AID, INVESTMENT AND GROWTH IN SOUTHERN AFRICA

By

Joseph Upile Matola

THESIS

Submitted to

KDI School of Public Policy and Management

in partial fulfillment of the requirements

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MASTER OF DEVELOPMENT POLICY

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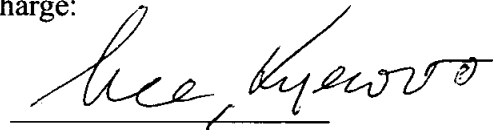KDI School of Public Policy and Management

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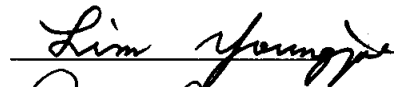
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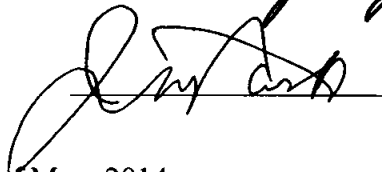
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ABSTRACT

AID, INVESTMENT AND GROWTH IN SOUTHERN AFRICA

By

Joseph Upile Matola

This pa per i nvestigates t he r ole of O fficial D evelopment Assistance (ODA) i n e nhancing investment a nd facilitating e conomic g rowth in Southern A frica. We us e a da ta c overing a panel of 12 countries in the region from 1991 to 2012. The study finds that aid has generally been i neffective i n facilitating g rowth in the r egion a lthough i ts e ffectiveness pos itively depends on quality of policies and institutions. The impact of these policies and institutions on aid effectiveness is found to be very limited hence making aid effective only when at very high levels. Nevertheless, a look at the aid-investment relationship shows that aid has a strong positive i mpact on i nvestment. T hese t wo f indings suggest that overall there ar e o ther exogenous ne gative e ffects of a id t hat are s tronger an d t herefore tend t o offset t he pos itive gains from aid that comes through its impact on investment.

Dedicated to my beloved mother, Grace Matola.

ACKNOWLEDGEMENTS

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1. INTRODUCTION

1.1 Background of the Study

Although Africa's economic growth has been somewhat satisfactory in the 2000s, poverty remains a huge challenge the in southern Africa and most other parts of the continent. Until recently, Economic growth has historically stagnated in Africa and the income gap with the world's developed countries has widened continuously[1]. Southern Africa has not been any exception in the African economic stagnation. According to Weil, D (2009), in the period between 1970 and 2005, countries such as Zimbabwe, Zambia and Democratic republic of Congo have actually experienced a decline in their per capita incomes. One of the factors to which this economic stagnation is attributed to is inadequate accumulation of capital resulting from poor saving rates among other factors. In this regard, the international community has employed different measures to help these countries grow their economies. Foreign aid has largely been one of those measures.

Official Development Assistance (ODA) is one of the major forms of international capital flows to countries in southern Africa. Since the beginning of aid, large amounts of foreign resources have been channeled to the region (and the rest of the continent) in order to accelerate growth through increasing investment in both physical and human capital. Despite the persisting poverty levels, foreign aid still forms a significant portion of government financing for many of countries in the region. Countries like Democratic Republic of Congo, Malawi, Mozambique, Tanzania and Zambia are big dependents of foreign aid and ODA

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[1]According to Weil D. (2009), as of 1820 the richest part of world - the western offshoots - had GDP per capita 3 times that of Africa. By 1998 the ratio had risen to 19 to 1.

typically contributes to more than 10 percent of their respective incomes.

Table 1. 2000-2012 average ODA receipts as a percentage of GNI

Country	ODA/GNI
Angola	5.27
Botswana	1.74
Democratic Republic of Congo	18.55
Lesotho	7.49
Malawi	23.1
Mozambique	33.2
Namibia	3.83
South Africa	0.33
Swaziland	2.36
Tanzania	15.03
Zambia	20.4
Zimbabwe	6.64
Average	**11.58**

Sources: World Bank Development Indicators

Table 1 above indicates ODA-income ratio for 12 countries within the region from 1991 to 2012. Foreign aid to these countries averaged 11.58 percent of the total Gross National Income (GNI) during this period. These kinds of resource transfers have taken place amidst disagreements between foreign aid analysts on the effectiveness of aid in achieving its very purpose of economic growth and welfare improvement.

Different empirical investigations have yielded diverse results regarding impact of aid on economic growth. Consequently, three main schools of thought have emerged in the aid literature. Some studies have established that aid is generally effective, other findings assert that aid has no impact on growth and others claim aid is effective only under certain policy and institutional conditions. These disagreements can be attributed to differences in data sets (countries and time frames under investigation), differences in study methodologies and many other factors. Nevertheless, there seems to be an agreement between development

partners that aid has not been as effective as it could be and different measures have been proposed aimed at making aid more effective[2]. It is against this background that this study attempts to establish the impact of these foreign resources that have been channeled to southern Africa on investment and growth of the region.

1.2 Statement of Problem

There is need to establish evidence of the impact of aid on investment and growth in southern Africa. Absence of clear evidence of the effectiveness aid in an economy tends to undermine development efforts of development partners. We know that aid policy typically has a specific purpose. For instance, some development partners focus on interventions that directly target welfare improvement of the poor. On the other hand some aim to increase economic growth and do so by channeling their aid towards investment activities. Whether any of these forms of aid delivery work is an empirical matter that needs to be investigated on a case by case basis. Thus it is in the same spirit that we need to establish evidence of effectiveness of aid for the case of southern Africa and fill this knowledge gap[3].

Filling the aforementioned knowledge gap is beneficial to both donor and recipient countries within the region. Since there is persisting disagreements on the general impact of aid, establishing evidence on whether aid facilitates investment and growth will help improve development efforts in the region as development partners will be able to make well informed decisions on how best to allocate aid resources. If it is established that aid has a positive

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[2]See the Paris declaration of 2005 which outlined five principles to be followed in order to make aid more effective.

[3]Impact of aid on welfare improvement or poverty reduction in the region is beyond the scope of this paper.

impact on investment and economic growth, development partners will have to focus their efforts on enhancing investment. If the evidence proves otherwise they will have to rethink their aid policies.

1.3 Purpose of the Study

This paper investigates the impact of ODA in enhancing investment and fostering economic growth in Southern Africa. We know from a theoretical perspective that aid affects the economy in different ways, both positively and negatively. On the positive side, theories such as two-gap model postulate that foreign aid provides the much needed resources to poor countries in the form of savings and foreign exchange which facilitates capital accumulation thereby enhancing growth. On the negative side, aid can hurt the recipient economies through a phenomenon called the Dutch disease. In this regard, aid flows increases the supply of foreign exchange which leads to appreciation of the domestic currency which in turn weakens the competitiveness of domestic tradable goods thereby suppressing exports. The net effect of these opposing effects of aid on growth remains a big debate among scholars and needs to be investigated empirically on a case by case basis[4]. This is the essence of this study.

The study will further more investigate whether aid in the region exhibits diminishing returns and whether or not its impact depends on the quality of policies and institutions. Some theoretical arguments have been put forward that the aid-growth relationship could be non-linear owing to absorptive capacity constraints of the recipient countries which results in diminishing marginal returns of aid as the recipient country approaches its absorptive

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[4] A classic debate between prominent Economists John Maynard Keynes and Bertil Ohlin on the potential repercussions of World War 1 reparations demanded of Germany highlights how contradictory the impacts of foreign resource transfers can be even from a theoretical perspective. See Steven Brakman and Charles van Marrewijk (1998).

capacity. The Dutch disease phenomenon also provides support to the non-linearity of the aid and growth relationship since any impact of aid on the real exchange rate will only set in at higher levels of resource transfers. As for the influence of policies and institutions, there are also different views on their role in aid effectiveness.

Given the uncertainties and contradictions of the theoretical and empirical impact of aid, it is important that researchers develop models for specific countries or regions rather than generalize findings from studies done in other regions or studies covering a wide range of countries with different economic structures and challenges. Cross country studies on aid effectiveness literature may not properly capture the heterogeneous characteristics of the countries involved[5]. It is the same reasoning that this study focuses only on countries in southern Africa which we assume have reasonably similar economic characteristics as opposed to studying a broader sample of diverse economies. The sample contains a panel of 12 countries over a 22 year time span. Specifically, the study attempts to answer the following research questions.

