peers

(i) Sub-Saharan Africa



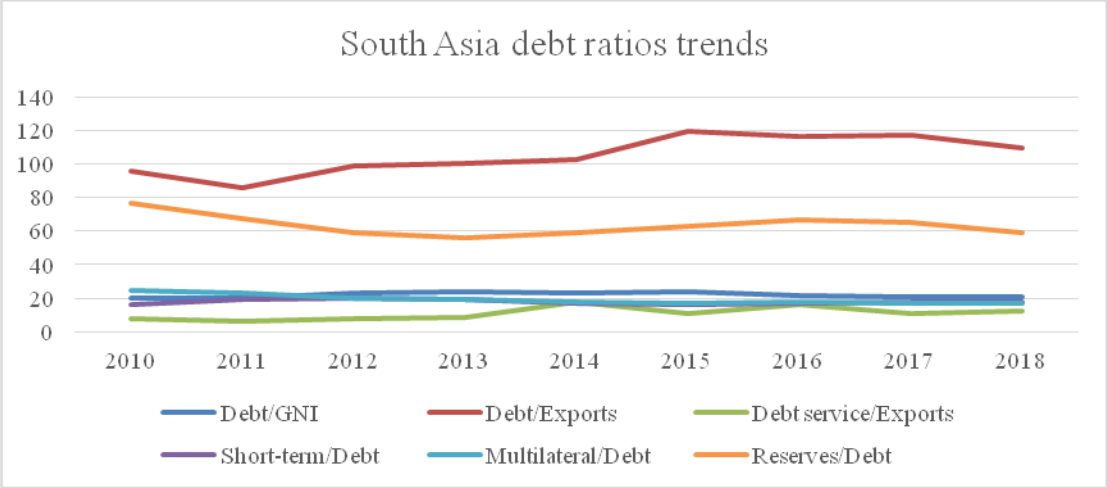
Source: International Debt Statistics, 2020, The World Bank

(ii) Latin America and Caribbean



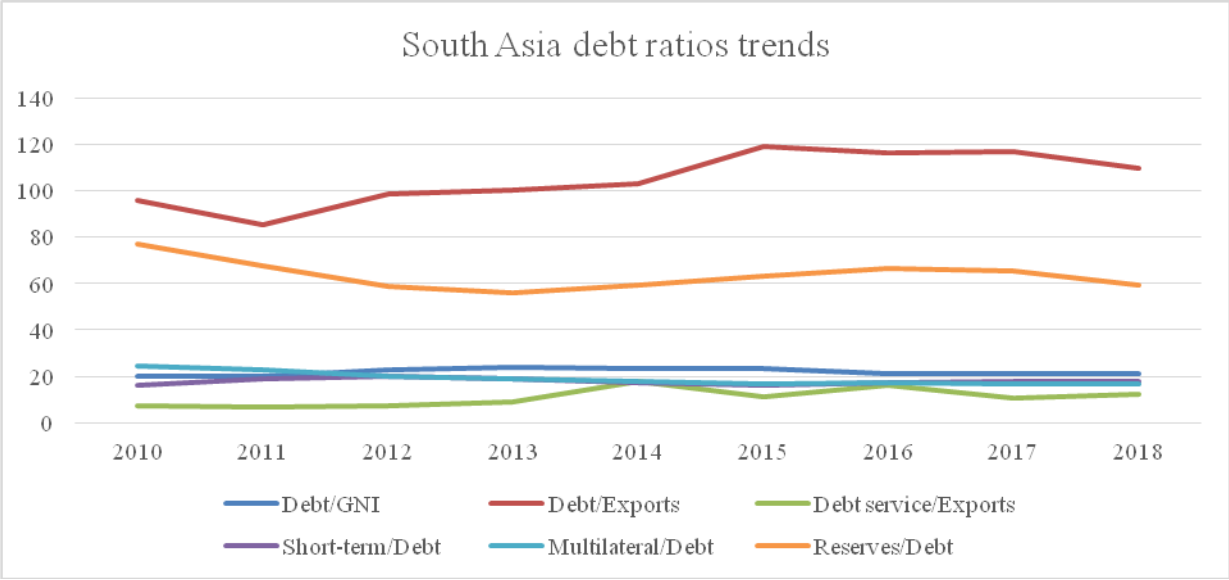
Source: International Debt Statistics, 2020, The World Bank

