



# **Is public debt boosting economic growth in SADC?**

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by  
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## **Abstract**

The World Bank estimates that Africa's inadequate infrastructure decreases productivity by around 40 per cent every year and reduces national economic growth by 2 per cent annually. Such disadvantages hinder private sector investment, which is a key driver of job and wealth creation. Financing the development of infrastructure in an appropriate manner has been a leading topic in the continent's development agenda. In order to remedy the infrastructure deficit problem, more and more African countries are increasing their public debts by borrowing in the international markets to finance their infrastructure deficits in the hope that it will ultimately spur economic growth and attract more investment.

SSA's access to the international markets has grown significantly, facilitated by easing global financial conditions. By end March 2014, 13 countries had issued international sovereign bonds, for reasons that include infrastructure building. The sub-Saharan Africa's region's access to international markets has come under much attention lately as debt levels are rising with fears that they may reach the unsustainable pre-HIPC levels. For example, Zambia's total debt burden stood at an unsustainably high USD5.4 billion in 2005 – equivalent to 74% of the country's GDP and almost 208% of its foreign exchange earnings (IHS Global Insights, 2014). The attainment of debt relief under the IMF and World Bank's Multilateral Debt Relief Initiative (MDRI) in early 2006 dramatically decreased the country's debt holdings to less than 25% of GDP. However, in the third quarter of 2012, the government issued its first Eurobond and raised debt capital of USD 750 million. This was followed by a USD 1 billion Eurobond issue in the second quarter of 2014 (IHS Global Insights, 2014) with the stated intention of using the funds for infrastructural development and maintenance. However, according to the latest IMF statement on Zambia released on 6 June 2014, Zambia's macroeconomic situation, though potentially promising, is in trouble and needs urgent fixing. It appears that the government of Zambia wants an IMF funding arrangement, possibly a bailout (Zambian Economist, 2014).

In the face of mounting evidence that access to the international capital markets and rising public debt are more likely to have enhanced vulnerability than growth, this paper examines the determinants of economic growth in a panel of 15 countries. It examines the impact of external debt, total public debt and infrastructure expenditure on economic growth in the southern African region over a period of 10 years (between 2004 and 2014).

The findings suggest an inverse relationship between external debt and total public debt against economic growth. The findings also suggest that there is a positive relationship between infrastructure development and economic growth amongst the countries in the southern Africa region. These relationships were found to be insignificant, suggesting that other factors outside of the variables of infrastructure expenditure, external debt and total public debt are influencing economic growth (or slowdown) in the region. The paper also examines the current debt situation in the 15 countries and policy considerations are also presented.

## Table of contents

1. Declaration	2
2. Abstract	3
3. Table of contents	5
4. List of tables	7
5. Chapter 1 : Introduction	8
1.1 Context of the research area	8
1.2 Statement of the problem	10
1.3 Purpose of the research	12
6. Chapter 2: Literature Review	14
2.1 Public debt and economic growth	14
2.1.1 Is there a critical level of public debt such that over it more public debt leads to lower growth – all else equal?	14
2.1.2 The effect of external debt on growth in developing countries – the debt overhang hypothesis	19
2.2 Infrastructure and economic growth	23
7. Chapter 3: Research Methodology	28
3.1 Introduction	28
3.2 Quantitative Research	28
3.3 Data Collection	29
3.4 Data Analysis	30
3.5 Suitability of the model	31
3.6 Model testing procedure to be followed	33
3.7 Constraints of the research	33
8. Chapter 4: Presentation and discussion of results	35

4.1 Model suitability using panel data from 15 African countries	35
4.2 Estimation of the Random effects GLS regression model for SADC countries	36
4.3 Interpretation of results	37
4.4 Conclusion and policy considerations	39
9. Chapter 5: Conclusion	45
10. References	50
11. Appendix 1: Data for panel data model	55
12. Appendix 2: Data tables	61

## List of tables

Table 1: Results of the Hausman specification test.....	35
Table 2: Regression output for the growth against infrastructure spending .....	36
Table 3: Regression output for growth against external debt.....	36
Table 4: Regression output for growth against debt (total public debt).....	37
Table 5: Organised data for regression output and panel data model.....	54
Table 6: Total public debt as a percentage of GDP in SADC 2004 - 2014).....	59
Table 7: External debt to official creditors as a percentage of GDP in SADC (2004 - 2014).....	60
Table 8: Capital expenditure / infrastructure expenditure as a percentage of GDP in SADC (2004 – 2012).....	60
Table 9: GDP growth in SADC (2004 – 2014).....	61
Table 10: Tax revenues as a percentage of GDP in SADC (2004 – 2014).....	62
Table 11: SADC countries sovereign bond issuances.....	63

## **Chapter 1: Introduction**

According to the Africa Infrastructure Country Diagnostic (AICD) estimates, Africa's total infrastructure financing needs amounted to \$93 billion a year in 2008, with only \$45 billion financed (Brixiovia et al, 2011). Even if problems such as inefficient management, poorly targeted subsidies or tariffs were eliminated, a \$31 billion a year gap would remain. Closing it will require innovative financing resources (Brixiovia et al, 2011). In SADC, US\$ 2.1 billion annually for at least a decade is required to complete and maintain the infrastructure need (SADC Infrastructure Master Plan, 2012).

The World Bank estimates that Africa's inadequate infrastructure decreases productivity by around 40 per cent every year and reduces national economic growth by 2 per cent annually. Such disadvantages hinder private sector investment, which is a key driver of job and wealth creation. Foster and Briceno - Garmendia describe the main constraints to infrastructure development to include (1) deficiencies in planning, preparation, and procurement; (2) poor management of existing infrastructure assets; (3) barriers to a regional approach to infrastructure development relative to national projects, such as higher transaction costs, more complex risks, and the absence of cross border cooperation and harmonization of policies, and (4) the lack of political will.

### **1.1 Context of the research area**

Financing the development of infrastructure in an appropriate manner has always been a leading topic in the continents development agenda. Traditionally, infrastructure projects in Africa have been financed by the public sector or international investors (Irwing and Manroth, 2009) or from donor funding. However, the fiscal space for domestic public sector sources of infrastructure financing is limited (Irwing and Manroth, 2009). In 2009 Irwing and Manroth estimated that most governments in sub-Saharan Africa spend about 6-12 per cent of their gross domestic product (GDP) each year on infrastructure and also pointed out that that does not amount to much in absolute terms because the economies in question tend to be small and hence these annual expenditures pale in comparison with the amounts needed. In SADC, governments spent on average between 2004 and 2012, 3.1 – 13.4 per cent of their gross domestic product on infrastructure investment, with South Africa the largest

economy in the region spending on average 1.3 per cent of their gross domestic product on infrastructure over the same period (African Development Bank, 2013).

In the past, Africa's infrastructure needs were largely financed by aid however more recently there has been an increased pressure to move away from traditional sources of financing, such as donor funding, for a number of reasons. First, this aid is often tied to conditions that are not necessarily beneficial to the recipient country or aligned to the continent's priorities.

Second, funding has become unpredictable, especially in light of the global financial constraints. Even though disbursement of official development finance (ODF) towards Africa's infrastructure has grown from US\$7.3 billion in 2008 to US\$ 10.1 billion in 2010 in real terms, year after year all rich nations have failed to reach their obligations of the 0.7 per cent of GDP target, with the amount of aid pledged trailing at around 0.2 to 0.4 per cent.

Third, it has become really hard for most African countries to access concessional lending after their debts were relieved in the Heavily Indebted Poor Country Initiative (HIPC) and the Multilateral Debt Relief Initiative (MDRI) process.

To remedy the infrastructure deficit problem, more and more African countries are increasing their public debts to finance the infrastructure deficit in the hope that it will ultimately spur economic growth and attract more investment. Increasingly governments are making use of the international capital markets to finance their development needs, as a result, sub-Saharan Africa's access to capital markets has grown significantly, facilitated by easing global financial conditions<sup>1</sup>.

The international capital markets present a largely untapped pool of capital to boost the debt capacity available for infrastructure financing. Capital markets are a natural source of infrastructure finance in developed country markets such as the US, and more recently an increasing number of developing countries such as India have made use of them, providing longer term finance than traditional bank lending (Irving and Manroth, 2009).

Access to international bond markets brings opportunities to investors and sub-Saharan African countries, but risks exist. Foreign investors can diversify their portfolios by

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<sup>1</sup> Low interest rates in advanced economies and low global risk aversion leading to portfolio reallocation in search of risk adjusted yields and diversification opportunities are facilitating access of sub-Saharan African countries to international capital markets.

increasing their exposure to Africa, even from a relatively low base; and sub-Saharan African sovereigns can broaden the investor base for their public debt instruments. For issuers, the first impact is to enhance the available fiscal financing envelope, including longer –term project financing. The process also brings financial innovation to the continent, such as infrastructure bonds to bond enhancements and guarantees for local currency bond market products. Local currency bond markets helps sub-Saharan African economies better shield consumption and investment spending from the impact of exogenous shocks. This said, the availability of debt instruments may also generate new macro financial and debt vulnerabilities that need to be monitored carefully, and may in some cases reduce access to concessional financing( IMF Regional Economic Outlook, 2013).

## **1.2 Statement of the problem**

Sub-Saharan Africa’s access to the international markets for borrowings for infrastructure needs has come under much attention lately. By end March 2014, a diverse array of 13 countries in the region had issued international sovereign bonds, for reasons that include infrastructure building, benchmarking, and debt restructuring. According to the IMF, 3 countries in SSA have issued bonds with the stated intention to use the money raised for building public infrastructure. In 2007, Ghana issued bonds to fund several projects, mainly energy and road projects. In 2012, Zambia issued sovereign bonds also to fund several projects in the energy and transport sector.

It is no secret that sovereign bonds carry significantly higher borrowing costs than concessional debt does. So why now the rush to borrow on the international markets?

Firstly investors who have put their money in the continent have realized the regions high return potential. The high return potential is owed to the natural wealth and improved macroeconomic policies and development potential (Stiglitz, 2013). With the exception of South Africa, the African continent has long been neglected by global financial markets, largely due to perceived political risk, and weak economic performance. However, during the past decade, Africa has made substantial progress in improving political and economic governance. Collectively the countries in the continent now boast robust average GDP growth, low debt ratios (thanks to the debt relief from the HIPC Initiative and the MDRI), abundant natural and human resources, among other potentialities. These factors have led to a reassessment of Africa’s risk configuration by global investors and opinion makers in an

environment characterized by uncertainty (Stiglitz, 2013). Secondly, SSA governments have realized that the conditionality and close monitoring typically associated with the multilateral institutions make them less attractive sources of financing. What makes international markets so lucrative for the governments of today is that with the no emphasis of close monitoring of the usage of funds obtained from the international markets, it will be years before any problems manifest and, then, some future politician will have to resolve them (Stiglitz, 2013). Who knows how much money raised by Zambia on the international markets really ended up being used to fund infrastructure?

In the SADC region, Mozambique, DRC, Malawi, Zambia, Tanzania, Madagascar are all countries that have benefited from the HIPC Initiative and MDRI debt relief process. They are also countries that have issued international bonds for various reasons mainly citing infrastructure finance. However, they have all been recently downgraded by the rating agencies because debt sustainability has become questionable and even though most of them are said to be the fastest growing economies in the SSA region ; many of the economies debt accumulation growth rate has been faster than the economic growth – posing a great cause for concern. Debt situations have worsened in some middle income countries and are now a factor constraining policy decisions. For example, Mauritius and Seychelles have debt levels that exceed the IMF indicative threshold level, whereas the South African debt ratio has been gradually approaching the threshold level over the past four years. An examination by the IMF (in its Regional Economic Outlook in 2013) revealed that debt developments in Sub-Saharan African countries indicate that (1) several countries have experienced significant increases in public sector debt levels since 2007; and (2) forward looking assessments by the IMF of debt sustainability suggest that the debt outlook is a concern in a number of countries, partly constraining fiscal policy space.

What seems to be a big concern is how African governments seem to have forgotten the lessons learnt from the sovereign debt reforms of the 1980s and the liberalization of capital markets in the 1990s where (Gill and Pinto):

- Growth prospects of countries were overestimated , leading to excessive borrowing
- Access to debt led to procrastination by governments on necessary but difficult reforms
- Debt was misused, either facilitating capital flight or being invested in bad projects

- Available market based debt instruments created a predisposition to crisis

All the above mentioned factors depict what is happening in Africa today.

### **1.3 Purpose of the Research**

Empirical studies of the importance of infrastructure as a source of growth gained prominence with the papers of Auschuer (1989a, 1989b), which were followed by a large body of econometric research. In fact, the concerns over the sustainability of public debt levels are grounded in both theory and empirics. However, very few studies have been done on the Sub-Saharan Africa region. The objective of this thesis is to investigate whether the public debt incurred for infrastructure development does indeed spur economic growth. The research will focus on the countries in the southern Africa region and aim to assess the following:

Given the current and past macroeconomic outcomes (2004 -2014), is the public debt boosting economic growth?