1. How has foreign aid affected the investment rates of Southern African countries?

2. How has the investment rate in Southern Africa affected the region's economic growth rate?

3. What kind of direct relationship, if any, is there between foreign aid and economic growth in the region?

4. What role, if any, do political and economic institutions in this region play in determining effectiveness of aid?

5. How do we improve the performance of foreign aid in fostering growth in these

[5]Hussein et al (2012)

countries?

1.4 Study Hypothesis

To the extent that the developing countries of Southern Africa are resource constrained and aid relaxes these constraints, its impact on growth is expected to be positive and regardless of the prevailing policy distortions in the individual countries within the region. Nevertheless policy and institutional quality is expected to enhance or reduce the impact of aid. With this argument and our research questions in mind, a hypothesis is made that *foreign aid to Southern Africa facilitates investment and leads to economic growth and its impact on growth is stronger in good policy and institutional conditions*. Thus our hypothesis is twofold. First, foreign aid is hypothesized to have a positive impact on investment and growth. Secondly, this impact is expected to vary with prevailing policy and institutional conditions.

1.5 Structure of the Paper

This paper is organized as follows. Following the introduction provided above, a review of existing literature relevant to the study will be presented in chapter 2. Chapter 3 shall discuss the methodology used in the study including data, specification of the econometric model and definitions of the variables used. The chapter will further include an econometric analysis in which the findings will be discussed and interpreted. Finally, chapter 4 will contain summaries, conclusions and policy recommendations.

2. LITERATURE REVIEW

A lot of literature has been written regarding impact of aid on economic growth, poverty reduction and other social-economic indicators. It suffices to say results of the different studies could not be more different and diverse. Numerous studies have validated the principal theoretical expectations that aid facilitates economic growth unconditionally while on the contrary just as much literature has refuted the role of aid as facilitating factor of economic growth. The intermediate position that aid is effective only under certain policy and institutional conditions has also been backed by a lot of literature, most famously by Craig Burnside and David Dollar in 1997. This chapter examines aid effectiveness literature along these three lines and the various challenges that stand in the way of aid effectiveness.

2.1 Empirical Results: Literature Supporting Unconditional Effectiveness of Aid

Hansen et al (2000) reexamine the aid-savings, aid-investment, and aid-growth relationships as a scrutiny of existing literature and attempt to solve the "micro-macro paradox of aid". They conclude that overall, existing literature support the view that aid contributes to economic growth regardless of policy conditions and therefore, the micro-macro paradox can be ruled non-existent. They confirm this result in Hansen et al (2001) in which they study foreign aid and per capita income growth using a non-linear specification and controlling for investment to explain the channel which aid increases growth. Their results also suggest a positive aid-growth link. This relationship becomes insignificant when investment and human capital are controlled for suggesting that aid has a positive impact on growth through capital accumulation. They also find that foreign aid exhibits diminishing returns.

Bhavnani et al (2005), echo the view that studies on aid effectiveness usually make one

simple methodological error by not recognizing that aid is given for different reasons including humanitarian purposes whose motive hardly is to facilitate economic growth. They analyze three different types of aid: early impact aid such as economic infrastructure investments, late impact aid such as health and education and humanitarian aid. They find that early impact aid, which is one that is designed to directly affect growth, has a strong positive impact on growth in which a 1 percentage point of early impact aid produces a 0.31 percentage point in growth. Their results further suggest that although this relationship is stronger in countries with better institutions and policies, it also holds otherwise. For late impact and humanitarian their results are statistically insignificant but they suggest different modeling techniques may be more appropriate. They conclude that aid has a positive impact on growth regardless of policy conditions as long as its design is meant for growth.

Some studies have investigated aid effectiveness by focusing on a panel of a few developing countries similar to the approach of this paper. Hatemi-J et al (2005) uses panel cointegration approach to study the aid-growth relationship for Botswana, Ethiopia, India, Kenya, Sri-Lanka, and Tanzania. He finds evidence that foreign aid has a positive and significant effect on real income for each and every country in his sample.

Hassan et al (2012) suggest that cross-country studies may fail to take into account heterogeneous characteristics of each country involved and as such single-country regressions maybe more appropriate. In this regard they analyze impact of aid on investment and on growth in Ethiopia in which they find a positive relationship that does not depend on policy and institutions. However they find that for the case of Ethiopia, aid was more effective in facilitating growth during their socialist military regime (1975-1990) than during the democratic regime (1991-2010).

Dalgaard, Hansen, Tarp (2004) explored another dimension of aid by analyzing aid's impact on long-run productivity. Overall their study finds that generally aid positively affects the productivity of countries and also positively affects growth. However, they find a surprising result that aid has had less impact in tropical climates than non-tropical ones suggesting that maybe foreign aid may not have been properly targeted to some "particular needs" of these tropical areas. They also find a weak relationship between aid effectiveness and policy

2.2 Empirical Results: Literature Refuting Effectiveness of Aid

Studies that refute the effectiveness of aid in facilitating growth of poor countries hinge on various premises such as the Dutch disease problem, the aid fungibility problem - which makes aid enter the income equation as consumption rather than investment, and sometimes weak investment-growth link different from that postulated in growth theories. Other explanations lie in exogenous factors such as that aid helps expand bureaucratic organizations, enrich the elite class, sustain the corrupt regimes, and reduce farmers' income by lowering prices of agricultural products.

In a critique of Craig Burnside and David Dollar's work (discussed below), Easterly W et al (2003) conclude that the findings of Burnside and Dollar that aid brings growth in good policy environments are not robust to additional data. Their study uses the same model specifications as the Burnside and Dollar study but only adds more countries and number of years. Their findings indicate an insignificant relationship between growth and the aid-policy interaction. Nevertheless, they concede that their findings simply reduces the confidence that such a relationship exists and is not a claim that aid is ineffective per se.

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Djankov S, et al (2006) studied impact of aid by distinguishing between grant and loans and analyzing their individual effects. They also took into account other (private) foreign resource transfers in the form of Foreign Direct Investment (FDI) and remittances. Their findings indicate that aid has a negative impact on growth through decreasing investment and increasing government consumption. Private flows on the other hand induce investment and positively affect growth.

One of the more recent studies that have found no evidence of any aid growth relationship is that of former IMF economist Raghuram Rajan and his colleague Arvind Subramanian. In their 2005 study, "Aid and Growth: What Does the Cross-Country Evidence Really Show?", they analyze cross-sectional and panel data focusing on instrumenting aid in order to remove its possible endogeneity and also focusing on testing the general validity of the aid and growth relationship. They find no evidence that aid increases growth whether in a good policy environment or not. They make a recommendation that studies should focus on identifying aspects of aid that offset what should be undisputable positive impacts of resource transfers to resource constrained countries. Thus they concede that the aid apparatus need to be rethought to make aid effective.

Boone (1996) is another paper that finds no evidence of aid effectiveness regardless of political conditions. He finds no evidence to support that more liberal and democratic political regimes exhibit higher impact of aid on human development indicators than repressive ones. He however finds that democratic societies have higher human development as proxied by infant mortality rates than repressive ones. This is perhaps due to more empowerment of the poor under democratic governments than under repressive ones. Thus he concludes that short term aid to newly liberalized regimes would probably be more effective in improving welfare.

2.3. Empirical Results: Literature Supporting Conditional Effectiveness of Aid

Most arguments in support of conditional effectiveness of aid have been put forward by World Bank economists. World Bank's paper in 1998 titled "assessing aid: what works, what doesn't and why?" is seen by many as an attempt by World Bank under pressure to give evidence that aid is effective. The paper tries to assess whether aid is effective and the conditions that make it as such. They conclude that aid works better in developing countries with sound management of their economic, political and social institutions. They further argue that in countries with good economic management aid is more efficient in reducing poverty and it promotes private investment. As for countries with poor economic management, more aid is needed to take one person out of poverty and aid crowds out private investment.