(iii) South Asia



Source: International Debt Statistics, 2020, The World Bank

(iv) East Asia and Pacific



Source: International Debt Statistics, 2020, The World Bank

Appendix 6 – Regional correlations (2010 – 2018 debt ratios): SSA & peers

(a) SSA

	Debt/GNI	*Debt/Exports*	*Debt service/Exports*	*Short-term/Debt*	*Multilateral/Debt*	*Reserves/Debt*
Debt/GNI	1					
Debt/Exports	0.9385	1				
Debt service/Exports	0.9756	0.9514	1			
Short-term/Debt	-0.8933	-0.8474	-0.9034	1		
Multilateral/Debt	0.0385	-0.1057	-0.0823	-0.1002	1	
Reserves/Debt	-0.9622	-0.9807	-0.9826	0.9124	0.0768	1

Source: International Debt Statistics, 2020, The World Bank

(b) Latin America & Caribbean

	Debt/GNI	*Debt/Exports*	*Debt service/Exports*	*Short-term/Debt*	*Multilateral/Debt*	*Reserves/Debt*
Debt/GNI	1					

	Debt/GNI	*Debt/Exports*	*Debt service/Exports*	*Short-term/Debt*	*Multilateral/Debt*	*Reserves/Debt*
Debt/Exports	0.9515	1				
Debt service/Exports	0.8844	0.9185	1			
Short-term/Debt	-0.4065	-0.3949	-0.5900	1		
Multilateral/Debt	-0.7177	-0.6985	-0.5475	0.5707	1	
Reserves/Debt	-0.9600	-0.9440	-0.7907	0.3410	0.8051	1

Source: International Debt Statistics, 2020, The World Bank

(c) South Asia

	Debt/GNI	*Debt/Exports*	*Debt service/Exports*	*Short-term/Debt*	*Multilateral/Debt*	*Reserves/Debt*
Debt/GNI	1					
Debt/Exports	0.2496	1				
Debt service/Exports	0.2843	0.5506	1			
Short-term/Debt	0.1601	-0.4962	-0.4576	1		
Multilateral/Debt	-0.4934	-0.8221	-0.6602	0.1411	1	
Reserves/Debt	-0.7784	-0.1616	-0.2607	-0.5075	0.6317	1

Source: International Debt Statistics, 2020, The World Bank

(d) East Asia and Pacific

	Debt/GNI	*Debt/Exports*	*Debt service/Exports*	*Short-term/Debt*	*Multilateral/Debt*	*Reserves/Debt*
Debt/GNI	1					
Debt/Exports	0.6306	1				
Debt service/Exports	-0.0750	0.7106	1			
Short-term/Debt	0.5331	-0.2884	-0.8376	1		
Multilateral/Debt	-0.6931	-0.9140	-0.5012	0.0926	1	
Reserves/Debt	-0.3922	-0.9393	-0.8403	0.4910	0.8867	1

Source: International Debt Statistics, 2020, The World Bank

Appendix 7 – Regional regressions (2010 – 2018 debt ratios): SSA & peers

1. SSA

Regression Statistics	
Multiple R	0.9844
R Square	0.9691
Adjusted R Square	0.9177
Standard Error	1.4298
Observations	9

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	5	192.4871	38.4974	18.8314	0.0179
Residual	3	6.1329	2.0443		
Total	8	198.62			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	-10.9108	36.6257	-0.2979	0.7852	-127.4700	105.6484	-127.4700	105.6484
Debt/Exports	0.0473	0.1105	0.4284	0.6973	-0.3043	0.3990	-0.3043	0.3990
Debt service/Exports	1.3720	0.8020	1.7107	0.1857	-1.1804	3.9244	-1.1804	3.9244
Short-term/Debt	-0.0132	1.0703	-0.0124	0.9909	-3.4195	3.3930	-3.4195	3.3930
Multilateral/Debt	0.8997	0.7919	1.1361	0.3384	-1.6205	3.4200	-1.6205	3.4200
Reserves/Debt	0.1526	0.5938	0.2570	0.8138	-1.7372	2.0425	-1.7372	2.0425