The following questions will assist in assessing the above:

1. Is there a relationship between total public debt (external and / domestic debt) and GDP growth across all countries in the SADC region?
2. Is this debt spurring development?
3. Are tax bases growing fast enough to support the growth in the debt (external and total debt)?
4. Is there a relationship between infrastructure expenditure and debt in the SADC region
5. Is there a relationship between infrastructure expenditure and growth in the SADC region?

The rest of the paper is structured as follows:

The next chapter lays down the foundation of this research paper by reviewing the empirical literature on the relationship between public debt and economic growth as well as the relationship between infrastructure and economic growth. Chapter 3 outlines the research methodology and Chapter 4 presents and discusses the results of the research. It also provides

policy considerations and recommendations for countries in the southern Africa region.  
Chapter 5 concludes.

## **Chapter 2: Literature Review**

Many economists have tried to investigate the effect of external debt on economic growth. The researchers have used different data sets, methods and techniques to test the nature of the relationship between external debt; total public debt; and infrastructure development on economic growth. Some researchers concluded that a negative relationship between external debt and economic growth exists because of the inefficient allocation of resources. This chapter examines the literature on public debt and economic growth. It also examines the effect of infrastructure expenditure by governments on economic growth.

### **2.1 Public debt and economic growth**

#### **2.1.1 Is there a critical level of public debt such that over it, more public debt leads to lower growth, all else equal?**

The global financial crisis and the expansionary government reactions in many countries has revamped the attention of policy makers and academics on the growth effects of large public debts. Recent empirical studies have investigated the impact of public debt on growth in advanced countries however few have focused on developing countries or African economies.

In 2010 Presbitero researched total public debt and growth in developing countries. He drew a study of a panel of low income and middle income countries over the period 1990-2007 and the results showed that public debt has a negative effect on output growth up to a threshold of 90 percent of GDP, beyond which its effect becomes irrelevant.

In 2012, Panizza and Presbitero explored whether there is a casual effect between public debt and economic growth. The two authors researched whether high levels of public debt reduce economic growth. They concluded that even if public debt is effective in the short run , expansionary fiscal policies that increase the level of debt may reduce long-run growth, and thus partly (or fully) negate the positive effects of the fiscal stimulus. Their conclusions were in line with a growing empirical literature which shows that there is a negative correlation between public debt and economic growth in advanced and emerging economies, and find that this correlation becomes particularly strong when public debt approaches 100 percent of GDP. Their findings are consistent with the findings of Reinhart and Rogoff, 2010a, as well as Kumar and Woo, 2010; Checherota and Rother, 2010 and; Cecchetti et al 2011.

Panizza and Presbitero's second part of their paper placed a huge focus on causation; arguing that correlation does not imply causation. The two economists speculated that the link between public debt and economic growth could be driven by the fact that it is low economic growth that leads to high levels of debt. However, they observed that the correlation between debt and growth could be due to a third factor that has a joint effect on these two variables.

In 2012 Presbitero continued his research and considered the growing role of internal borrowing looking explicitly at the effect of total public debt on output growth. This particular paper focused on poor countries and used a large sample of low and middle income countries to estimate the partial correlation between initial total public debt and subsequent per capita GDP growth. He also took to uncover possible non-linearities in a multivariate setting by adopting different econometric techniques. Finally, he also investigated the presence of possible sources of heterogeneity in the growth effect of public debt. He assessed this by looking at the impact of public debt conditioned to a country's policies and institutional quality. With respect to the latter point, he argued that there are sound reasons to expect debt overhang<sup>2</sup> to be a binding constraint to investment and growth only in countries with sound macroeconomic policies and institutions while in countries with volatile policies and lousy institutions, the latter are likely to hamper GDP growth, not debt, whose effect is overshadowed and becomes statically irrelevant (Arslanalp and Henry, 2006; Presbitero, 2008; Cordella, Ricci and Ruiz- Arranza, 2010; Arone and Presbitero, 2010).

The evidence found in Presbitero's paper complements the one introduced by Reinhart and Rogoff (2010b), Caner, Grennes and Koehler-Geib (2010) and Kumar and Woo (2010): while they show that a debt burden above 90 percent is likely to hinder growth in advanced countries, they also provide evidence that debt overhang in low and middle income countries

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<sup>2</sup> Debt overhang indicates a situation in which an organisations debt is so large that any earnings generated by new investment projects are entirely appropriated by existing debt holders, and hence even projects with a positive net present value cannot reduce the organisations stock of debt or increase the value of the organisations (Myers 1977). The concept of debt overhang migrated to the international finance literature in the mid-1980s, when the debt crisis motivated a series of influential papers by Krugman (1988, 1989) and Sachs (1989). These authors argued that, as sovereign governments service their debt by taxing firms and households, high levels of debt imply an increase in the private sectors expected tax burden. Debt overhang characterizes a situation in which this future debt is perceived to be so high that it acts as a disincentive to current investment, as investors think that the proceeds of any new project will be taxed away to service the pre-existing debt.

is a growth constraint also for lower levels of debt. This is consistent with the hypothesis of debt sustainability and debt management capacity increasing with income. The argument used by Presbitero follows the old notion that industrialised countries are better able than developing countries to borrow and use domestic foreign financing in a productive way, without paying the costs in terms of disincentive to investment, capital flight, policy volatility and crowding out, which generally goes hand in hand with large debts. By contrast, in developing countries the negative consequences of debt overhang are likely to offset the possible benefits derived from the availability of additional resources. The main reason for this opposite result is related to poor economic management and bad institutions, consistent with evidence discussed in the paper showing that country specific factors affect the way in which debt affect the economy: as already shown with respect to external debt (Presbitero, 2008; Cordella et al, 2010), also total public debt is a constraint for economic growth only in countries that lack sound institutions and stable macroeconomic policies. Thus, irrespective of the income level, poor institutions and policies are likely to be the first-order constraint to growth. Where and when the institutional framework is sound, public debt has real effects on the economy – at least above 77 percent, while the evidence discussed in the paper suggests that in developing countries, where institutions and macroeconomic policies are less strong, debt overhang is effective for an intermediate level of indebtedness. In addition, where debt is larger, macroeconomic policies are generally worse and more volatile and they overshadow the possible negative effects of debt on output growth, which become statistically not significant.

Notwithstanding a widespread data limitation, some recent efforts in collecting comparable public debt figures makes it possible to try and uncover the growth effect of total public debt. Abbas and Christensen (2010) complement the vast literature on external debt and growth finding that , in a panel of low income countries and emerging markets the stock of domestic debt becomes too large (above 35 percent of bank deposits), its contribution to economic growth turns negative). Other than being statistically robust across different econometric specifications, the growth effect of public debt is economically relevant: a 10% increase in the debt to GDP ratio is associated with a reduction of 0.2 percentage points.

Gill and Pinto examined the association of poor results in developing countries, and two polar views emerged in their research:

Firstly, debt intolerance<sup>3</sup> proponents argued that developing countries, especially those with a history of default and high inflation and weak fiscal and financial institutions, countries cannot handle debt without becoming vulnerable to a crisis once external (public plus private) debt crosses 15-25 percent of GDP—a threshold much lower than actual external debt levels for larger developing countries. As similar arguments would apply to public debt, the policy prescription would be to lower indebtedness. Therefore, if debt is a binding constraint the countries need to either run larger primary fiscal surpluses in the hope of lowering interest rates, or face another round of devaluation and default (Gill and Pinto, 2005).

Secondly, original sin<sup>4</sup> proponents argue that it is not the fault of developing countries, but their inability to borrow long-term in their home currency in the external markets. This creates a currency mismatch which increases output volatility and vulnerability to crisis. This mismatch would typically lead to a big increase in the debt-to-GDP ratio in the event of a real exchange rate collapse. The proponents further argue that the inability to issue long-term debt in the home currency is unrelated to domestic policies and institutions; this missing market stems instead from capital market imperfections, network externalities and transactions costs (Gill and Pinto, 2005).

Thirdly, in assessing the original sin hypothesis, Goldstein and Turner (2004) agree that currency mismatches pose a threat, but disagree that they are exogenous to a particular country situation and therefore require an international solution. Their solution is to improve domestic policies— such as adopting flexible exchange rates to create more awareness of exchange risk, and more prudent macroeconomic policies more generally—and strengthen financial institutions in order to improve domestic financial intermediation while enabling strict oversight and control of currency mismatches. There is no quick fix; a decade may be required to secure tangible and lasting improvements.

Andros Kourtellos also came to the same conclusion as Presbitero. His findings suggest that once a rich set of alternative theories are considered, there is very little evidence for such

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<sup>3</sup> Refers to the inability of emerging markets to manage levels of external debt that under the same circumstances would be manageable for developed countries.

<sup>4</sup> Refers to a situation in which most countries are not able to borrow in their domestic currency.

nonlinearities. Instead his findings suggested that the relationship between public debt and growth is mitigated crucially by the quality of a country's institutions. When the country's institutions are below a particular quality level, then more public debt leads to lower growth (all else equal). However, if a country's institutions are of sufficiently high quality, then public debt is growth neutral.

In terms of the empirical literature, a recent prominent study by Reinhart and Rogoff, 2010 found that there is generally a weak relationship between government debt and economic growth for countries with debt below 90% of GDP. However, for countries with debt-to-GDP over 90%, debt can have adverse consequences on growth. Other studies have attempted to provide a formal test for the 90% threshold value of Reinhart and Rogoff, 2010. For example, Cecchetti et al., 2011b and Caner et al., 2010 employed the threshold regression of Hansen, 2000 to estimate public debt thresholds. Cecchetti et al., 2011b studied the effects of public debt on growth using a new dataset on debt levels in 18 OECD countries from 1980 to 2010. Using threshold regression, they found that government debt is bad for growth when it is above the threshold value of 85% of GDP. Caner et al. (2010) using threshold regression methods on data for a larger set of countries for 1980–2008 find that a threshold of 77% public debt-to-GDP ratio is the critical level after which debt becomes damaging to growth. Relatedly, Minea and Parent (2012) employed the panel smooth threshold regression model of González et al. (2005) who found that there is a negative effect of public debt on growth when the level of debt is between 90% and 115% of GDP. However, according to Munnell, 1992 the current work suffers from a number of conceptual and methodological issues highlighting that an important limitation of the recent work has been the failure to adequately account for heterogeneity in the effect of debt on growth, which may arise due to alternative growth theories. Specifically, researchers have been searching for threshold effects of public debt on growth when debt is above or below a particular public debt threshold value. The alternative that has been considered is simply that there is no nonlinearity in the effect of public debt on growth. However, these studies do not investigate other possible threshold variables beyond the debt-to-GDP ratio. Munnell 1992 argues that the effect of public debt on growth is not only characterized by excessive levels of debt but the first order constraint to growth – which is poor institutions. Their argument is well placed in the context of African economies that are plagued by weak public institutions.

### **2.1.2 The effect of external debt on growth in developing countries – the debt overhang hypothesis**

The only explicit debt-growth theoretical link is that between external borrowing (public or private) and growth, the assumption being that if the marginal product of capital is higher than the world interest rate for developing countries, then such countries would benefit from external borrowing (Eaton (1993)). But even here, external debt helps to exploit the existing growth potential of the country; it does not enhance it (Gill and Pinto, 2005). Theoretically, therefore, the only guideline one finds is that the rate of return on spending should exceed the marginal cost of borrowing on the assumption that the debt is eventually repaid (Gill and Pinto, 2005).

The theoretical literature on the relationship between external debt and economic growth has focused largely on the harmful effects of a country's "debt overhang"—the accumulation of a stock of debt so large as to threaten the country's ability to repay its past loans, which, in turn, scares off potential lenders and investors. That is, if a country's debt level is expected to exceed the country's repayment ability with some probability in the future, expected debt service is likely to be an increasing function of the country's output level. Thus, some of the returns from investing in the domestic economy are effectively "taxed away" by existing foreign creditors, and investment by domestic and foreign investors is discouraged.

Debt overhang also depresses growth by increasing investors' uncertainty about actions the government might take to meet its onerous debt-servicing obligations. As the stock of public sector debt rises, investors may worry that the government will finance its debt-service obligations through distortionary measures, such as rapidly increasing the money supply (which causes inflation). Amid such uncertainty, wary would-be private investors tend to remain on the sidelines. And even when they do invest, they are more likely to opt for projects with quick returns rather than for projects that enhance growth on a sustainable basis over the long run. This is particularly true for African countries where the infrastructure investment is often related to the exploitation of a natural resource and it needs to be exported so the infrastructure is often not related to anything that will contribute to intra-country trade or regional trade (usually its infrastructure leading to ports).

Moreover, debt overhang may also discourage efforts by the government to carry out structural and fiscal reforms that could strengthen the country's economic growth and fiscal position, because a government whose financial position is improving almost inevitably finds itself under increasing pressure to repay foreign creditors. This disincentive to reform would exist in any country with a heavy external debt burden, but it is of special concern in low-income countries, where structural reforms are essential to sustain higher growth.