Arguably the most influential and yet controversial argument is the Burnside and Dollar study in 1997 –Aid, Policy and Growth. Following a growing feeling that aid has not been effective in facilitating growth and reducing poverty, Burnside et al (1997) came up with a different hypothesis in their analysis. They introduced a policy and institution effectiveness variable and hypothesized that aid effectiveness is conditioned upon good policies and institutions of the recipient governments. They concluded that aid has a positive impact on growth if the recipient country has good fiscal, monetary, and trade policies. This finding had significant policy implications by making a case for policy selectivity of aid which has since been followed by different donors.

Following several criticisms of the study such as the Easterly W et al (2003) study, Collier and Dollar (2002) made modifications to the study by including a broad measure of policy

and a larger sample set of countries. They acknowledge that the policy indicator used in the Burnside and Dollar study may not capture all policies that affect growth as it only focused on three macroeconomic indicators. In this study, Collier and Dollar uses the World Bank's Country Policy and Institutional Assessment which has 20 different components covering macroeconomic issues, structural policies, public sector management, and policies for social inclusion Collier et al (2002). Their findings confirm the findings of Burnside and Dollar (1997) that aid works only in good policy environments. Burnside and Dollar (2004) is another attempt to confirm their argument and they reassert that aid's impact is not the same everywhere but rather is conditioned upon policy and institutional environment.

Kosack (2003) analyses aid effectiveness using a slight deviation from the common aid effectiveness measure given by improvements in GDP or GDP per capita. He analyses aid's impact on the quality of life of the poor. He finds no evidence of aid alone affecting the quality of life on the aggregate level. He however finds evidence that aid improves quality of life in democratic regimes but is ineffective and may even be harmful in autocratic ones.

2.4. Empirical Results: Challenges of Aid and Other Issues

A lot other literature has been written to highlight other aspects of aid that poses different challenges. Djankov (2008) analyzes the phenomenon called "the curse of aid" which likens the impact of aid on political institutions to the impact that discovery of natural resource deposits such as oil has. The logic behind is that foreign aid, just like the discovery of oil, are sudden windfalls of resource transfers developing countries. Their impact on political institutions could therefore be similar. He uses a panel regression analysis with political institution as the regressand and aid per GDP and oil rents as two of the regressors. The findings indicate that aid worsens political institutions much more than oil rents do.

A closely related argument was made by Busse and Groning (2009) in their study of the impact of aid on governance which found that aid has a negative rather than a positive impact on governance. These results were robust to a range of different model specifications. These two findings are particularly disturbing given that some studies have found that aid is more effective in countries with good political and economic governance. Combining these two findings implies that aid is self-defeating given that it deteriorates the very conditions that it is supposed to be more effective in.

However, other studies have indicated no relationship between aid and policies or institutions. Burnside and Dollar (2000) considered the possibility of treating policy as an endogenous variable in the aid-policy-growth relationship. They estimated a policy equation and found that exogenous changes in aid had no impact on the policy index.

Aid fungibility poses another challenge in the delivery of aid. One of the explanations often offered for lack of aid effectiveness is that aid simply substitutes government investment. Chattergee et al (2007) studied aid effectiveness and fungibility. They analyzed the effect that aid has on government expenditure of its own resources. They found that overall aid is fungible with about 70 percent of aid simply substituting rather than complementing government expenditure. Aid meant for investment activities tend to be the most fungible at almost 90 percent while fungibility of aid for social infrastructure was at 78 percent. There was no evidence of fungibility with aid meant for non-investment activities. Other evidence of aid fungibility is also provided by Burnside et al (2000) where they find that aid tends to increase government consumption. This relationship was found to be especially stronger with bilateral aid when compared to multilateral aid.

Researchers have also investigated the Dutch disease as one of the challenges of aid. In a cross-country study, Rajan et al (2009) find that aid has adverse effects on the growth of the manufacturing sector. Their study further indicates that the channel through which aid hurts the manufacturing sector is by appreciating the domestic currency which in turn lowers competitiveness of the sector. Fielding, D. (2009) also finds evidence of Dutch disease in Sub-Saharan Africa. However, he finds significant country variations with regard to the size of the effect with one country actually experiencing exchange rate depreciation.

The diversity of the findings in the aid effectiveness literature gives more reason to focus aid effectiveness studies to specific economies. Moreover, different countries face different challenges of aid such as governance, different levels of fungibility and varying degrees of Dutch disease which influences respective impacts of aid. Therefore as argued by Hussein and Lee (2012), single country studies for a specific period could be more appropriate than generalized cross-country studies. In the same spirit, a panel of a few economies with similar regional characteristics should offer a more specific rather than generalized result.

Therefore, this study builds on the strengths of the studies like those of Hussein and Lee and Hatemi-J et al (2005) who focused on one country and a panel of a few developing countries respectively. We attempt to overcome the shortcomings of the other studies discussed in the literature review which make general conclusions based on samples that are too broad. We believe the Southern African countries included in the sample are reasonably homogeneous to be studied together over some time span and make generalized conclusions. We further recognize the need to address the endogeneity of aid and other explanatory variables in the growth model as done by Rajan et al and Burnside et al among others.

3. METHODOLOGY OF THE STUDY AND EMPIRICAL ANALYSIS

Given that our hypothesis has two components namely the aid-investment link and the aid-growth link, we approach our investigation by estimating two regression equations, one for each relationship. This approach is also used by Hussein and Lee (2012). We also use the same specifications used by Hussein and Lee which are adopted from Hansen et al (2001) and Burnside et al (1997) for the aid-investment equation and the aid-growth equation respectively. However for this paper we make some modifications to these specifications as per our hypothesis and other circumstances necessitating such changes.

3.1. The Aid-Investment Regression

We begin our analysis by examining the aid and investment relationship before moving to the aid growth relationship. Our aid-investment regression is derived from the one used by Hansen and Tarp (2002) and later by Hussein and Lee (2012). We make slight modifications to the models used by the Hansen et al and Hussein et al and proceed to regress investment on aid, savings, and interest rates in the model given by equation (1) below.

$$\text{inv}_{it} = \beta_0 + \beta_1 \text{aid}_{it} + \beta_2 \text{sav}_{it} + \beta_3 \text{rint}_{it} + \varepsilon_{it} \dots\dots\dots\dots\dots\dots\dots\dots\dots(1)$$

where inv is the ratio of fixed capital formation to GDP

      aid is ratio of official development assistance to GDP

      sav is ratio of gross domestic savings to GDP

      rint is real interest (lending) rate

Our main interest in this regression is on the aid variable. As indicated in the hypothesis, we expect aid to have a positive impact on investment which in turn is expected to lead to

growth. The theoretical basis is that aid provides the much needed resources for investment in resource constrained countries. For our aid variable we use the ratio of ODA to GDP provided in the World Bank development indicators databank.

The inclusion of savings as an explanatory variable is based on macroeconomic theory that identifies savings a major determinant of investment. In macroeconomics, the savings-investment identity indicates that when some assumptions are made, saving should equal to investment in an economy[6]. Since savings represent income or resources that remain after consumption, they provide funds for investment activities. In reality the savings-investment identity does not hold because all economies have some degree of openness which allows for international capital mobility. As for the case of the countries being investigated in this study, they are fairly open and we do not expect a one to one relationship between savings and investment but the relationship is expected to be strong nevertheless.

One modification we make to the models used by Hansen et al and Hussein et al is the inclusion of interest rates. Macroeconomic theory also identifies interest rate as another important factor in investment decisions. Although empirically interest rates tend to have little impact on investment, in this study we observe that they may be an important variable in the case of countries in southern Africa. This is because interest rates in the region tend to be significantly high which is likely to make them an important factor in private investment decisions given the high borrowing costs[7]. We use real interest rates in our model in order to

[6]For this identity to hold we assume an economy without the external sector.