Source: International Debt Statistics, 2020, The World Bank

2. Latin America & Caribbean

Regression Statistics	
Multiple R	0.9890
R Square	0.9782
Adjusted R Square	0.9418
Standard Error	1.4224

Observations	9

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	5	271.8705	54.3741	26.8759	0.0107
Residual	3	6.0695	2.0232		
Total	8	277.94			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	76.3224	29.8933	2.5532	0.0837	-18.8113	171.4561	-18.8113	171.4561
Debt/Exports	-0.2090	0.1586	-1.3179	0.2791	-0.7137	0.2957	-0.7137	0.2957
Debt service/Exports	1.0928	0.6376	1.7139	0.1851	-0.9364	3.1220	-0.9364	3.1220
Short-term/Debt	1.4645	1.6303	0.8983	0.4352	-3.7239	6.6529	-3.7239	6.6529
Multilateral/Debt	-0.8167	1.8379	-0.4444	0.6869	-6.6656	5.0322	-6.6656	5.0322
Reserves/Debt	-1.1073	0.4288	-2.5820	0.0816	-2.4720	0.2575	-2.4720	0.2575

Source: International Debt Statistics, 2020, The World Bank

3. South Asia

Regression Statistics	
Multiple R	0.92651
R Square	0.85842
Adjusted R Square	0.62245
Standard Error	0.94249
Observations	9

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	5	16.1573	3.2315	3.6378	0.1584
Residual	3	2.6649	0.8883		
Total	8	18.8222			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	26.0718	22.5415	1.1566	0.3312	-45.6651	97.8088	-45.6651	97.8088
Debt/Exports	0.1507	0.1002	1.5031	0.2298	-0.1683	0.4697	-0.1683	0.4697
Debt service/Exports	0.0597	0.1467	0.4073	0.7111	-0.4070	0.5265	-0.4070	0.5265
Short-term/Debt	-0.5121	0.4812	-1.0641	0.3653	-2.0436	1.0194	-2.0436	1.0194
Multilateral/Debt	0.9672	0.5427	1.7823	0.1727	-0.7598	2.6943	-0.7598	2.6943
Reserves/Debt	-0.4693	0.1393	-3.3694	0.0434	-0.9126	-0.0260	-0.9126	-0.0260

Source: International Debt Statistics, 2020, The World Bank

4. East Asia and Pacific

Regression Statistics	
Multiple R	0.9929
R Square	0.9858
Adjusted R Square	0.9621
Standard Error	0.2614
Observations	9

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	5	14.2105	2.8421	41.5802	0.0057
Residual	3	0.2051	0.0684		
Total	8	14.4156			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	3.7224	7.2828	0.5111	0.6445	-19.4548	26.8995	-19.4548	26.8995
Debt/Exports	0.3067	0.0656	4.6726	0.0185	0.0978	0.5156	0.0978	0.5156
Debt service/Exports	-1.1933	0.6737	-1.7713	0.1746	-3.3371	0.9506	-3.3371	0.9506
Short-term/Debt	0.0486	0.0718	0.6773	0.5468	-0.1798	0.2771	-0.1798	0.2771
Multilateral/Debt	1.6972	1.1746	1.4449	0.2442	-2.0409	5.4354	-2.0409	5.4354
Reserves/Debt	-0.0481	0.0406	-1.1829	0.3221	-0.1774	0.0813	-0.1774	0.0813

Source: International Debt Statistics, 2020, The World Bank

Footnotes

[i] S&P Global Ratings 2017

[ii] The Paris Club is an informal group of 19 creditor nations that, since inception, meet in Paris each month. Its objective is to find workable solutions to payment problems faced by debtor nations. (see Adam Hayes, 2019, Investopedia – accessed 21 June 2019)

[iii] International Debt Statistics, 2019, The World Bank