Of course, not all foreign borrowing dampens investment and growth. At low levels of debt, additional foreign borrowing could stimulate growth, to the extent that the additional capital financed by this new borrowing enhances the country's productive capacity. Higher output, in turn, would make it easier for a country to service its debt. As debt and the capital stock increase, however, the marginal productivity of investment falls. Some analysts have argued that only above a certain threshold will additional foreign loans have a negative impact on growth, owing to the debt-overhang considerations explained above. That is, up to a certain threshold, increased borrowing makes repayment of debt more likely. But, beyond that threshold, further increases in foreign debt reduce the prospects of creditors being repaid. As a country's access to loans drops, its ability to accumulate capital suffers, and growth may slow. In short, the negative effects of debt overhang are likely to take effect only after a certain threshold level has been reached.

The empirical literature has found mixed support for the debt-overhang hypothesis. Most models of the determinants of growth have presumed that the stock of debt affects growth both directly (by reducing a government's incentives to undertake structural reforms) and indirectly (by dampening investment). But relatively few studies have assessed the direct effects of the debt stock on investment in low-income countries econometrically. A 2001 review of studies on the debt-overhang hypothesis by Geske Dijkstra and Niels Hermes found the empirical evidence on this issue to be inconclusive and few studies have been able to determine how large the stock of external debt has to be, relative to GDP, for the debt overhang to have an effect.

A 2002 study of 93 developing countries between 1969 and 1998 by Pattillo et al found strong support for the debt-overhang hypothesis, however. The authors found that external debt began to have a negative impact on growth when its net present value exceeded 160–170 percent of exports and 35–40 percent of GDP. Their simulations suggest that doubling

the average stock of external debt in these countries would slow down annual per capita growth by between a half and a full percentage point.

In a follow-up study in 2004 by the IMF, Pattillo and her coauthors applied a growth-accounting framework to a group of 61 developing countries over 1969–98 and found that doubling their average external debt level reduces growth of both per capita physical capital and total factor productivity by almost 1 percentage point. In other words, large debt stocks negatively affect growth by dampening both physical capital accumulation and total factor productivity growth.

In theory, the service of external public debt (the payment of interest and repayment of principal which is to be distinguished from the stock of external debt, may also affect growth by discouraging private investment or altering the composition of public spending. Higher external interest payments can increase a country's budget deficit, thereby reducing public savings. This, in turn, may either drive up interest rates or crowd out the credit available for private investment, depressing economic growth. Larger debt-service payments can also inhibit growth by squeezing the public resources available for investment in infrastructure and human capital. Indeed, such nongovernmental organizations as Oxfam International see high external debt service as a key obstacle to meeting basic human needs in developing countries. But relatively few empirical studies have tested these hypotheses by assessing the effects of debt service payments on private investment or on the composition of public spending, and the available empirical evidence is mixed.

Debt service, in contrast with the stock of debt, has no direct effect on growth, perhaps because its influence is realized through its impact on investment, which is also included as an explanatory variable in most growth models and is thus held constant. Gross investment has a significant positive impact on growth. Economists from the IMF have found that lagged GDP has a statistically significant negative impact. The central government's fiscal balance has a significant positive effect, consistent with recent research that found links between sound fiscal policy and economic growth, while population growth and terms of trade shocks are statistically significant and negative. Re-estimating the growth equations, but disaggregating gross investment into private and public investment, suggests that it is public investment that affects growth in low-income countries. For each percentage point of GDP increase in public investment, annual per capita growth rises by 0.2 percentage points. High

levels of public investment that increase budget deficits do not necessarily lead to faster growth, however, because larger budget deficits have a dampening effect on economic activity. In the re-estimated equations, changes in the terms of trade, population growth, and openness have no significant effect on growth. As before, debt service has no direct effect. With respect to the stock of debt, the results are once again consistent with the debt-overhang hypothesis—the marginal impact of external debt on growth becomes negative beyond a threshold ratio of debt-to-GDP of about 50 percent of GDP for the face value of debt and 20–25 percent of GDP for the estimated net present value of debt.

The results of the growth model used by Patillo show that: estimated results provide some support for the debt-overhang hypothesis and suggest a threshold of about 30–37 percent of GDP. Beyond that threshold, higher external debt is associated with lower growth rates for per capita income, independent of any effect debt may have on gross domestic investment.

These findings imply a more powerful relationship between debt and growth in poor countries than researchers have found in developing countries generally. And the effect of debt on growth is greater when the effects of debt on public investment and the central government's fiscal balance, both of which influence growth, are taken into account.

The stock of external debt has no significant effect on public investment; public investment seems to be driven more by the government's current fiscal position and the availability of resources than by factors that affect fiscal sustainability over the longer term. However, the results support the hypothesis that higher debt service (as opposed to the stock of external debt) crowds out public investment. The relationship is nonlinear, with the crowding-out effect intensifying as the ratio of debt service to GDP rises. On average, for every percentage point of GDP increase in debt service, public investment declines by about 0.2 percentage point of GDP. In some sense, the modest magnitude of this decline is surprising, indicating that large debt burdens have not seriously hampered public investment in low-income countries. More important, it implies that, all things being equal, debt relief by itself cannot be expected to lead to large increases in public investment. In most cases, debt relief leads either to greater public consumption or, if used to reduce government deficits or to lower taxes, to greater private consumption and investment.

If only a small share of debt relief is channeled into public investment, the corresponding impact on growth will also be modest. For example, according to economists Panizza and Presbitero a reduction in the ratio of debt service to GDP from 8.7 percent (the average in 2000 of the seven most heavily indebted poor countries) to 3.0 percent (roughly the average debt service-to-GDP ratio for all highly indebted poor countries in 2002) would increase public investment by 0.7–0.8 percentage point of GDP and indirectly raise real per capita GDP growth by 0.1–0.2 percentage point annually. Still, this small boost to growth (in absolute terms) is roughly equal to the actual growth in per capita incomes achieved by heavily indebted poor countries during the 1990s. Moreover, if half (instead of a fifth) of this debt service relief were channeled to public investment, annual per capita growth would rise quite significantly (about 0.5 percentage point a year). Under all scenarios, the positive impact of greater public investment on growth will be offset, in part or in full, if financed through larger budget deficits.

**So in conclusion:** although high levels of debt can depress economic growth in low-income countries, external debt slows growth only after its face value reaches a threshold level estimated to be about 50 percent of GDP (or, in net present value terms, 20–25 percent of GDP).

## **2.2 Infrastructure and economic growth**

The relationship between infrastructure and economic growth is quite complex. Although infrastructure development is important and necessary for industrial take-off and economic growth, the desire for growth does not necessarily mean higher or increased need for infrastructure and more infrastructures does not necessarily guarantee more economic growth (Romp and de Haan, 2005).

While pioneer efforts in the field suggest a positive relationship between infrastructure development and economic growth and report robust positive coefficients (Ratner, 1983; Auscher, 1989; Mitsui and Inoue, 1995), a sizable number of subsequent studies have reported less than attractive results, thus suggesting a weak link between infrastructure development and economic growth (Munnell, 1992; Gramlich, 1994; Romp and de Haan, 2007).

Aschauer (1989), investigated whether all government expenditures are productive using a production function in which output depended on public capital and employment. His result showed that the elasticity of output with respect to public capital was between 0.34 and 0.39. This result was interpreted to mean that the marginal productivity of public capital is 70 cents to a dollar. Other studies such as Eisner, (1991), Ford and Poret, (1991), Holtz-Eakin(1988); using macro time series approach all found evidence in support of Aschauer (1989). However, their results showed public capita elasticity of output significantly lower than Aschauer's earlier claim. They all found that the marginal product of government capital higher than the marginal products of private capital. These findings somehow defy logical reasoning given the available data. The studies have been criticized based on a number of issues which includes: their definition of government capital; their failure to recognize the time series properties of data used in the studies and the potency of the econometric method used in their analysis. Generally the stock of public capital used in the above studies is the addition of state and local capital stock which corresponds to the official figure in government publications. However, the official figure in government publication comprises some public capital components which have no direct bearings or connections to productivity or output levels (Gramlich, 1994).

The enthusiasm among policymakers for the early Auschauer results was matched, if not surpassed, by skepticism for the part of many economists. Critics of these studies charged that the methodology was flawed, that the direction of causation between public investment and output growth was unclear and that, even if the historical empirical relationships were estimated correctly, they provide no clear indications for current policy (Munnell, 1992). So who's right? What do we know and not know about the link between public infrastructure and productivity?

Most economists agree that public capital investment can expand the productive capacity of an area, both by increasing resources and by enhancing the productivity of existing resources. For example, a well-constructed highway allows a truck driver to avoid circuitous back roads and to transport goods to market in less time. The reduction in required time means that the producer pays the driver lower wages and the truck experiences less wear and tear. Hence, public investment in a highway enables private companies to produce their products at lower total cost. The condition of the highway, of course, is just as important as its existence.

Similar stories can be told for mass transit, water and sewer systems, and other components of public capital.

Beginning with Aschauer's work, a number of studies have estimated regressions where the dependent variable is output within some area, and the independent variables are private capital, labour, public capital and a constant for the level of technology. In such regressions, the levels of public capital are generally significant, and the consensus is that Aschauer made a significant contribution by drawing attention to the importance of public infrastructure and by adding public capital to the conventional production function. The controversy arises about the method of estimating this expanded function and about the interpretation of the results.

Public capital enhances the productivity of private capital, raising its rate of return and encouraging more investment. On the other hand, from the investors perspective, public capital acts as a substitute for private capital and "crowds out" private investment. The estimated equations confirmed both forces but suggested that, on balance, public capital investment stimulates private investment.

What we need to bear in mind is that the growth in the capital stock, whether private or public, in one year is to be correlated with the growth in output in that same year is not realistic. In fact, equations estimated in this form often yield implausible coefficients for labor and private capital as well as for public capital (Evans and Karras, 1991; Hulten and Schwab, 1991; Tatom, 1991).

Capital investment, private as well as public, goes hand in hand with economic activity. However, this mutual influence can exist without necessarily tainting the coefficient on public capital, or, for that matter, private capital in estimated production functions.

In 1996 Hulten investigated the relationship between infrastructure capital and economic growth. His paper showed that those low and middle income countries that use infrastructure inefficiently pay a growth penalty in the form of a much smaller benefit from infrastructure investments. The magnitude of this penalty is apparent when the growth experience of Africa is compared with that of East Asia: over one-quarter of the differential growth rate between

these two regions can be attributed to the difference in effective use of infrastructure resources. At the same time, the difference due to new public capital formation is negligible.

Most contemporary explanations of economic growth assign a prominent role to capital formation. However, the relevant literature has focused primarily on investment in new capital, and comparatively little attention has been given to the effective use of capital stocks once the conditions responsible for economic backwardness may operate through the poor management of the means of production. If capital stocks are not used effectively, additional capital formation may be of little help in stimulating economic growth.

Moreover, “inadequate maintenance means that power systems in developing countries have only 60 percent of their generating capacity available at a given time, whereas best practice would achieve levels of 80 percent (and) water supply systems deliver an average of 70 percent of their output to users, compared with best practice delivery rates of 85 percent”. The World Development Report goes on to note that these deficiencies often arise from inadequate management of the existing infrastructure assets, as distinct from inadequate levels of new construction.

The existence of an infrastructure effectiveness problem is well documented. What is not well known is the actual magnitude of the penalty that inefficiency imposes on economic growth. In addition, those countries that use infrastructure inefficiently pay a growth penalty in the form of a much smaller benefit from new infrastructure investments. This is the problem especially for African countries because maintenance of existing infrastructure is often neglected. At the same time, the difference due to public capital formation is negligible. An even stronger impression is conveyed by the comparison of high and low growth rate economies. According to Hulten, more than 40% of the growth differential is due to the efficiency effect, making it the single most important explanatory of differential growth performance. However, the very strength of the efficiency effect invites the speculation that the infrastructure effectiveness variable is really a proxy for a more general productive efficiency. In this interpretation, it is the productivity with which all inputs are used that affects GDP growth rates, and not just the input of infrastructure. If this alternative interpretation is correct, it challenges the recent literature that suggests that differences in

total factor productivity are not of central importance in explaining the success of the East Asian economies.

Thus economies that make less efficient use of their infrastructure capital are constrained to have lower level of real income per capita in the long run (all else equal). This is the penalty exacted by inefficiency. Thus, countries with different levels of infrastructure effectiveness will have different levels of income per capita, but the same steady-state rate of growth.

In conclusion from the facts presented above, a key focus of the current literature on the effects of public debt on economic performance has been the attempt to identify nonlinear and in particular threshold effects. While many papers have found the debt threshold to be 90% of GDP, the threshold for low and middle income countries is much lower at 35% which is a key finding for the purposes of this research.