[7]Folawewo, A.O and Tennant, D (2008) observe that interest rate spreads in southern African countries are the highest in Sub-Saharan Africa averaging 10.8 per cent while Africa in general has one of the highest interest rate spreads in the world. This indicates that Southern Africa has very

factor in inflation

3.1.1. Breusch-Pagan Lagrangian Multiplier test for Random Effects

We recognize here that cross-country analyses bring with them a number of methodological concerns one of which is unobservable heterogeneity of countries. Given that different countries have some unique characteristics, economic or otherwise, one cannot be sure if all the respective influences of these variables can be taken into account in our model let alone if they can be observed. Although the countries under investigation in this study are fairly similar in terms of their income levels and economic structures, the issue of heterogeneity is one that still needs to be looked into in order to determine the most suitable estimation technique. For this reason we conduct the Breusch-Pagan Lagrangian multiplier test for random effects in order to determine whether we have random effects which would make the panel estimation a more appropriate method than a pooled OLS. In this section we conduct the test for the aid-investment regression and the results of the test are shown in tables 2.

Table 2: Breusch-Pagan Lagrangian Multiplier test for Random Effects for the aid-investment model

```
Breusch and Pagan Lagrangian multiplier test for random effects

      linv[cn1,t] = Xb + u[cn1] + e[cn1,t]

      Estimated results:
                          Var        sd = sqrt(Var)
                _____
              linv |    .1551342        .3938708
                 e |    .0710983        .2666426
                 u |    .0498864        .2233527

      Test:    Var(u) = 0
                          chi2(1) =     186.55
                     Prob > chi2 =      0.0000
```

Results from the Breusch-Pagan Lagrangian Multiplier test for random effects for our aid-

high lending rates.

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investigation regression indicate that indeed there is a panel effect across the countries under investigation. This test tests the null hypothesis that the variances of the country specific error terms are equal to zero - $Var(\varepsilon_i) = 0$ in our case. As table 2 shows, the Chi-square test statistic is very large at 186.55 and the p-value is 0.0000. We therefore reject the null hypothesis and conclude that there are significant country specific effects that need to be taken into account. We therefore conduct a panel estimation for investment model.

3.1.2 Modeling Investment with Random Effects: Hausman Test

Having decided to conduct a panel estimation we face another decision of whether to estimate our model with random effects or fixed effects. The general approach to deciding a more appropriate model between a random effects model and a fixed effects model is to conduct the **Hausman Test.** We therefore conduct the Hausman test for the investment model as shown in table 3 below. The test generates a small Chi-square test statistic at 1.75 and a large p-value at 0.6261. We therefore fail to reject the null hypothesis that the difference in the coefficients generated by our model is not systematic. We therefore proceed to estimate a random effects model for the aid-investment regression.

Table 3: Results of the Hausman test for the aid-investment regression

| | —— Coefficients —— | | | |
	(b) fe	(B) re	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
aid	.4435527	.4512273	-.0076746	.1022344
sav	.3601961	.3623825	-.0021864	.0321651
rint	.0040832	.0030311	.0010521	.001094

```
                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)
                =           1.75
      Prob>chi2 =        0.6261
```

3.1.3. Expected results

For our investment regression we expect the parameters of aid and savings to have positive signs since we expect positive relationships between the two variables and the dependent variable. The coefficient of real interest rate is expected to be negative.

3.1.4. Results of the Aid and Investment regression

As stated in our hypothesis, we expect foreign aid to affect the growth of the economy by increasing investment. Therefore we expect a positive relationship between aid and investment. The results of our aid and investment regression are shown in Table 4 below. As expected, our findings indicate a positive impact of aid on investment in southern Africa. The aid variable has a statistically significant and positive coefficient. The magnitude of the coefficient also indicates a significantly high aid semi-elasticity of investment where an increase in the aid to GDP ratio by one percentage point on average leads to approximately a 0.5 percentage points increase in share of GDP invested in capital formation. We can therefore conclude that indeed aid has helped in increasing investment in these eleven countries and to this effect aid has been very effective. Studies that found a similar result include Hansen et al (2000) and Hussein et al 2012.

Table 4: Results for the aid and investment regression

```
Random-effects GLS regression              Number of obs     =        174
Group variable: cn1                        Number of groups  =         11

R-sq:  within  = 0.2390                     Obs per group: min =          4
       between = 0.2129                                     avg =       15.8
       overall = 0.2301                                     max =         20

Random effects u_i ~ Gaussian              Wald chi2(3)      =      52.97
corr(u_i, X)        = 0 (assumed)          Prob > chi2       =     0.0000


         inv │    Coef.    Std. Err.      z     P>|z|    [95% Conf. Interval]
─────────────┼──────────────────────────────────────────────────────────────
         aid │  .4512273   .1150782      3.92   0.000     .2256782    .6767764
         sav │  .3623825   .0600611      6.03   0.000     .2446649    .4801002
        rint │  .0030311   .0022637      1.34   0.181    -.0014057    .0074679
       _cons │  11.05995   2.643517      4.18   0.000     5.878753    16.24115
─────────────┼──────────────────────────────────────────────────────────────
     sigma_u │  6.5335431
     sigma_e │  7.1099411
         rho │  .45782814   (fraction of variance due to u_i)
```

The findings also indicate a strong and positive relationship between savings and the rate of investment. This is also well expected and in line with theory. An increase in the domestic saving ratio by 1 percentage point tends to increase the share of investment by around 0.4 percentage points. As for real interest rate, the results are neither statistically nor economically significant indicating that in practice interest rates have no significant impact on investment decisions.

3.2. The Aid-Growth Regression

The model used for our growth regressions was initially used by Burnside and Dollar (1997) and later modified by Hussein and Lee (2012) to include investment as one of the regressors. The model allows for the examination of the impact of aid in relation to the quality of policies and institutions in the economy. The growth regression is specified as Equation (1) below.

$$\text{lgdppc}_{it} = \beta_0 + \beta_1 \text{aid}_{it} + \beta_2 \text{policy}_{it} + \beta_3 \text{aidpol}_{it} + \beta_4 \text{aidsqr}_{it} + \beta_5 \text{inv}_{it} + \beta_6 \text{lhdvt}_{it} +$$

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$$\beta_7 export_{it} + \beta_8 lpop_{it} + \beta_9 linpcy_{it} + \varepsilon_{it} \ldots \ldots \ldots (2)$$

Where: gdppc is per capita GDP in 2005 US dollar prices,

      aid is ratio of official development assistance to GDP,

      policy is policy and institution index proxied by the World Bank's government

      effectiveness index,

      aidpol is policy index interacted with aid,

      aidsqr is the square root of aid,

      inv is the ratio of fixed capital formation to GDP,

      lhdvt is human development which is proxied by infant mortality,

      export is share of exports in gdp,

      pop is total population,

      inpcy is initial per capita income in 2005 U.S. dollar prices,

l denotes use of natural logarithm for that specific variable.

As indicated earlier, our main variable of interest is aid and here it enters the model in three forms. First we regress aid on growth using aid in its pure form to see its marginal impact on growth independent of the other variables. Secondly, aid is interacted with the policy variable to determine whether indeed the effectiveness of aid depends on the quality of policies and institutions as claimed by studies such as the Burnside and Dollar studies. Finally, the variable aid squared is also included in the model. Inclusion of this variable is based on the view that aid may exhibit diminishing returns and countries may have limits to their absorptive capacity of aid which would entail that aid and growth have a nonlinear relationship.

As for the investment variable, its inclusion in the growth equation is based on growth

theories such as the Harold-Domar and Solow model in which investment is regarded as the major determinant of growth. Furthermore, the aid-growth literature is based on the theoretical basis that aid affects growth through enhancement of investment which in turn leads to growth. Thus inclusion of investment also allows us to also determine the channel through which aid affects growth. It is also for the same reasons that the model also includes human capital development which measures level of human capital. WDI data on fixed capital formation as a percentage of GDP is used for investment and the infant mortality rate is used for as a proxy for human capital development.

The other variable examined is the policy and institutional quality index which is also examined separate from aid apart from being interacted with it. The policy variable has been studied as one of the determinants of growth recent growth literature. As Feenstra and Taylor (2008) observes, from a macroeconomic perspective quality of institutions and policies tend to be positively correlated with higher per capita incomes and negatively correlated with volatility of the same. As for the empirical aid literature, the role of policies and institutions is still an area of disagreement. In this paper we use the government effectiveness index from the world governance indicators (WGI) as a proxy for policy and institutional index.

In our model we also include exports in order to capture the contribution of trade in growth. We also include initial income following growth literature which helps us capture conversion of growth to its steady state level. And lastly we also include population which is another important variable in growth theory.

3.2.1. Incorporating Endogeneity of Aid: The Hausman-Taylor Analysis

For the growth regression, we also have to make a decision on the most appropriate

estimation technique for in our analysis. Here we can conduct a Hausman test as in our investment regression to choose between a random effects or fixed effects estimation. However, both these estimation techniques may not be appropriate for our aid growth regression due to potential endogeneity of aid and some other explanatory variables in the regression. We note that aid allocation is more often based on economic performance of the recipient country. Therefore more aid may be allocated to poorer countries in order to facilitate poverty reduction or it may be allocated to high performing countries in order to enhance their growth. Either way the direction of causality between aid and growth may be a two-way relationship implying potential endogeneity that needs to be incorporated in our analysis.

For this reason we choose to conduct a Hausman-Taylor estimation for the aid-growth regression. This estimation technique has two main advantages for our analysis. Firstly, this technique factors in time invariant variables and estimates the coefficients of such variables efficiently. Secondly, this technique allows treatment of some variables as endogenous variables thereby controlling for the endogeneity of such variables. Therefore with this technique we are able to control for the endogeneity of the aid variable (including aid squared and the aid and policy interaction term) and other potentially endogenous control variables such as population. We further conduct the over-identification Chi-square test in order to test whether we included valid instruments for the excluded variables.

We first estimate our full model as specified in equation 2 to enable us to test our overall theory. Then we estimate another model that excludes all insignificant explanatory variables from our model having established that they are not important determinants of growth in our case. We also analyze the exclusion of investment and human capital as regressors. This is

done since theoretically aid is supposed to affect growth through investment in physical and human capital which could make the inclusion of aid, investment and human capital in one model rather inappropriate.

3.2.2. Expected results

We expect growth to have a positive relationship with aid and its interaction with policy. Aid squared is expected to have a negative sign indicating diminishing returns. Investment, human development, exports and policy are all expected to also have a positive relationship with aid. Initial income is expected to have a negative sign reflecting convergence to steady state income level. The coefficient of population may take either sign.

3.2.3. Results of the aid and growth regression

The results of the aid-growth hausman-taylor analysis are presented in table 7 below together with the overall specification test and the over-identification test. For our instrumental variable estimation, we treat aid, aid squared, aid and policy interaction and population as endogenous variables.

Table 5: Results of the aid-growth hausman-taylor analysis

Dependent variable: log of per capita GDP	Hausman-Taylor Estimated coefficients		Expected sign of coefficient
Independent variables	**Model 1**	**Model2**	**All models**
Aid/GDP	-0.023 (-5.36)***	-0.023 (-5.59)***	(+)
$(Aid/GDP)^2$	0.0001 (4.76)***	0.0001 (4.98)***	(-)
Aid*Policy	0.006 (2.70)***	0.007 (2.95)***	(+)
Policy	0.266 (5.23)***	0.252 (5.16)***	(+)
Investment/GDP	-0.001 (-0.88)		(+)
Human Capital	-0.031 (-0.35)		(+)

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Population	1.31 (9.09)***	1.314 (15.03)***	
Exports/GDP	0.0002 (0.22)		(+)
Initial per capita GDP	1.592 (3.18)***	1.592 (3.53)***	(-)
Constant	-25.472 (-5.49)***	-25.396 (-6.96)***	
Number of observations	155	156	
Overall specification test	Wald chi^2(9)= 297.2 Prob>chi^2=0.0000	Waldchi^2(6)=303.3 Prob>chi^2=0.0000	
Over-identification	xtoverid error	Chi^2(1)=0.069 p-value=0.7928	

Note   1) Numbers in parentheses are z-values

2) *, ** and *** represent statistical significance at 10%, 5% and 1% respectively

Both our models have large Wald Chi-square test statistics indicating that overall the models have been well specified. However we fail to conduct the over-identification test for model 1 due to the problem of internal re-estimation of the instruments. Nevertheless Model 2 generates a large p-value for our over-identification test leading to failure in rejecting the null hypothesis that the excluded instruments are valid instruments. Therefore, model 2 which excludes investment and all insignificant variables from our full model passes both the overall specification test and over-identification test.

Given our model specification, the coefficients of the aid variable have to be interpreted with great caution. As Woodridge (2013) notes, the parameters on the original variables can be tricky to interpret when we include an interaction term. The inclusion of the interaction term changes the meaning of the aid coefficient by making its predicted impact on our dependent variable to vary with values taken by policy variable. Thus the positive coefficient of the interaction variable indicates that the impact of aid on growth is a positive function of the policy variable in our model. This result provides evidence of a relationship between aid and growth that is conditioned on the prevailing quality of policies and institutions. We examine

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this relationship further in section 3.3 on the discussion of the results.

Furthermore, the inclusion of the square of aid means that the impact of aid on growth also depends on the levels of aid. The positive coefficient of this variable is an interesting result as it indicates increasing returns to aid as opposed to diminishing returns that we expected. However, the coefficient is economically insignificant and therefore not a very significant finding.

From table 7 we can see that our aid parameters are negative. This is an indication that at lower levels of policies, aid is ineffective to the extent of actually having a negative impact on growth. As the level of policies increases, the positive impact of aid increases thereby making the net effect of aid less negative. Given the fact that the quality of policies and institutions in the region is on the lower side, it is therefore fair at this point to conclude that overall aid alone is not effective in fostering growth in the region but its impact improves with improved policies and institutions, a finding shared by Burnside and Dollar. Thus we reject our hypothesis that aid in southern Africa is effective in facilitating economic growth regardless of prevailing policy conditions. Furthermore, the policy variable (pol) has a positive coefficient that is both statistically and economically significant which further highlights the importance of policies and institutions in economic growth.

In terms of capital accumulation, both human development and fixed capital formation have insignificant parameters suggesting absence of their impact on growth. Thus the link between investment and growth seems to be missing from our model. Our theoretical expectation was that of a strong positive relationship between growth and capital accumulation (both physical and human) which happen to be the theoretical premise on which most aid is delivered. We

attribute this result to model specification. As noted by Hussein and Lee (2012), empirical studies using a methodology like ours do not capture the relationship between investment and growth properly. Therefore a refined methodology specifically for investigating the impact of investment on growth may be more appropriate.

The analysis further indicates that population growth has a positive impact on economic growth while the impact of exports is insignificant. Another interesting result is the positive coefficient of initial income which we expected would be negative. The results that we get suggests that the higher the initial income, the higher the economic growth rate. This could be because the initial incomes of these economies are very low to begin with, with the steady state income levels still far from being reached.

3.3 Discussion of the Findings and Policy Implications

The results of our empirical analysis point to two important findings. Firstly, we have established that aid has a strong and positive impact on investment in the region. This should be an important result for development partners in the region given that most aid is given based on the premise that it will enhance investment in the recipient countries. In other words, the goal of aid is mostly economic growth, but the intended immediate outcome is increased investment. Thus to the extent that foreign aid targets boosting investment, aid can be seen as effective.

The second major finding is that, the impact of aid on the overall economy depends on the quality of policies and institutions. In this regard aid's impact on economic growth improves with improved policies and institutions. Now the question becomes **to what extent can policies and institutions influence the effectiveness of aid**. To have a more clear idea on the importance of policies and institutions on the effectiveness of aid given our model, we

estimate the impact of aid given three policy conditions. Firstly we analyze the impact of aid on growth at the average policy environment in the region (at policy index = 1.91) during the sample period. Secondly we analyze the impact of aid on growth given the best possible policy environment (at policy index = 5). Lastly we examine aid effectiveness at the worst possible policy environment (at policy index = 0). These scenarios are examined at the average level of aid in our sample equal to 11.58 percent of GDP. The results are summarized in table 9 below.