## **Chapter 3: Research Methodology**

### **3.1 Introduction**

This chapter outlines the methodology that will be used to conduct this research paper.

The economic theories presented in Chapter 2 suggest that if the borrowed money by a country is utilized in an effective and efficient manner for productive investment purposes then it can add value to the economic growth of that country. On the other hand large amount of external debt may cause a negative effect on the economic growth. This irony is explained by the debt overhang theory presented in Chapter 2 of this paper. When the accumulated debt amount crosses the threshold level of a country's repayment capacity, the expected default may cause the domestic and foreign investors to draw back their money; this will negatively affect the economic growth of the country. This indicates that if the debt overhang is present then the future increase in the output are paid to the creditors in the form of debt servicing, the external debt play the role of tax on the future output.

This paper is based on economic growth and its explanatory variables external debt; total public debt and infrastructure expenditure. The analysis done on the economic growth is based on the research done by the economists mentioned in Chapter 2 who were of the view that the debt burden of a country has a negative effect on the output produced.

### **3.2 Quantitative Research**

The research will purely be of a quantitative nature, meaning that it will make use of numerical analysis in order to answer the research questions stated in Chapter 1 of this document.

The greatest strength of quantitative research is that it produces quantifiable, reliable data that is usually generalizable to some larger population (Research Methods class notes, 2012). Quantitative analysis also allows researchers to test specific hypotheses, in contrast to qualitative research, which is more exploratory. However critics of quantitative research highlight the fact it decontextualizes human behavior in a way that removes the event from its real world setting and ignores the effects of variables that have not been included in the model (Research Methods class notes, 2012).

This study wishes to test whether public debt boosts economic growth in SADC. The hypothesis will therefore be broken down into public debt (external and domestic) and infrastructure expenditure to test the correlation between the factors. The following hypothesis will be tested across all countries in the SADC region:

H1A: Total public debt (external and domestic debt) and economic growth is positively correlated

H1B: External debt and economic growth is positively correlated

H1C: Infrastructure expenditure and public debt is positively correlated

H1D: Infrastructure expenditure and economic growth is positively correlated

In this instance testing for a relationship between the different variables will require the use of an econometric model. Thus, a quantitative study not a qualitative study needs to be undertaken.

### **3.3 Data collection**

Fifteen countries from the Southern Africa Development Africa (SADC) region have been chosen for the study. The analysis will cover years 2004 to 2014. The study concentrates on the effects of “newly acquired government debt” that is often substantiated as addressing pressing infrastructure bottlenecks in the relevant countries.

The data used for the study will be secondary data. Secondary data is data which already exists in processed form i.e. has been summarized and/or interpreted (Research Methods Class notes, 2012). The data will be obtained from the IMF Regional Economic Outlook 2013 and the African Development Bank Statistics Department. The econometric software, STATA Command, will be used to handle the panel data.

The following data will be collected per country in the SADC region to examine the above mentioned hypothesis:

1. Infrastructure expenditure (by the government)
2. Economic growth
3. External debt
4. Total public debt

All data will be measured as a percentage of GDP.

### **3.4 Data Analysis**

In order to test the above relationships, the data will be organized into panel data. Panel data (also known as longitudinal or cross-sectional time series data) is a data set in which the behavior of entities are observed over time. These entities could be states, companies, individuals, countries etc. Panel data allows one to control for variables one cannot observe or measure like cultural factors or difference in business practices across companies; or variables that change over time but not across entities (i.e. national policies, federal regulations, international agreements etc). Thus it accounts for individual heterogeneity (Torres- Reyna, 2007).

Torres- Reyna describes the several benefits from using panel data. These include the following:

- Controlling for individual heterogeneity. Panel data suggests that individuals, firms, states or countries are heterogeneous. Time series and cross-section studies not controlling this heterogeneity run the risk of obtaining biased results
- Panel data are better able to study the dynamics of adjustment. Cross-sectional distributions that look relatively stable hide a multitude of changes. Panels are also necessary for the estimation of inter-temporal relations, lifecycle and intergenerational models
- Panel data are better able to identify and measure effects that are simply not detectable in pure cross-section or pure time series data.
- Panel data models allow us to construct and test more complicated behavioural models than purely cross-section or time series data.

Limitations of panel data include:

One big disadvantage of using panel data is that conclusions based on simple linear regressions will not apply since individual specific characteristics are not taken care of. The usual macroeconomic conclusions are likely not to be confirmed due to interference of these characteristics that are attributable to individual country, firm or household. In other words, macro panels on countries or regions with long time series that do not account for cross-

country dependence may lead to misleading inference (Torres – Reyna, 2007; Borenstein, Hedges, Higgins and Rothstein, 2009).

Ultimately, panel data is not a panacea, however it will yield more powerful unit root tests than individual time series.

### **3.5 Suitability of the model**

In reality different countries, households or firms are by their very nature different and any disparities of behaviour is likely to be systematic. To this end, therefore, there is a need to subject panel data to hypothesis testing to ensure we are going to deal with the right model.

The Hausman test will be used to differentiate between the fixed effects model and random effects model in panel data. The fixed effects model assumes that there are unique attributes of entities (countries) that are not the results of random variation and do not vary across time.

The Fixed Effects (FE) Model explores the relationship between predictor and outcome variables within an entity (country, person, company, etc.). Each entity has its own individual characteristics that may or may not influence the predictor variables (for example, being a male or female could influence the opinion toward certain issue; or the political system of a particular country could have some effect on trade or GDP; or the business practices of a company may influence its stock price) Borenstein et al, 2009.

When using the fixed effects model we assume that something within the individual may impact or bias the predictor or outcome variables and we need to control for this. This is the rationale behind the assumption of the correlation between entity's error term and predictor variables. Fixed effects remove the effect of those time invariant characteristics so we can assess the net effect of the predictors on the outcome variable (Borenstein et al, 2009).

Another important assumption of the fixed effects model is that those time-invariant characteristics are unique to the individual and should not be correlated with the others. If the error terms are correlated, then FE is not suitable since inferences may not be correct and you need to model that relationship (probably using random-effects), this is the main rationale for the Hausman test (Torres – Reyna, 2007).

The random effects model assumes that there are unique, time constant attributes of individuals that are the results of random variation and so do not correlate with the individual

regresses. The rationale behind the random effects model is that, unlike the fixed effects model, the variation across entities is assumed to be random and uncorrelated with the predictor or independent variables included in the model. It is used when there is belief that differences across entities have some influence on the dependent variable then the random effects model should be used (Torres – Reyna, 2007).

An advantage of this model is that you can include time invariant variables (i.e. gender). In the fixed effects model these variables are absorbed by the intercept.

Random effects assume that the entity's error is not correlated with the predictors which allows for time invariant variables to play a role as explanatory variables. In random effects one needs to specify those individual characteristics that may or may not influence the predictor variables. The problem with this is that some variables may not be available therefore leading to omitted variable bias in the model. Therefore RE allows to generalise the inferences beyond the sample used in the model.

This model is adequate if we want to draw inferences about the whole population, not only the examined sample.

The usual null hypothesis in testing for a suitable model is that the model to be estimated is a Random-Effects model. This is analogous to writing the maintained statement as:

$H_0$  : The differences in behaviour among the panels is not systematic.

The opposing hypothesis is that the differences in panels are due to systematic differences among them.

The actual testing procedure involves a test statistic called the Hausman Test statistic given as follows:

$$\text{test statistic} = (\mathbf{b}-\mathbf{B})'[(\mathbf{V}(\mathbf{b})-\mathbf{V}(\mathbf{B}))^{-1}](\mathbf{b}-\mathbf{B})$$

where:

$\mathbf{b}$  = Fixed-Effects regression coefficients

$\mathbf{B}$  = Random-Effects regression coefficients

$\mathbf{V}(\mathbf{b})$  = variance of b-coefficients

$V(\mathbf{B})$  = variance of B-coefficients

The hypothesis we are testing can be written in a different way as shown below:

$b$  = consistent under  $H_0$  and  $H_a$ ; obtained from Panel Estimation

$B$  = inconsistent under  $H_a$ , efficient under  $H_0$ ; obtained from Panel Estimation

The calculated Hausman Test statistic follows a Chi- Square distribution with degrees of freedom equal to the number of parameters in the model excluding the constant.

Decision rule is reject  $H_0$  if the test statistic is greater than the critical value from the Chi-Square distribution. In reality and for brevity, however, we conclude the decision on the hypothesis based on the probability value of the test statistic.

When the probability value of the Hausman test statistic is less than five percent ( 5%) then we can reject the null hypothesis and make a conclusion that the differences in the panels is systematic and therefore a Fixed-Effect model is suitable for estimation.

### **3.6 Model Testing Procedure to be followed:**

Step one: there is need to estimate the FE- model and store the results. Appropriate Stata commands are used to do this.

Step two: we estimate the RE – model and then

Step three: We compute the test statistic and then compare it with the chi-square critical and the finally make a decision.

Once the model has been chosen, the various relationship tests stated above will be conducted.

### **3.7 Constraints of the research**

One of the criticisms of the recent work on the effects of public debt on growth is that the papers largely ignore the problem of endogeneity especially in addressing the threshold variable. The endogenous growth theory holds that economic growth is primarily the result of endogenous and not external forces. Endogenous growth theory holds that investment in human capital, innovation, and knowledge – based economy are significant contributors to

economic growth. The theory also focuses on positive externalities and spillover effects of a knowledge-based economy which will lead to economic development. The endogenous growth model also suggest that other factors besides just the debt-to-GDP ratio; e.g. a country's trade openness or institutional quality contribute to economic growth. The endogenous growth models have been analysed by various authors in the economics literature. For example, Futigami et al. (2008) have studied an endogenous growth model productive public spending and public debt but assumed that government debt must converge to a certain exogenously given debt to GDP ratio asymptotically. Kourtellos, Panizza and Greiner etc. have all used the endogenous growth model to determine the threshold level of debt. However, this thesis is not aimed at finding out the threshold level of debt in the SADC countries. The IMF Debt Sustainability Framework (DSF) has already determined those thresholds for many African countries including those in the SADC region. The aim of the thesis is to determine whether public debt boosts economic growth in SADC by looking at various relationships listed above. Thus the thesis will exclude variables that are usually added in endogenous growth models such as labour.

## Chapter 4: Presentation and discussion of results

This chapter computes and presents the findings of the panel data analysis. It also presents suggestions for policy considerations by governments in the southern Africa region that are considering issuing or have issued sovereign bonds with the purpose of financing infrastructure.

### 4.1 Model suitability using Panel Data collected from 15 African Countries

Following the application of the procedure for testing model suitability outlined in Chapter 3 the results below were obtained.

The table below shows the results of the Hausman Specification Test.

Hausman Test of Independent Variables on Growth						
---- Coefficients ----						
	(b)			(B)	(b-B)	sqrt(diag(V_b-V_B))
	Fixed			Random	Difference	S.E.
IS (Infrastructure Spend)			.2051212	.2477809	-.0426597	.0765154
ExDebt (External Debt)	-.0100631	-.0114217	.0013585	-.0114217	.0013585	.0192698
Debt (Total Debt)			.011371	.0081253	.0032457	.0214597
b = consistent under Ho and Ha; obtained from xtreg						
B = inconsistent under Ha, efficient under Ho; obtained from xtreg						
Test: Ho: difference in coefficients not systematic						
chi2(3) = (b-B)'[(V_b-V_B)^(-1)](b-B)						
= 1.72						
Prob>chi2 = 0.6331						

From the results table the probability value of the Hausman test statistic is greater than 5% and this means we fail to reject the Null Hypothesis that the difference in the coefficients is not systematic.

Therefore the suitable model to use to estimate is the Random-Effects model. The implication of this is that there are no individual effects in the SADC countries. As stated in Chapter 3, the Random effects model assumes that the entity's error term is not correlated with the predictors which allows for time invariant variables to play a role as explanatory variables. In the Random effects model the individual characteristics that may or may not influence the predictor variables need to be specified. The problem with this is that some of the variables may not be available therefore leading to omitted variable bias in the model. The biggest influence of the relationship between debt and economic growth in African

countries is the state of public institutions which is very hard to measure quantitatively and the data was unavailable for the countries under study. Thus this also presents a constraint to the research.

#### 4.2 Estimation of the Random –Effects GLS Regression Model for SADC countries

The dependent variable is economic growth. The control variables are external debt (ExDebt), total debt (Debt) and infrastructure spending (IS).