Table 6: Impact of the average level of aid on growth for given policy environments

Policy environment	Policy = 1.91	Policy = 0	Policy = 5
∂lgdppc/∂aid for aid = 12.5	-0.009	-0.02	0.01

As shown in table 9 above, at the average quality of policies and institutions for the sample countries during the sample period, the average level of aid tended to lower income by 0.009 percent. This means that given the current levels of policies and institutional quality (1.91 by our index), aid has been generally ineffective and its impact has been somewhat negative although economically not very significant. Going a step further and analyzing aid effectiveness at lower levels of policies and institutional quality (e.g. at the lowest possible policy level of 0), the impact of aid becomes more negative. On the other hand, if the region was to achieve the highest possible level of policy and institutions (policy index=5), we could expect the current levels of aid to increase incomes by 0.01 percent which is still economically not so significant.

The exercise in table 5 indicates that indeed for the past 2 decades foreign aid to southern Africa has been quite ineffective in facilitating economic growth in the region, a conclusion

shared by Rajan, Easterly, Djankov, Boone and other researchers. It also confirms that poor quality of policies and institutions has contributed further to the ineffectiveness of aid as Burnside and Dollar's concluded.

Policy Implications

The findings of this study have some important policy implications on the way forward for aid in southern Africa. But in a nutshell we make conclusions similar to the recommendations made by Raghuram Rajan and Arvind Subramanian that the whole aid apparatus need to be rethought to make aid more effective. Thus we see policies such as the Paris Declaration as an important step in this direction. Such policies need to be fully implemented and improved where possible[8]. Development partners need to make new efforts on identifying aspects of aid delivery that offset what should be an undisputable positive impact of aid to resource constrained countries on their economic growth. Thus more efforts are needed on the aid effectiveness agenda.

Meanwhile, two actions can be taken that can bring some improvement on the effectiveness of aid. First of all, delivery of foreign aid need to be more focused on investment activities. Given the strong relationship between aid and investment, if development partners in the region focus their foreign aid efforts on targeting investment, their aid efforts will be more likely to positively affect the economies in the region. If the link between aid and investment is strong enough, then the more foreign aid targets investment, the more likely it is to enhance economic growth.

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[8]Kye Woo Lee (2013) notes that the Paris Declaration does not include principles or policies related to optimal aid allocations which could improve development effectiveness of the policy.

The second action that can be taken in order to improve on the effectiveness of aid is to adopt strategies aimed at improving the policy environment in recipient countries. Aid should not be policy selective but in those countries where policies and institutions are of poor quality, parallel efforts should be made to improve the policy environment in order to improve on the effectiveness of aid. Thus extra efforts could be focused on areas such as promoting good governance, and capacity building and technical support on policies and institutions among other issues. However it has to be noted that there is a limit on the effectiveness of this recommendation and it alone cannot improve the impact of aid on growth to satisfactory levels.

4. SUMMARY AND CONCLUSIONS

In this paper we have investigated the relationships between aid, investment and economic growth in southern Africa. We have built on the strengths of the studies like those of Hussein and Lee by narrowing our sample to southern Africa and we have attempted to overcome the shortcomings of studies that make generalized conclusions for very broad sample of countries. We have found that in the region, aid has a strong positive impact on investment. However we have established that with respect to facilitating economic growth in the region, aid has generally been ineffective. Furthermore, consistent with other literature we have found that aid becomes less ineffectiveness (more effective) with better policies and institutions although the influence of policies and institutions on aid effectiveness is very limited.

We take some caution of the results and note some limitations of the study. First of all we take note that the methodology used in this study may not be appropriate for analyzing the link between investment and growth and by extension the channel through which aid affects growth. In this regard we recommend that evidence on this relationship should be gathered from other studies focusing on the impact of investment on growth using more appropriate models. With this evidence we can make a more confident conclusion on whether aid can positively affect growth through the investment channel.

For the purpose of future studies, attention should be given on the negative effects of foreign aid that seem to counter the positive gains from aid's ability to improve investment. Such studies could focus on the impact of aid on governance, issues of aid fungibility, issues of aid and the Dutch disease and on other aspects that could undermine effectiveness of aid. Other

studies could narrow down our sample even further to one country to produce an even more

specific result.

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ANNEX 1: RESEARCH DATA

COUNTRY	YEAR	gdppc	aid	inv	hdvt	intrate	sav	Aidsqr	rint	policy	export	pop
Angola	1991	1513.49	2.81168	12.9475	125.7		-3.45754	7.905545			30.2633	10652765
Angola	1992	1364.23	9.7873	3.61769	125.3		-58.9511	95.79124			68.7913	11002796
Angola	1993	993.898	8.93333	26.4411	124.9		-41.83	79.80437			53.9014	11372174
Angola	1994	996.162	23.0095	30.5211	124.7		-41.7833	529.4371			85.3577	11743377
Angola	1995	1066.92	11.2926		124.3	206.25		127.5228	-2465.54			12105010
Angola	1996	1153.35	7.80838	34.822	123.9	217.875	98.9604	60.9708	-3927.24	1.66	82.7223	12451978
Angola	1997	1211.44	5.54975	25.5598	123.2	37.75	12.6209	30.79972	-181.427		68.4919	12791354
Angola	1998	1259.79	6.41023	35.6609	122.6	45	21.0586	41.09105	-62.285	1.14	56.7231	13137483
Angola	1999	1264.69	8.21711	28.8996	121.8	80.2967	3.14333	67.52089	-167.899		86.2965	13510666
Angola	2000	1264.02	4.05719	12.755	120.9	103.16	-0.38826	16.46079	-221.837	1.04	89.6262	13924912
Angola	2001	1262.01	3.83359	13.4509	119.8	95.9666	-28.3587	14.69641	-56.5944		75.3865	14385337
Angola	2002	1396.23	4.22605	12.6148	118.9	97.3358	1.77778	17.8595	-11.5612	1.25	74.9538	14886570
Angola	2003	1392.43	4.03711	12.7096	117.8	96.115	7.14812	16.29826	-2.1087	1.36	69.57	15420988
Angola	2004	1494.3	6.61859	9.14573	117.1	82.3342	13.8703	43.80573	38.7923	1.22	69.6867	15976669
Angola	2005	1706.54	1.7129	8.79039	115.9	67.7181	32.3503	2.934026	44.7544	1.33	86.0175	16544429
Angola	2006	1990.84	0.459176	15.3692	114.3	19.5108	48.5369	0.210843	6.2075	1.13	79.8373	17122433
Angola	2007	2359.28	0.468629	13.5119	112.1	17.6988	38.4681	0.219613	5.450099	1.26	76.3975	17712834
Angola	2008	2597.05	0.523442	16.2259	109.7	12.5336	30.935	0.273992	0.0599	1.43	78.0985	18314433
Angola	2009	2573.69	0.347623	15.2379	107.1	15.6821	4.30793	0.120842	1.950601	1.53	55.0553	18926621
Angola	2010	2576.65	0.320636	12.6682	104.6	22.5436	23.8989	0.102807	8.0731	1.37	62.4131	19549104
Angola	2011	2593.84	0.217245	11.4105	102.2	18.7572	22.8232	0.047195	5.2902	1.35	64.977	20180554
Angola	2012	2685.83			99.5	16.9303			6.6368	1.48		20820529