#### Dependent variable = Economic Growth (Growth)

Table 2: Regression output for growth against Infrastructure spending (IS):

```

Random-effects GLS regression                Number of obs    =    135
Group variable: country                  Number of groups =    15

R-sq:  within = 0.0239                    Obs per group:  min =    9
        between = 0.2431                    avg =    9.0
        overall = 0.0870                    max =    9

corr(u_i, X) = 0 (assumed)                  Wald chi2(1)     =    3.73
                                                Prob > chi2      =    0.0533

                                         (Std. Err. adjusted for 15 clusters in country)

```

Growth	Coef.	Robust Std. Err.	z	P> z	[95% Conf. Interval]	
IS	.229373	.1187172	1.93	0.053	-.0033085	.4620545
_cons	3.223316	1.1596	2.78	0.005	.9505425	5.49609
sigma_u	2.1644615					
sigma_e	3.9523529					
rho	.23071489	(fraction of variance due to u_i)				

Table 3: Regression output for growth against External Debt (Ex Debt)

```

Random-effects GLS regression                Number of obs    =    154
Group variable: country                  Number of groups =    14

R-sq:  within = 0.0077                    Obs per group:  min =    11
        between = 0.0153                    avg =    11.0
        overall = 0.0099                    max =    11

corr(u_i, X) = 0 (assumed)                  Wald chi2(1)     =    1.83
                                                Prob > chi2      =    0.1758

                                         (Std. Err. adjusted for 14 clusters in country)

```

Growth	Coef.	Robust Std. Err.	z	P> z	[95% Conf. Interval]	
ExDebt	-.0141444	.0104468	-1.35	0.176	-.0346198	.006331
_cons	5.618693	.6400466	8.78	0.000	4.364225	6.873162
sigma_u	2.2696192					
sigma_e	3.7880345					
rho	.26415753	(fraction of variance due to u_i)				

Table 4: Regression output for growth against Debt (Total Debt)

```

Random-effects GLS regression           Number of obs   =       164
Group variable: country              Number of groups =        15

R-sq:  within = 0.0065                Obs per group: min =       10
        between = 0.0000                avg =       10.9
        overall = 0.0015                max =       11

corr(u_i, X) = 0 (assumed)              Wald chi2(1)    =        2.27
                                           Prob > chi2     =       0.1321

```

(Std. Err. adjusted for 15 clusters in country)

Growth	Coef.	Robust Std. Err.	z	P> z	[95% Conf. Interval]	
Debt	<b>-.010194</b>	<b>.0067691</b>	<b>-1.51</b>	<b>0.132</b>	<b>-.0234612</b>	<b>.0030732</b>
_cons	<b>5.47679</b>	<b>.8067215</b>	<b>6.79</b>	<b>0.000</b>	<b>3.895644</b>	<b>7.057935</b>
sigma_u	<b>2.3345759</b>					
sigma_e	<b>3.6465145</b>					
rho	<b>.29072139</b>	(fraction of variance due to u_i)				

### 4.3 Interpretation of results

Increasing infrastructure spending by one percentage points results in economic growth of 0.229 units and increasing external debt and total debt by one percentage points results in a decline in economic growth of 0.014 units and 0.010 units respectively. This concludes that infrastructure spending has a positive effect on economic growth in the SADC countries and external debt and total debt have a negative effect on economic growth across the SADC countries. For all three variables the two tail p-values are greater than 0.05 meaning that the independent variables of infrastructure expenditure, external debt and total debt have an insignificant influence on the dependent variable economic growth. This means that economic growth is largely affected by factors outside this model. As pointed out earlier, this could largely be the result of weak public institutions that plague African countries. This finding is consistent with that of Andros Kourtellos who found that the relationship between public debt and growth is crucially affected by the quality of a country's institutions. When a country's institutions are below a particular level, then more public debt leads to lower growth (all else equal). However, if a country's institutions are of sufficiently high quality, then public debt growth is neutral.

A good example of this is the debt of Japan which is 243.2% of GDP and the United States which is 104.5% of GDP including external debt (IMF, 2013). However, because the two countries public institutions are of sufficiently high quality and have debt management policies in place, the public debt effects against economic growth are neutral compared to the effects of public debt on growth in African countries.

The results presented above are also consistent with the findings of researchers such as Atique and Malik, 2012, Presbitero, 2010 etc. who found that there was an inverse relationship between economic growth and external debt. Even more so the results are consistent with the results of Gill and Pinto who found that for developing countries external debt has a negative effect on economic growth at levels of about 15 – 25 percent of GDP instead of 90 percent as for developed countries. All countries under observation had external debt levels lower than 50 percent due to the debt relief initiative of the multilateral institutions. Yet, external debt had a negative effect on economic growth in the panel of countries under study.

The results are also consistent with the findings of Hulten who found that infrastructure has a positive relationship with economic growth however low and middle income countries that use infrastructure inefficiently pay a growth penalty in the form of a much smaller benefit from infrastructure investment. The World Bank has noted that the deficiencies often arise from inadequate management of the existing infrastructure assets, as distinct from inadequate levels of the new construction. The existence of an infrastructure effectiveness problem is well documented, what is not well known is the actual magnitude of the pending inefficiency. Hulten, 1996 found that a one percent increase in the infrastructure effectiveness parameter is found to have an impact on growth that is more than seven times larger than the impact of the same percentage increase in the rate of public investment. In addition, these countries that use infrastructure inefficiently pay a growth penalty in the form of a much smaller benefit from new infrastructure investments. The magnitude of this penalty is apparent when the growth experience of Africa is compared with that of east Asia. Over one quarter of the differential growth rate between these two regions can be attributed to the difference in effective use of infrastructure resource. At the same time, the difference due to public capital formation is negligible. An even stronger impression is conveyed by the comparison of high and low growth rate economies (Hulten, 1996). Hulten also found that more than 40% of the growth differential is due to the efficiency effect, making it the single most important

explanatory of the differential growth performance. However, the very strength of the efficiency effect invites the speculation that the infrastructure effectiveness variable is really a proxy for more general productive efficiency. In this interpretation, it is the productivity with which all inputs are used that affects GDP growth rates, and not just the input of infrastructure (Gill and Pinto, 2005).

So knowing that it is the inefficiency of public institutions that affect the economic growth of African countries more so than the infrastructure and public debt, the next phase of this chapter describes the risks and opportunities presented by issuing of international sovereign bonds for infrastructure investment.

#### **4.4 Conclusion and Policy considerations**

Issuing international sovereign bonds creates both opportunities and risks. These are, in principle, separate from those arising from changes in the level and composition of public debt, which reflect fiscal policy decisions and public debt management responses to the external environment. Countries may issue international sovereign bonds when public debt levels and ratios are falling, remaining unchanged, or increasing. They may issue foreign currency denominated sovereign bonds at the same time that authorities manage to reduce the currency risk in their overall debt portfolio. For example, countries may issue foreign currency-denominated sovereign bonds in smaller amounts than public foreign currency – denominated external debt maturing in that year. This could result in a lower public debt level and lower foreign currency risk.

According to the IMF, the main opportunities that stem from issuing international sovereign bonds are:

- International sovereign bond issuance can provide a benchmark for pricing corporate bonds in international markets, over time expanding the yield curve, and help increase access for the private sector and parastatal companies.
- Accessing international markets through a sovereign bond can strengthen macroeconomic discipline and move forward transparency and structural reforms as a result of increased scrutiny by international market participants. For instance, Nigeria's fiscal and monetary discipline to date has continued to strengthen following its increased presence in international markets in recent years

- At the current juncture of easy global financial conditions, issuing sovereign bonds could provide access to long term funding to help finance infrastructure, helping supplement low domestic rates in some countries. Ghana, Senegal, Tanzania and Zambia are examples of countries that tapped international capital markets with the stated objective of financing capital projects
- Also, sovereign bond issuance can help lower debt servicing costs by substituting outstanding public external instruments (also denominated in foreign currency) contracted at higher interest rates with sovereign bonds with lower coupon rates, longer maturities, and no amortization for a significant time.

Against these advantages, a number of potential risks are associated with access to additional finance, especially in the context of easy global liquidity. These risks include possible excessive fiscal expansion and public debt management problems that may impair macroeconomic stability (IMF, 2012).

- Given limited administrative capacity, weak fiscal institutions, low efficiency of public investment expenditure, and governance issues prevailing in some of the sub-Saharan African countries, there is a risk that increased public spending or investment projects financed by bond issuance may be poorly selected or executed and therefore would not render value for money. Increased public investment spending may also be accompanied by a rise in recurrent primary spending, which may be hard to reverse.
- In terms of public debt management, it is possible that countries lengthen the maturity of public external debt and increase the share of public debt denominated in foreign currency. Although issuing sovereign bonds at low interest rates for longer maturities is generally advisable and could reduce rollover risks, countries need to factor in risks arising from changes in macro-financial environments over time. Bonds, in particular those with a bullet repayment structure, may have to be repaid at a time of higher interest rates, or when the currency may be weaker. Tapping international bond markets may also in some cases lead to reduced access to concessional financing. A strong public debt management office would help mitigate the risks associated with public external debt.
- Although sovereign bond issues could help increase private sector and parastatal entities access to international capital markets, sometimes corporate governance structures and debt monitoring capacity may not be in place to contain

macroeconomic and structural vulnerabilities arising from increased private sector and parastatal external debt and currency risk exposure. Both the Asian crisis and the financial turmoil in Europe are reminders of the drawbacks of excessive private foreign debt.

- Similar to other forms of capital flows, international bond financing has potential repercussions for the conduct of monetary and exchange rate policy. A shift to larger foreign financing potentially implies appreciation pressure for the domestic currency (depending on the import content of the associated spending). This may harm export competitiveness and if addressed via the issuance of sterilization bills, may cause an interest burden to the monetary authority or the treasury.

The final choice needs to weigh advantages and disadvantages of alternative forms of financing in a country specific context. Capacity and financing constraints are a decisive factor in determining how a country can use different financing options to reduce existing gaps, including in infrastructure. From the standpoint of costs and risks, concessional financing remains the best option. However, as sub-Saharan African countries are finding it increasingly harder to obtain concessional financing, they have to diversify their financing sources. In principle, in addition to the issuance of international bonds, there is a menu of financing options, including domestic bonds, syndicated loans, and public-private partnerships. In practice large projects will often be financed by a combination of available resources. Some countries in the region for example, Senegal have used and combine these options for infrastructure projects.

Scaling up investment and the best financing venue should be seen as a joint decision. Policy makers will need to consider carefully the implementation capacity and the speed with the economy can absorb the desired “scaling up” of infrastructure expenditure. Once a sustainable path has been determined, policy makers need to assess the strengths and weaknesses of various financing options. They will therefore have to weigh carefully the issuance of bonds against alternative forms of more tailored financing, involving lower carry-costs in case of bond proceeds cannot be allocated immediately to a specific high return use.

The financial characteristics of the sovereign bond instruments could also contribute to mitigating the potential risks involved.

- Size of a bond should be carefully considered, based on its impact on the issuer's debt profile. Accordingly, a prospective borrower needs to assess the impact of the new debt on debt sustainability and conduct a cost benefit analysis of the corresponding investment program. It should avoid exceeding funding needs to minimize carry-costs, while being large enough to avoid an illiquidity premium.
- Currency mismatches between the structure of government revenue and its overall public debt obligations should be mitigated to the extent possible. Debut issuers have generally denominated their bonds in the major reserve currencies, including the US dollar, euro, or yen. Although currency swap instruments may be used, US dollar instruments have denominated because they offer the deepest and most liquid markets. The possibility of issuing bonds in domestic currencies to tap international savings may be explored in some cases, and, in the savings may be explored in some cases, and in the longer term, a gradual program for local currency sovereign bond issuance could be planned.
- Debt profile and structure of repayment. The bond maturity is an important consideration because, all other things remaining equal, a longer maturity would be lower rollover risks. Debut issuers may in some cases prefer short maturities; allowing time to showcase a strong performance lowering spreads. Meanwhile a short maturity may increase rollover risks. The type of bond (bullet, sinking, amortizing bond) is also critical in minimising rollover risk. The bullet structure is the most common traded), but may create bumps in the debt service profile. An amortizing bond would instead smooth the debt-service profile in the countries with higher public debt levels and more consolidated market presence. A bullet repayment combined with sinking fund whereby the issuing country sets up a fund that is gradually built to reduce the rollover risk at maturity provides a midway approach.
- Legal terms and information disclosure. The prospective issuer needs to prepare well ahead. It should set up the legal framework and institutional capacity needed to support, monitor, and service international bonds. It should carefully consider, with the help of legal and financial advisors, the terms of the new bonds, most importantly the law that will govern these instruments and the market in which they are to be issued. The issuer may choose to issue a global bond and/ or exotic bond, and select the modalities of the issuance (public offering versus private placement). In this

context, the issuer should keep in mind that different costs and requirements regarding information disclosure and transparency to potential investors.

Sound public debt management strategy and asset management capabilities are crucial for the success of a bond issuance. From a debt management perspective, the advisability of an international bond issuance should be assessed within the country's medium term debt strategy framework. This would entail an evaluation of the implications for the country's debt structure, management, and sustainability. In particular, the size and terms of a bond issue should be consistent with the country's medium term fiscal policy objectives. Also, developing in-house human capacity (including investor-relations programs) may help reduce funding costs and monitor price signals from secondary market transactions. An in-house capacity may be useful over time to assess proper levels of interest rates, in addition to the advice of investment advisors assisting with the issuance. Asset management capacity may become particularly useful when the amount borrowed exceeds the immediate financial needs.

The International Monetary Fund has made the following recommendations for sub-Saharan Africa sovereign issuers:

- Develop a sound macroeconomic framework and strive to maintain prudent fiscal policies that safeguard fiscal and public debt sustainability
- Improve the composition and profile of public debt under an appropriate medium term debt management strategy
- Adhere to best practices in terms of information disclosure and outreach to potential investors.
- Lock in low interest rates with modest amortisation over long maturities, while smoothing the maturity profile of the entire public debt portfolio to minimize rollover risks.
- Internalise the risks from uncertain future global conditions, which may make it more difficult to access markets and rollover debt
- Review their capacity and secure appropriate technical assistance to prepare for issuing international sovereign bonds.

Finally, a sovereign bond issue may not in all cases be the best financing option. Countries need to carefully consider alternative options to fund public infrastructure projects; in many

cases, more tailored financing options can either be less expensive or less risky. For example, bond financing may not be efficient if it is not possible to mitigate carry-costs by matching the funding requirements of the project over time through consecutive bond issues.

Countries considering issuing international sovereign bonds should review capacity needs and secure appropriate technical assistance and training. Specific capacity building needs could include the following areas: (1) building macroeconomic frameworks reflecting the dimensions of the new bond issues- for instance, reserve adequacy exercises could help prevent debt-servicing problems and help identify carry-costs (ii) implementing improved prudential frameworks to monitor all relevant risks, currency mismatch, liquidity and interest rate risk) may increase the capacity of the banking system to intermediate the inflows effectively; and (iii) formulating and implementing a medium term debt strategy consistent with preserving debt sustainability and strengthening debt management and monitoring capacity. As part of a medium term debt framework, strengthening project evaluation capacity would generally also be necessary.

The African Development Bank has made the following recommendations for financing Africa's infrastructure with less impact on the debt sustainability:

1. Tapping reserves in "excess-savings" countries
2. Establishing sovereign wealth funds
3. Establishing Public Private Partnerships

Again all the above recommended options require adequate institutions.

## Chapter 5: Conclusion

Without a doubt sovereign debt can help developing countries. It can enable governments to facilitate growth take-offs by investing in a critical mass of infrastructure projects and in the social sectors when taxation capacity is limited, or when the alternative would be to print money and compromise macroeconomic stability. Debt also facilitates tax smoothing and counter-cyclical fiscal policies, essential for reducing output volatility; and it permits an equitable alignment of benefits and costs of long-gestation projects by shifting taxation away from current generations. Sovereign debt can also facilitate the achievement of growth, for example, by enabling the optimal social provision of public goods such as education and infrastructure when taxation capacity is limited today but expected to be higher in the future. It also helps when public investments spur private investment through complementarities. But this critically assumes that only those public projects with economic returns exceeding the cost of borrowing are selected; and that the government subsidizes such projects when their financial return is lower than the cost of funds through redistributive taxation (as opposed to further borrowing): in other words, that governments play their assigned role (Gill and Pinto, 2005).

The IMF highlights three reasons that explain why public debt may be better than taxation:

1. Tilting – allowing a more equitable manner in which a country can exploit investment opportunities with long gestation periods. In a growing economy, it would be inequitable to tax current (poorer) generations to pay for investments that will benefit future (richer) generations. The only problem with this is that African countries sovereign bonds periods are too small and rarely span over 10 years, increasing the debt servicing burden of the government
2. Smoothing – allowing a more efficient manner for conducting counter-cyclical policies or meeting emergency spending needs. Raising and lowering taxes frequently may entail efficiency losses and generate economic uncertainty.
3. Stability – excessive reliance on printing money could lead to high and volatile inflation, which obscures the information content of relative prices and hurts investment.

This is what theory tells us. And there is every reason to believe that governments which borrow and spend prudently will reap these benefits in practice. But we also know that there has been a profusion of costly macroeconomic crises during the 1990s with public debt being a central cause e.g. Russia 1998 and Argentina 2001, or else absorbing the brunt of the impact e.g. Indonesia, Korea, Malaysia and Thailand during 1997 -98. And the external debt crisis of the 1980s and the now controversial financial liberalization of the early 1990s have raised serious questions about the benefits of market based external finance for developing countries with access to the international capital markets (Gill and Pinto, 2005). History has also taught us that unsustainable debt levels can lower growth by raising real interest rates and crowding out the private sector. Debt has eventually to be repaid- borrowing is simply postponed taxation. Hence, the use to which funds are put and the returns relative to the cost of borrowing become crucial (Gill and Pinto, 2005).

The thesis set out to answer the following questions:

**Is there a relationship between total public debt (external and / domestic debt) and GDP growth across all countries in the SADC region?**

Yes, from the workings in Chapter 4 we can see that there is a positive correlation between infrastructure investment and a negative correlation between total public debt and external debt against economic growth. However, all these relationships were weak. This could reflect a number of factors, such as business cycle considerations (for example, lower revenue from subdued domestic activity could lead to delays in implementing projects), or capacity constraints. That said, it suggests the impact of possible time lags between bond issuance and putting the proceeds into actual use. This also highlights the issue of fungibility of funds as the proceeds of additional debt may be used for other budgetary purposes. Of all the countries that issued sovereign bonds in SADC for the purpose of infrastructure development e.g. Zambia and Tanzania investment in public infrastructure did not increase substantially afterwards. Instead investment in public infrastructure as a percentage of GDP in Zambia decreased afterwards.

As discussed in Chapter 4 above, omitted variables can also be an explanation, e.g. a supply shock could both lead to lower growth and a higher public debt-to-GDP ratio. And weak institutions could likewise lead to low growth and high indebtedness.

### **Is the debt spurring development or a desirable level of economic growth?**

From the panel data analysis, it seems unlikely that the debt is spurring development (if it is then the impact is really minimal) as the public institutions lack debt management policies and lack policy certainty that affect foreign direct investment in the country.

### **Are tax bases growing fast enough to support the growth in the debt (external and total debt)?**

No, over the period under review tax bases have grown on average 7% whilst total public debt has grown by 49% on average over the same period.

The issue of causality remains. **Does high public debt cause low growth, or is it a cumulative symptom of bad past decisions on spending and taxation, misuse of fiscal resources, poorly designed stabilization programs and the postponed consequences of contingent liabilities?** From Chapter 2 and Chapter 4, the main cause of low economic growth in African states is the poor public institutions and the lack of clear policies on debt management. A pragmatic view is that once a country crosses a certain debt-to-GDP threshold, debt could easily become a dominant factor going forward as well as the biggest constraint on policies and growth; how it was accumulated becomes secondary and dealing with the indebtedness itself becomes a primary task and countries which chose to generate large primary surpluses in institutional reform.

The following has also been learnt:

Public debt can constrain growth in developing countries through three channels:

1. **Debt Overhang:** In a highly indebted economy, since private investors expect that future output will in effect be taxed to repay the debt, the expected return to private investment is reduced; hence investment and growth fall. Private investment may also be discouraged by the macroeconomic uncertainty and unpredictable taxation engendered by high debt. And the incentives for governments to carry out policy reform may be lower since successful reforms would result in greater pressure to repay creditors.
2. **Fiscal Space:** High debt service results in pressures on the government budget and may reduce public investment and social spending, in turn reducing economic growth.

3. Crowding Out: The financing of high fiscal deficits could raise real interest rates and dampen, or crowd out, private investment as lenders may prefer to hold relatively safe and high-yielding government paper. Where capital controls do not exist, private borrowers crowded out of the domestic market may tap the overseas market; but are unlikely to invest in real assets so long as government debt yields high returns.

Based on the evidence available, public debt appears to be constraining growth in a number of prominent developing countries, most obviously in those that are experiencing debt sustainability problems. A debt sustainability problem means that the present combination of primary surpluses, real interest and growth rates is no longer tenable. It could also be a sign of solvency problems, i.e., that creditors believe that the present value of surpluses is less than the outstanding public debt. This in turn could mean that the country is not expected to grow out of its debt problem otherwise, there would not be a sustainability issue to begin with—and generate uncertainty about future inflation and taxation with harmful effects on investment .

Further, any developing country which is debt intolerant and faces high spreads on its sovereign borrowing should also be regarded as being in a situation where public debt is constraining growth. Developing countries tend to be more volatile than their industrialized counterparts such as Japan and the United States. Catão and Kapur (2004) find that once the volatility of output or the terms of trade is included in logit regressions of default probability in a cross-country panel, the credit history variable of Reinhart, Rogoff and Savastano (2003) is no longer significant. This means that credit history is to some extent a substitute for volatility, which translates into debt distress: a one percentage point increase in volatility in real GDP leads to a 12 percent decline in the sustainable debt threshold. Paradoxically, countries that most need debt finance for smoothing are the ones that can least tolerate it. This also raises the puzzle why countries and their creditors continue to underestimate the levels of volatility, or to overestimate their own capacity to service debt in its presence.

Whilst debt levels are in some SADC countries such as Zambia and Mozambique are soaring, it is probably neither realistic nor desirable to hold off infrastructure investment until such reforms are adopted. For the evidence suggests that, in addition to providing immediate economic stimulus, public infrastructure investment has a significant, positive effect on output and growth.

In conclusion – the combination of a favourable global environment and improved domestic conditions offers the option of issuing sovereign bonds to first time issuers in sub-Saharan African countries. In many cases there will be a need for substantial capacity- building efforts. It is advisable then that sovereign issuances be carefully planned and prepared, and used as only one of a range of possible financing instruments. In particular, issuance of sovereign bonds should be one of several pillars of broadening government financing instruments, which should also include efforts to develop domestic debt markets and broaden options for infrastructure finance. Most importantly, African countries need to improve their public institutions and policies before any substantial inclusive economic growth can be realized from the investment in infrastructure and debt.

## References

1. Hulten, C., 1996. *Infrastructure capital and Economic growth: how well you use it may be more important than how much you have*. NBER Working Paper Series
2. Gramlich, E., 1994. *Infrastructure investment: a review essay*. *JSTOR Journal of Economic Literature*, vol.32, No.3. (Sep., 1994), pp. 1176 -1196.
3. Melina, G.; Yang, S and Zanna, L., 2014. *Debt sustainability, public investment, and natural resources in developing countries: the DIGNAR Model*. International Monetary Fund Working Paper WP/14/50
4. Munnell, A., 1992. *Policy watch: infrastructure investment and economic growth*. *The Journal of Economic Perspectives*, vol. 6, No. 4, (Autumn, 1992), pp.189 -198
5. Presbitero, A., 2010. *Total public debt and growth in developing countries*. Centro Studi Luca d' agliano, Development studies working papers. N. 300
6. Aschauer, D., 1988. *Is public expenditure productive?* *Journal of Monetary Economics* 23(1989) 177-200
7. Panizza, U. and Presbitero, A., 2012. *Public debt and economic growth: is there a causal effect?* Money and Finance Research Group working paper no. 65
8. Guidelines for public debt management, 2001. International Monetary Fund and the World Bank. Viewed 3 June 2013 from [http://treasury.worldbank.org/bdm/htm/guidelines\\_publicdebt.html](http://treasury.worldbank.org/bdm/htm/guidelines_publicdebt.html)
9. Malik, K. and Atique, R., 2012. *Impact of domestic and external debt on the economic growth of Pakistan*. *World Applied Sciences Journal* 20 (1): 120 -129, 2012

10. Elmendorf, Douglas W. and Gregory Mankiw, N., 1999. *Government debt*, Handbook of Macroeconomics, in: J. B. Taylor & M. Woodford (ed.), Handbook of Macroeconomics, edition 1, volume 1, chapter 25, pages 1615-1669 Elsevier.
11. Kourtellos, A.; Stengos, T and Ming Tan, C.2013. *The effect of public debt on growth in multiple regimes*. Journal of macroeconomics, vol 38.2013
12. Greiner, A. 2010. *Economic growth, public debt and welfare: comparing three budgetary rules*. German Economic Review 12(2): 205-222
13. Greiner, A. 2012. *Public capital, sustainable debt and endogenous growth*. Elsevier Research in Economics 66(2012) 230-238
14. Mecagni, M.; Krijenko, I., Gueye, C., Mu, Y.; Yabara, M. and Weber,S. 2014.*Issuing international sovereign bonds, opportunities and challenges for sub-saharan Africa*. International Monetary Fund. Viewed 5 August 2014 from <http://www.imf.org/external/pubs/ft/dp/2014/afr1402.pdf>
15. Torres – Reyna, O.,2007. *Panel data analysis fixed and random effects using stata v.4.2*, viewed 30 May 2014 from <http://www.princeton.edu/~otorres/Panel101.pdf>
16. Melina, G., Yang, S., and Zanna, L. 2014. *Debt sustainability, public investment, and natural resources in developing countries: the DIGNAR model*. IMF Working Paper 14/15
17. Ceccacici, S., Marchesiani, A., and Peccchi, L. 2006. International Journal of Theoretical and Applied Finance vol. 10, No 5 (2007) 763 -770.
18. Heylen, F., Hoebeeck A., and Buyse, T. 2013. *Government efficiency, institutions, and the effects of fiscal consolidation on public debt*. European Journal of Political Economy 31(2013) 40 -59