Botswana	1991	3432.27	3.27205	31.2712	38.1	11.8333	44.2901	10.70631	0.068299		53.0295	1424512
Botswana	1992	3434.6	2.61244	29.5505	39	14	40.3061	6.824843	-2.1676		48.1796	1465079
Botswana	1993	3406.86	2.91661	26.9464	40.6	14.9167	40.9506	8.506614	0.5859		47.0954	1505296
Botswana	1994	3440.05	2.06962	25.5287	42.6	13.9167	35.0455	4.283327	3.3738		49.2782	1544870
Botswana	1995	3504.02	1.88865	25.5713	44.9	14.4167	36.2751	3.566998	3.904201		50.9453	1583455
Botswana	1996	3612.92	1.63743	24.782	47.1	14.5	42.0245	2.681177	4.4171	2.97	54.1914	1620994
Botswana	1997	3893.02	2.413	24.9749	49.3	13.9467	45.4269	5.822569	5.22677		56.2486	1657349
Botswana	1998	4216.12	2.00084	26.0617	51.1	13.6508	44.4567	4.00336	6.9894	3	48.8811	1692149
Botswana	1999	4345.52	1.0865	24.9418	53.1	14.7758	36.1113	1.180482	7.0265		51.6013	1724918
Botswana	2000	4521.46	0.579877	25.8374	54.6	15.4792	44.1884	0.336257	6.87771	3.01	53.2649	1755370
Botswana	2001	4608.26	0.494692	23.5812	54.5	15.75	36.5117	0.24472	9.19096		44.2698	1783343
Botswana	2002	4952.27	0.689558	24.529	54.3	16.2083	34.095	0.47549	8.1755	3.09	46.5693	1808973
Botswana	2003	5195.18	0.377829	26.0228	52.3	16.4	39.1799	0.142755	7.210099	3.23	45.3534	1832607
Botswana	2004	5440.03	0.552087	24.8184	47.7	15.75	39.9926	0.3048	8.8043	3.14	44.2262	1854731
Botswana	2005	5467.27	0.509344	24.5385	45.7	15.7375	45.1752	0.259431	7.12727	3.16	51.2499	1875808
Botswana	2006	5687	0.735618	24.0015	45.5	16.4583	43.8921	0.541134	4.9031	3.02	52.2544	1895949
Botswana	2007	6130.01	1.05549	27.0449	45.9	16.215	45.9958	1.114059	9.134001	3.09	54.5201	1915195
Botswana	2008	6295.88	6.87205	27.5729	46.1	16.5417	36.7216	47.22507	3.8395	3.06	50.9531	1933727
Botswana	2009	5727.78	2.7704	35.4632	44.8	13.7556	26.5253	7.675117	5.7283	2.98	37.0575	1951717
Botswana	2010	6164.37	1.14056	31.2683	43.6	11.4583	28.0796	1.300877	4.509419	2.96	35.7661	1969342
Botswana	2011	6481.69	0.762657	32.1694	42.9	11		0.581646	2.54183	2.98	44.3517	1986709
Botswana	2012	6663.61		36.1221	41	11			3.45972	2.94	44.7844	2003908
Congo, Dem. Rep.	1991	262.339	5.70436	6.09564	112.3			32.53972			20.3801	36252903
Congo, Dem. Rep.	1992	225.596	3.57935	7.10772	112.3			12.81175			16.6781	37730902
Congo, Dem. Rep.	1993	187.621	1.76602	2.25071	112.3			3.118827			11.328	39257380
Congo, Dem. Rep.	1994	173.862	4.77158	7.54462	112.3			22.76798			22.6253	40711860

Congo, Dem. Rep.	1995	169.658	3.99271	9.65361	112.3			15.94173			28.4823	42012595
Congo, Dem. Rep.	1996	163.6	3.07699	27.0957	112.3			9.467867		0.81	30.0028	43122696
Congo, Dem. Rep.	1997	151.062	2.77246	2.5	112.3			7.686534			18.75	44078382
Congo, Dem. Rep.	1998	145.691	2.15392	2.1	112.3			4.639371		0.53	29.7901	44961180
Congo, Dem. Rep.	1999	136.649	3.12906	3.06901	112.3			9.791017			23.6357	45889184
Congo, Dem. Rep.	2000	124.333	4.52178	3.35756	112.3			20.4465		0.54	22.3919	46949354
Congo, Dem. Rep.	2001	118.645	5.68586	5.21835	112.3			32.32901			18.6346	48167256
Congo, Dem. Rep.	2002	119.413	22.3944	8.54026	112.3			501.5091		0.76	21.1033	49516674
Congo, Dem. Rep.	2003	122.722	99.5132	12.2316	112.3			9902.877		0.89	26.642	50972152
Congo, Dem. Rep.	2004	127.093	30.9374	12.7704	112.3			957.1227		1.05	30.6751	52487206
Congo, Dem. Rep.	2005	133.1	28.1537	13.8415	112.3			792.6308		0.91	33.6175	54027839
Congo, Dem. Rep.	2006	136.578	26.3018	13.2442	111.9	46.4358		691.7847	33.3831	0.85	34.2051	55590896
Congo, Dem. Rep.	2007	141.072	14.4644	18.24	110.7	47.001		209.2189	30.0559	0.73	65.1644	57187735
Congo, Dem. Rep.	2008	145.602	17.07	22.393	108.9	43.1542		291.3849	25.8528	0.83	61.3007	58819266
Congo, Dem. Rep.	2009	145.602	42.0539	18.0274	106.7	65.4175		1768.531	-663.249	0.79	45.2053	60486455
Congo, Dem. Rep.	2010	151.77	29.0475	23.5542	104.5	56.5183		843.7573	-28.5515	0.77	68.3361	62190948
Congo, Dem. Rep.	2011	157.796	38.4756	20.5261	102.2	43.7534		1480.372		0.83	68.2766	63931324
Congo, Dem. Rep.	2012	164.515			99.9	28.4467						65705291
Lesotho	1991	520.732	12.5305	72.2969	67.8	20	44.9458	157.0134	2.321899		18.7128	1627898
Lesotho	1992	547.594	12.9993	70.3824	67.8	18.25	46.4803	168.9818	1.0415		20.2445	1660368
Lesotho	1993	554.773	13.5778	63.6172	68.5	15.8333	40.7421	184.3566	2.697599		23.6187	1693453
Lesotho	1994	573.704	10.6632	66.7344	69.7	14.25	51.2923	113.7038	6.03526		24.4777	1725125
Lesotho	1995	575.586	9.4162	70.1348	71.4	16.375	26.7865	88.66482	7.10417		22.452	1753826
Lesotho	1996	596.959	9.08138	74.8206	73.3	17.7083	27.3065	82.47146	8.37799	1.99	29.8919	1779192
Lesotho	1997	613.594	7.71793	61.9663	75.3	18.0333	18.7987	59.56644			28.9523	1801680
Lesotho	1998	617.465	5.64803	47.865	77	20.0625	-14.4818	31.90024		2.19	32.2075	1821608

Country	Year											
Lesotho	1999	613.88	2.86192	54.1352	78.5	19.0625	-0.34527	8.190587			28.3643	1839621
Lesotho	2000	639.659	3.61482	41.0636	79.9	17.1117	2.81679	13.06692	10.97972	2.12	34.8468	1856234
Lesotho	2001	661.27	5.12693	36.7816	81	16.5542	29.0501	26.28541	26.17035		53.8493	1871499
Lesotho	2002	659.859	7.64703	33.3568	82	17.11	27.855	58.47707	-16.7026	1.75	66.1689	1885493
Lesotho	2003	685.986	5.37912	33.1851	82.9	16.015	23.9967	28.93493	9.385839	1.81	60.0686	1898757
Lesotho	2004	696.839	5.4593	26.4455	83.6	12.375	23.6584	29.80396	7.35158	1.78	56.3685	1912018
Lesotho	2005	710.548	3.60994	21.1163	84.2	11.7167	15.5489	13.03167	8.27882	1.7	48.873	1925835
Lesotho	2006	735.59	3.77499	21.5326	83.9	12.1608	20.198	14.25055	6.08808	1.69	53.5461	1940410
Lesotho	2007	764.354	6.37432	21.9591	81.9	14.1317	22.5605	40.63195	6.11926	1.94	52.1004	1955781
Lesotho	2008	801.452	7.08293	27.8824	82.1	16.1869	28.9227	50.1679	5.471199	1.95	56.0226	1972200
Lesotho	2009	822.888	5.78351	26.9487	79.3	13	24.687	33.44899	5.62056	2.03	45.5884	1989870
Lesotho	2010	879.224	9.77152	27.201	76.8	11.2225	10.3895	95.4826	7.62469	2.08	44.0446	2008924
Lesotho	2011	902.828	9.0755	26.5332	72.7	10.4292	12.491	82.36469	5.40438	2.06	46.7803	2029520
Lesotho	2012	928.537		31.8047	74.2	10.1192			4.01561	2	46.5227	2051537
Malawi	1991	201.147	25.4782	16.998	138.9	20	17.7327	649.1387	7.3847		23.2716	9657545
Malawi	1992	184.45	32.7764	17.1586	135.3	22	5.16289	1074.292	-1.7514		23.2062	9759386
Malawi	1993	201.476	24.464	12.9774	131.6	29.5	4.69055	598.4873	6.727301		16.1303	9800657
Malawi	1994	179.906	41.2912	26.7737	127.9	31	5.67033	1704.963	-3.6496		29.6328	9851753
Malawi	1995	207.635	32.157	14.817	124.4	47.3333	7.76837	1034.073	-35.9925		30.3685	9964108
Malawi	1996	218.674	21.9238	9.74971	121	45.3333	6.71896	480.653	7.7313	2.36	22.8258	10153307
Malawi	1997	221.493	13.1174	9.31543	117.3	28.25	1.27221	172.0662	19.11265		21.3565	10404303
Malawi	1998	223.756	25.4234	11.0961	113.2	37.6667	13.1162	646.3493	7.917999	2.37	32.7702	10700168
Malawi	1999	224.02	25.7539	12.6065	108.4	53.5833	4.42471	663.2634	8.779102		28.0223	11012703
Malawi	2000	221.345	26.1317	12.3221	102.8	53.125	9.72049	682.8658	23.5435	2.33	25.6037	11321453
Malawi	2001	204.874	24.3222	13.7991	96.5	56.1667	10.3322	591.5695	33.4667		27.9912	11623158
Malawi	2002	203.053	14.4258		90.1	50.5417	7.30314	208.1037	35.7971	2.39	20.8027	11926818