19. Lora, E. and Olivera, M. 2007. *Public debt and social expenditure: Friends or foes?* Emerging Markets Review 8 (2007) 299- 310
20. Easterly, W. 2002. *How did heavily indebted poor countries become heavily indebted? Reviewing two decades of debt relief.* Centre for Global Development, Institute for International Economics
21. Greiner, A. 2012. *Public debt in a basic endogenous growth model.* Economic modeling 29 (2012) 1344 -1348
22. Gill, I. and Pinto, B. 2005. *Public debt in developing countries: has the market-based model worked?* World Bank Policy Research Working Paper 3674, August 2005
23. Borenstein, L., Hedges, L., Higgins, J. and Rothstein, H. 2009. *Fixed effect versus random effects models, introduction to meta-analysis.* John Wiley & Sons, Ltd
24. International Monetary Fund. 2013. *Regional economic outlook sub- Saharan Africa building momentum in a multi-speed world.* Viewed on 1 July 2013 from <https://www.imf.org/external/pubs/ft/reo/2013/afr/eng/sreo0513.htm>
25. Karayalcin, C., McCollister, K and Mitra, D. 2001. *Infrastructure, returns to scale and sovereign debt.* J International Trade & Economic Development 11:3 267 -278
26. Canning, D., Pedroni, D. 1999. *Infrastructure and long Run economic growth.* Elsevier Journal of Development Economics Volume 70, Issue 2, Pages 443–477
27. Forsland, K., Lima, L and Panizza, U. 2011. *The determinants of the composition of public debt in emerging market countries.* Review of Development Finance 1(2011) 207
28. Bulter, W., and Kletzer, K. 1992. *Deficits: which, how much, and so what?*

29. Romp, W., and de Haan, J. 2007. *Public Capital and Economic Growth: A Critical Survey*. Perspektiven der Wirtschaftspolitik, Verein für Socialpolitik, vol. 8(s1), pages 6-52, 04.
30. Irving, J and Manroth, A. 2009. *Local sources of financing for Infrastructure in Africa, a cross country analysis*. International Monetary Fund Policy Research Working Paper 4878
31. Cordella, T., Ricci, L. and Ruiz – Arranz, M. 2005. *Debt overhang or debt irrelevance? Revisiting the debt – growth link*. International Monetary Fund Working Paper WP/05/223
32. Stiglitz, J., and Rashid, H. 2013. *Sub-saharan Africa's subprime borrowers*. Viewed 5 September 2013 from <http://www.project-syndicate.org/commentary/sub-saharan-africa-s-subprime-borrowers-by-joseph-e--stiglitz-and-hamid-rashid>
33. Reinhart, C and Rogoff, K. 2013. *Financial and sovereign debt crises: some lessons learned and those forgotten*. International Monetary Fund Working Paper WP/13/266. Viewed 10 February 2014 from <https://www.imf.org/external/pubs/ft/wp/2013/wp13266.pdf>
34. Kumar, M., and Woo, J. 2010. *Public Debt and Growth*. International Monetary Fund Working Paper WO/10/174 viewed on 10 August 2013 from <https://www.imf.org/external/pubs/ft/wp/2010/wp10174.pdf>
35. Checherita – Westphal, C. and Rother, P. 2010. *The Impact of High and Growing Government Debt on Economic Growth: An Empirical Investigation for the Euro Area*. European Central Bank Working Paper no. 1237
36. Foster, V., and Briceno – Garmendia. 2009. *Africa's infrastructure, a time for transformation*. Viewed on 6 September 2013 from <http://www.wilsoncenter.org/sites/default/files/foster.presentation.pdf>

37. Hansen, H., and Tarp, F. 2000. *Aid effectiveness disputed*. Journal of International Development. Volume 12, Issue 3, pages 375–398
38. Brixiova, Z., Mutambatsere, E., Ambert, C., and Etienne, D. 2010. *Closing Africa's infrastructure gap: innovative financing and risks*. Viewed on 3 October 2013 from <http://www.afdb.org/fileadmin/uploads/afdb/Documents/Publications/Africa%20Econo%20brief%2020%282%29.pdf>
39. Greiner, A. 2007. *An endogenous model with public capital and sustainable government debt*. The Japanese Economic Review vol. 58 , No3 Sept 2007
40. Corsetti, G and Roubin, N. 1991. *Fiscal deficits, public debt and government solvency: evidence from OECD countries*. Journal of the Japanese International Economics 354 -380 (1991)
41. Blommestein, H. 2006. *Factors for a successful market in longevity-indexed government bonds: a public debt management*. Pensions - An International Journal, Volume 11, Issue 2, February 2006, Palgrave Macmillan
42. Ceccacci, S. 2007. *Public debt management and foreign currency denominated bonds*. International Journal of Theoretical and Applied Finance Volume 10 No.5 (2007) 763 -770
43. Wright, J. 1999. *British government borrowing in wartime, 1750 – 1815*. Economic History Review, LII, 2 (1999), pp255 -361

## Appendix 1

Table 5: Organised data for regression and panel data model

Country	Year	IS	Growth	ExDebt	Debt
Angola	2004	4.9	11.2	36.2	54.1
Angola	2005	5.5	20.6	15.9	44.8
Angola	2006	13.0	20.7	7.9	21.6
Angola	2007	14.4	22.6	6.5	21.4
Angola	2008	23.3	13.8	5.8	31.6
Angola	2009	12.4	2.4	8.3	36.5
Angola	2010	9.7	3.4	8.7	37.6
Angola	2011	8.6	3.9	7.5	31.5
Angola	2012	9.4	8.4	7.1	29.3
Angola	2013		6.2	9.4	32.8
Angola	2014		7.3	11.4	34.7
Botswana	2004	9.9	6	4.6	9.7
Botswana	2005	7.6	1.6	3.8	7
Botswana	2006	6.5	5.1	3.1	5.4
Botswana	2007	7.0	4.8	2.6	7.1
Botswana	2008	10.2	3	2.1	6.4
Botswana	2009	16.4	-4.7	12	15.8
Botswana	2010	13.3	7	13.1	17.6
Botswana	2011	9.9	5.1	10.2	16.7
Botswana	2012	8.2	3.8	9.6	14.9

Botswana	2013		6.4	8.8	13.4
Botswana	2014		5.8	7.5	11.7
Lesotho	2004	7.8	2.8	57.8	56.9
Lesotho	2005	8.0	2.9	52.2	61.6
Lesotho	2006	7.3	4.1	53.5	64.4
Lesotho	2007	6.9	4.9	41.7	60.4
Lesotho	2008	11.2	5.1	41	52.2
Lesotho	2009	13.9	4.8	39.6	37.8
Lesotho	2010	18.8	6.3	32.9	35.4
Lesotho	2011	18.3	5.7	31.5	39.1
Lesotho	2012	18.8	4	35.7	41.9
Lesotho	2013		3.5	37.1	43.1
Lesotho	2014		3.1	36.5	41.9
Namibia	2004	3.3	12.3	5.1	27.5
Namibia	2005	3.5	2.5	4.4	26
Namibia	2006	2.7	7.1	4.5	23.8
Namibia	2007	3.3	5.4	5.1	19.1
Namibia	2008	3.6	3.4	4.3	17.7
Namibia	2009	5.1	-1.1	4.9	16
Namibia	2010	5.8	6.6	4.4	15.7
Namibia	2011	6.7	4.8	6.2	23.5
Namibia	2012	9.2	4	8.3	26.6
Namibia	2013		4.2	7.9	31.9
Namibia	2014		4	7.9	29.1
Seychelles	2004	3.8	-2.9	33	163.2
Seychelles	2005	5.0	9	35.3	144.1
Seychelles	2006	7.2	9.4	22.2	132.5
Seychelles	2007	5.4	10.1	24.8	130.7
Seychelles	2008	2.0	-1.9	31.2	130
Seychelles	2009	5.3	-0.2	29.8	123.5
Seychelles	2010	8.6	5.6	24.7	81.6
Seychelles	2011	8.1	5	24.6	74.3

Seychelles	2012	13.2	2.8	26.6	82.5
Seychelles	2013		3.2	28.9	75.5
Seychelles	2014		3.9	31.6	66.2
South Africa	2004	1.1	4.6	2.3	35.9
South Africa	2005	1.0	5.3	2	34.7
South Africa	2006	1.2	5.6	1.9	32.6
South Africa	2007	1.1	5.5	1.8	28.3
South Africa	2008	1.2	3.6	1.9	27.8
South Africa	2009	1.2	-1.5	1.9	31.3
South Africa	2010	1.5	3.1	1.8	35.8
South Africa	2011	1.9	3.5	2	39.8
South Africa	2012	2.3	2.5	2.1	42.3
South Africa	2013		2.8	2.2	42.7
South Africa	2014		3.3	2.1	43.7
Swaziland	2004	8.2	2.3		18.5
Swaziland	2005	7.7	2.2		16.5
Swaziland	2006	7.1	2.9		17.3
Swaziland	2007	6.7	2.8		18.4
Swaziland	2008	7.8	3.1		16.6
Swaziland	2009	9.3	1.2		12.6
Swaziland	2010	8.7	1.9		17.1
Swaziland	2011	7.0	0.3		18.3
Swaziland	2012	9.3	-1.5		19
Swaziland	2013		0		20.9
Swaziland	2014		0.3		35.1
Zambia	2004	8.7	5.4	114.4	22
Zambia	2005	7.1	5.3	57.5	19.4
Zambia	2006	4.2	6.2	5	29.8
Zambia	2007	4.2	6.2	10.3	26.7
Zambia	2008	3.6	5.7	8.6	23.5
Zambia	2009	3.5	6.4	12.3	26.9
Zambia	2010	3.2	7.6	10.8	25.8

Zambia	2011	4.2	6.8	10.9	25.1
Zambia	2012	5.4	7.3	13.9	26.9
Zambia	2013		7.8	14.3	28.7
Zambia	2014		8	14	29.7
Malawi	2004	7.3	5.5	112.6	139.6
Malawi	2005	7.7	2.6	107.2	141.2
Malawi	2006	6.2	2.1	16.9	36.4
Malawi	2007	10.5	9.5	15.8	35.4
Malawi	2008	10.7	8.3	16.6	44.6
Malawi	2009	6.7	9	15.9	43.4
Malawi	2010	7.7	6.5	16	37.4
Malawi	2011	8.0	4.3	16.2	42.1
Malawi	2012	6.8	1.9	22.8	54.9
Malawi	2013		5.5	26.2	50.5
Malawi	2014		6.1	24.3	43.1
Mozambique	2004	10.0	7.9	77.5	70.7
Mozambique	2005	10.6	8.4	70.7	81
Mozambique	2006	10.5	8.7	45.5	53.6
Mozambique	2007	16.1	7.3	40.8	41.9
Mozambique	2008	18.3	6.8	36.6	42.1
Mozambique	2009	12.9	6.3	41.6	51.9
Mozambique	2010	13.9	7.1	42.3	49.3
Mozambique	2011	13.9	7.3	35.5	45.1
Mozambique	2012	14.8	7.5	32.8	46.6
Mozambique	2013		8.4	33.7	47
Mozambique	2014		8	34.6	47.6
Tanzania	2004	5.3	7.8	52.8	56.3
Tanzania	2005	7.8	7.4	43.6	56
Tanzania	2006	7.5	6.7	31	42.6
Tanzania	2007	6.4	7.1	18.5	28.4
Tanzania	2008	7.3	7.4	19.1	29.2
Tanzania	2009	7.6	6	22.2	32.6

Tanzania	2010	8.1	7	24.7	37.7
Tanzania	2011	7.4	6.4	27	40
Tanzania	2012	8.7	6.9	24.7	41.4
Tanzania	2013		7	23.5	44.9
Tanzania	2014		7.2	22.9	46.4
DRC	2004	2.8	6.6	167.9	196
DRC	2005	3.3	7.8	156.8	147.9
DRC	2006	3.2	5.6	134.2	149
DRC	2007	2.3	6.3	125.7	126.1
DRC	2008	3.7	6.2	114.2	133.1
DRC	2009	7.8	2.8	117.2	136.3
DRC	2010	14.1	7.2	23.3	38.4
DRC	2011	19.5	6.9	20.3	33
DRC	2012	21.7	7.1	21	36
DRC	2013		8.3	21.5	41.3
DRC	2014		6.4	22	46.2
Zimbabwe	2004	5.1	-6.1	62.7	
Zimbabwe	2005	1.9	-5.6	57.5	49.5
Zimbabwe	2006	2.0	-3.4	69	58.4
Zimbabwe	2007	1.2	-3.7	76.9	66.2
Zimbabwe	2008	0.3	-17.8	94.4	92.2
Zimbabwe	2009	0.8	8.9	88.2	90.7
Zimbabwe	2010	7.7	9.6	78.9	77.6
Zimbabwe	2011	5.2	10.6	65.2	65.3
Zimbabwe	2012	5.8	4.4	60	60.5
Zimbabwe	2013		5	56.1	56.1
Zimbabwe	2014		5.7	51.7	49.7
Mauritius	2004	3.9	4.3	7.5	56.9
Mauritius	2005	3.3	1.5	7.3	61.6
Mauritius	2006	3.3	4.5	6.8	64.4
Mauritius	2007	2.9	5.9	6	60.4
Mauritius	2008	4.3	5.5	5.5	52.2

Mauritius	2009	2.0	3	7.4	37.8
Mauritius	2010	2.7	4.1	8.4	35.4
Mauritius	2011	2.7	3.8	8.4	39.1
Mauritius	2012	2.5	3.3	8.9	41.9
Mauritius	2013		3.7	10.2	43.1
Mauritius	2014		4.4	12.1	41.9
Madagascar	2004	12.5	5.3	78.4	90.9
Madagascar	2005	9.9	4.6	66.5	82.2
Madagascar	2006	10.3	5	28.8	37
Madagascar	2007	7.6	6.2	26	33.5
Madagascar	2008	8.6	7.1	23.4	31.9
Madagascar	2009	4.9	-4.1	29.4	36
Madagascar	2010	5.0	0.4	28.7	36.1
Madagascar	2011	4.2	1.8	25.9	37.4
Madagascar	2012	3.5	1.9	25.8	38.3
Madagascar	2013		2.6	25	37.5
Madagascar	2014		3.8	24.3	39.3

Source: IMF Regional Economic Outlook, May 2014; African Development Bank Statistics Department, 2013

## Appendix 2:

Table 6: Total public debt as a percentage of GDP in SADC (2004- 2012)

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014(e)
<b>Angola</b>	54.1	44.8	21.6	21.4	31.6	36.5	37.6	31.5	29.3	32.8	34.7
<b>Botswana</b>	9.7	7	5.4	7.1	6.4	15.8	17.6	16.7	14.9	11.7	11.18
<b>Lesotho</b>	56.9	61.6	64.4	60.4	52.2	37.8	35.4	39.1	41.9	43.1	41.9
<b>Namibia</b>	27.5	26	23.8	19.1	17.7	16	15.7	23.5	26.6	31.9	29.1
<b>Seychelles</b>	163.2	144.1	132.5	130.7	130	123.5	81.6	74.3	82.5	75.5	66.2
<b>South Africa</b>	35.9	34.7	32.6	28.3	27.8	31.3	35.8	39.8	42.3	42.7	43.7
<b>Zambia</b>	22	19.4	29.8	26.7	23.5	26.9	25.8	25.1	26.9	28.7	29.7
<b>Malawi</b>	139.6	141.2	36.4	35.4	44.6	43.4	37.4	42.1	54.9	50.5	43.1
<b>Mozambique</b>	70.7	81	53.6	41.9	42.1	51.9	49.3	45.1	46.6	47	47.6
<b>Tanzania</b>	56.3	56	42.6	28.4	29.2	32.6	37.7	40	41.4	44.9	46.4
<b>DRC</b>	196	147.9	149	126.1	133.1	136.3	38.4	33	36	41.3	46.2
<b>Zimbabwe</b>		49.5	58.4	66.2	92.2	90.7	77.6	65.3	60.5	56.1	49.7
<b>Mauritius</b>	56.9	61.6	64.4	60.4	52.2	27.8	35.4	39.1	41.9	43.1	41.9
<b>Madagascar</b>	90.9	82.2	37	33.5	31.9	36	36.1	37.4	38.3	37.5	39.3
<b>Swaziland</b>	18.5	16.5	17.3	18.4	16.6	12.6	17.1	18.3	19	20.9	35.1

Source: IMF Regional Economic Outlook, May 2013

Table 7: External debt to official creditors as a percentage of GDP in SADC (2004 -2012)

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014(e)
<b>Angola</b>	36.2	15.9	7.9	6.5	5.8	8.3	8.7	7.5	7.1	9.4	11.4

<b>Botswana</b>	4.6	3.6	3.1	2.6	2.1	12	13.1	10.2	9.6	8.8	7.5
<b>Lesotho</b>	57.8	52.2	53.5	41.7	41	39.6	32.9	31.5	35.7	37.1	36.5
<b>Namibia</b>	5.1	4.4	4.5	5.1	4.3	4.9	4.4	6.2	8.3	7.9	7.9
<b>Seychelles</b>	33	35.3	22.2	24.8	31.2	29.8	24.7	24.6	26.6	28.9	31.6
<b>South Africa</b>	2.3	2	1.9	1.8	1.9	1.9	1.8	2	2.1	2.2	2.1
<b>Zambia</b>	114.4	57.5	5	10.3	8.6	12.3	10.8	10.9	13.9	14.3	14
<b>Malawi</b>	112.6	107.2	16.9	15.8	16.6	15.9	16	16.2	22.8	26.2	24.3
<b>Mozambique</b>	77.5	70.7	45.5	40.8	36.6	41.6	42.3	35.5	32.8	33.7	34.6
<b>Tanzania</b>	52.8	43.6	31	18.5	19.1	22.2	24.7	27	24.7	23.5	22.9
<b>DRC</b>	167.9	156.8	134.2	125.7	114.2	117.2	23.3	20.3	21	21.5	22
<b>Zimbabwe</b>	62.7	57.5	69	76.9	94.4	88.2	78.9	65.2	60	56.1	51.7
<b>Mauritius</b>	7.5	7.3	6.8	6	5.5	7.4	8.4	8.4	8.9	10.2	12.1
<b>Madagascar</b>	78.4	66.5	28.8	26	23.4	29.4	28.7	25.9	25.8	25	24.3
<b>Swaziland</b>	-	-	-	-	-	-	-	-	-	-	-

Source: IMF Regional Economic Outlook, May 2013

Table 8: Capital expenditure/ Infrastructure spend as a percentage of GDP in SADC (2004- 2012)

	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>
<b>Angola</b>	4.9	5.5	13	14.4	23.3	12.4	9.7	8.6	9.4
<b>Botswana</b>	9.9	7.6	6.5	7	10.2	16.4	13.3	9.9	8.2
<b>Lesotho</b>	7.8	8	7.3	6.9	11.2	13.9	18.8	18.3	18.8
<b>Namibia</b>	3.3	3.5	2.7	3.3	3.6	5.1	5.8	6.7	9.2
<b>Seychelles</b>	3.8	5	7.2	5.4	2	5.3	8.6	8.1	13.2
<b>South Africa</b>	1.1	1	1.2	1.1	1.2	1.2	1.5	1.9	2.3
<b>Zambia</b>	8.7	7.1	4.2	4.2	3.6	3.5	3.2	4.2	5.4
<b>Malawi</b>	7.3	7.7	6.2	10.5	10.7	6.7	7.7	8	6.8
<b>Mozambique</b>	10	10.6	10.5	16.1	18.3	12.9	13.9	13.9	14.8
<b>Tanzania</b>	5.3	7.8	7.5	6.4	7.3	7.6	8.1	7.4	8.7
<b>DRC</b>	2.8	3.3	3.2	2.3	3.7	7.8	14.1	19.5	21.7
<b>Zimbabwe</b>	5.1	1.9	2	1.2	0.3	0.8	7.7	5.2	5.8

<b>Mauritius</b>	3.9	3.3	3.3	2.9	4.3	2	2.7	2.7	2.7
<b>Madagascar</b>	12.5	9.9	10.3	7.6	8.6	4.9	5	4.2	3.5
<b>Swaziland</b>	8.2	7.7	7.1	6.7	7.8	9.3	8.7	7	9.3

Source: African Development Bank, Statistics Department

Table 9: GDP growth in SADC (2004- 2014)

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014(e)
<b>Angola</b>	11.2	20.6	20.7	22.6	13.8	2.4	3.4	3.9	8.4	6.2	7.3
<b>Botswana</b>	6	1.6	5.1	4.8	3	-4.7	7	5.1	3.8	6.4	5.8
<b>Lesotho</b>	2.8	2.9	4.1	4.9	5.1	4.8	6.3	5.7	4	3.5	3.1
<b>Namibia</b>	12.3	2.5	7.1	5.4	3.4	-1.1	6.6	4.8	4	4.2	4
<b>Seychelles</b>	-2.9	9	9.4	10.1	-1.9	-0.2	5.6	5	2.8	3.2	3.9
<b>South Africa</b>	4.6	5.3	5.6	5.5	3.6	-1.5	3.1	3.5	2.5	2.8	3.3
<b>Zambia</b>	5.4	5.3	6.2	6.2	5.7	6.4	7.6	6.8	7.3	7.8	8
<b>Malawi</b>	5.5	2.6	2.1	9.5	8.3	9	6.5	4.3	1.9	5.5	6.1
<b>Mozambique</b>	7.9	8.4	8.7	7.3	6.8	6.3	7.1	7.3	7.5	8.4	8
<b>Tanzania</b>	7.8	7.4	6.7	7.1	7.4	6	7	6.4	6.9	7	7.2
<b>DRC</b>	6.6	7.8	5.6	6.3	6.2	2.8	7.2	6.9	7.1	8.3	6.4
<b>Zimbabwe</b>	-6.1	-5.6	-3.4	-3.7	-17.8	8.9	9.6	10.6	4.4	5	5.7
<b>Mauritius</b>	4.3	1.5	4.5	5.9	5.5	3	4.1	3.8	3.3	3.7	4.4
<b>Madagascar</b>	5.3	4.6	5	6.2	7.1	-4.1	0.4	1.8	1.9	2.6	3.8
<b>Swaziland</b>	2.3	2.2	2.9	2.8	3.1	1.2	1.9	0.3	-1.5	0	3

Source: IMF Regional Economic Outlook, May 2013

Table 6: Tax Revenue as a percentage of GDP, excluding grants (2004 -2014)

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014(e)
<b>Angola</b>	36.7	43.9	50.2	45.8	50.9	34.5	43.5	48.8	44.5	40.4	38

<b>Botswana</b>	36.3	39.7	38.6	34	30.4	32.4	29.1	28.8	29.2	28.4	28.2
<b>Lesotho</b>	50.9	51.3	65.1	61.5	64.9	60.7	45.4	44.8	59.1	56.2	53.3
<b>Namibia</b>	25.1	26.2	28.4	30.3	30.9	30.9	28.1	30.1	33.6	31.2	30.9
<b>Seychelles</b>	40.3	39.2	39.7	31.7	31.4	32.9	34.1	35.8	37.3	36.6	35.9
<b>South Africa</b>	25.3	26.9	26.9	29.2	29.8	27.4	27.3	28.1	27.9	27.8	27.9
<b>Zambia</b>	18.2	17.6	17.2	18.4	18.9	16	17.8	20.9	19.8	20.4	20.4
<b>Malawi</b>	18.8	21.5	20.7	21.3	22.5	24	27.5	25	26	27.1	27.2
<b>Mozambique</b>	13.1	14.1	15	15.9	15.9	17.6	20.5	22.2	23.9	23.1	23.3
<b>Tanzania</b>	11.4	12.2	13.6	15.2	16	16.1	16.3	17.3	17.8	18.1	18.3
<b>DRC</b>	9.5	11.4	12.8	14.7	18.5	16.8	18.9	18.8	22.2	22.4	23.1
<b>Zimbabwe</b>		15.3	9.3	3.8	2.9	15.2	29.6	32.9	35.7	35.2	35.1
<b>Mauritius</b>	19	19.4	18.9	19.4	20.5	21.2	21.2	20.7	20.7	21.3	20.8
<b>Madagascar</b>	12	10.9	11.2	11.7	11.7	13.3	11.1	11.3	11	11.4	11.4
<b>Swaziland</b>	31.4	32.2	41.9	36.9	39.8	35.4	24.6	25.4	37.9	35.8	25.9

Source: IMF Regional Economic Outlook, May 2013

#### Sample of SADC countries sovereign bond issuances

	Date	Yield at issue	Tenor	Spread (in bps)	Size (\$ mn)	S&P (rating at issue)	Currency	Governing laws	Bond type	Coupon type
Seychelles	9/27/2006	9.466	5	470	200	B	USD	England	Bullet	Funged
Namibia	10/27/2011	5.835	10	336	500	Not rated	USD	England	Bullet	Fixed
Zambia	9/13/2012	5.625	10	384	750	B+	USD	England	Bullet	Fixed
Tanzania	2/27/2013		7	600	600	Not rated	USD	England	Bullet	Floating

Source: IMF Regional Economic Outlook, May 2013