Malawi	2003	208.76	21.7289	14.1392	83.8	48.9167	7.11066	472.1451	39.3399	2.32	26.6967	12238778
Malawi	2004	213.136	19.5823	16.2226	77.9	36.8333	6.27098	383.4665	25.4035	2.11	24.9599	12569075
Malawi	2005	213.157	21.1312	20.181	72.6	33.0833	3.02094	446.5276	17.673	2.33	24.0469	12924690
Malawi	2006	211.294	23.4813	22.7291	67.8	32.25	9.71806	551.3715	18.2757	2.14	22.6196	13307522
Malawi	2007	224.496	20.5163	23.9418	63.4	27.7153	22.8995	420.9186	19.76309	2.1	28.3288	13713756
Malawi	2008	235.915	21.7133	23.9474	58.8	25.2778	14.7147	471.4674	16.5652	2.11	28.1888	14138187
Malawi	2009	249.551	15.5555	23.8531	55.4	25.25	19.433	241.9736	16.82796	2.21	24.6489	14573422
Malawi	2010	258.058	19.4007	24.1619	52.6	24.625	18.984	376.3871	17.21341	2.18	29.376	15013645
Malawi	2011	261.545	14.6427	13.5077	49.2	23.75	13.8529	214.4087	16.12718	2.19	29.5856	15457579
Malawi	2012	258.956			46	32.3299			11.0586	2.12		15906526
Mozambique	1991	191.445	41.078	16.1794	152.8		4.2538	1687.402			10.1556	13893616
Mozambique	1992	175.888	81.2903	19.7698	150.2		5.9703	6608.113			13.0546	14350423
Mozambique	1993	184.146	63.2279	20.4332	147.2		2.86483	3997.768			12.9344	14893270
Mozambique	1994	189.477	60.8975	22.3436	143.7		6.09703	3708.505			14.0726	15453406
Mozambique	1995	188.164	51.3578	26.9754	139.4		9.44808	2637.624			15.6011	15981622
Mozambique	1996	196.173	28.8461	20.2233	134.5		7.61196	832.0975		2.36	14.7865	16463395
Mozambique	1997	210.489	26.1055	20.586	129		13.408	681.4971			13.3539	16914639
Mozambique	1998	227.324	25.3039	18.3364	123.2	24.3525	8.72947	640.2874	22.87214	2.11	12.2492	17350815
Mozambique	1999	239.6	18.929	19.9909	117.5	19.63	-1.7528	358.3071	16.77049		13.1665	17798060
Mozambique	2000	235.885	22.2359	30.9506	112.1	19.0392	10.9611	494.4353	6.315599	2.07	16.4802	18275648
Mozambique	2001	256.785	25.479	19.9718	106.9	22.7292	2.95998	649.1794	13.67923		23.3853	18785766
Mozambique	2002	271.7	55.0921	29.9583	102	26.7083	20.3583	3035.139	9.926899	2.14	27.3387	19319973
Mozambique	2003	280.043	23.4521	22.2764	97.4	24.69	4.269	550.001	11.2637	2.04	28.8855	19873545
Mozambique	2004	296.177	23.0224	18.6499	93.2	22.075	8.43427	530.0309	9.411501	1.99	30.8778	20438890
Mozambique	2005	313.108	20.859	18.6944	89.3	19.4672	7.54533	435.0978	12.29943	1.98	31.7279	21010440
Mozambique	2006	324.003	25.3294	17.6533	85.5	18.5613	7.73238	641.5784	5.3226	1.94	38.3579	21587392

Mozambique	2007	338.44	23.8456	16.1355	80.5	19.5173	7.05912	568.6127	11.35473	2.02	35.3504	22171318
Mozambique	2008	352.165	21.5523	16.4812	77.1	18.31	5.07801	464.5016	7.9822	2	32.267	22762614
Mozambique	2009	364.882	21.3395	14.9489	73.5	15.6757	1.84706	455.3743	12.42401	1.96	24.7888	23361035
Mozambique	2010	380.849	21.23	21.8456	71.1	16.2627	9.4004	450.7129	3.5615	1.93	26.1	23967277
Mozambique	2011	398.523	16.7289	24.6764	67.2	19.0996	12.5619	279.8561	8.9256	1.88	29.429	24581385
Mozambique	2012	417.451			63.1	16.8135			15.66748	1.86		25203414
Namibia	1991	2791.27	6.96992	16.0854	48.2	23.3633	22.1052	48.57979			53.1241	1466149
Namibia	1992	2898.01	4.98656	20.8699	47.5	20.2125	23.4922	24.86578			52.1933	1513689
Namibia	1993	2756.42	5.2556	21.146	47	18.0208	25.4591	27.62133			51.9028	1559475
Namibia	1994	2872.71	4.15052	19.5289	46.7	17.0533	30.0213	17.22681			48.4888	1605828
Namibia	1995	2903.39	5.20142	22.1706	46.7	18.5083	30.1522	27.05477			49.4884	1654220
Namibia	1996	2906.39	5.21725	23.5494	46.8	19.16	28.4955	27.2197		3.01	50.5829	1705314
Namibia	1997	2938.23	4.46181	19.6287	47.1	20.1792	23.7838	19.90775			47.5255	1757970
Namibia	1998	2948.21	5.18694	22.9975	47.4	20.7192	27.456	26.90435		2.71	45.9684	1809715
Namibia	1999	2969.79	5.30104	23.013	47.8	18.4842	23.9366	28.10103			46.1613	1857143
Namibia	2000	3007.32	3.86454	16.5825	48	15.2783	25.221	14.93467		2.67	40.8774	1897960
Namibia	2001	2990.31	3.16248	20.9301	47.9	14.5317	25.7266	10.00128			41.1724	1931273
Namibia	2002	3090.22	4.19497	19.9436	47.5	13.8375	25.3734	17.59777		2.63	46.0034	1958305
Namibia	2003	3183.93	2.83261	19.0891	46.8	14.7008	23.1884	8.023679	7.54854	2.74	43.3868	1981233
Namibia	2004	3535.26	2.58743	18.5618	45.6	11.3892	27.8403	6.694794	7.2427	2.6	39.8111	2003327
Namibia	2005	3582.24	1.75035	18.611	42.4	10.61	27.9832	3.063725	8.34878	2.54	40.4509	2027026
Namibia	2006	3787.22	1.91413	21.6295	39.8	11.1808	31.9702	3.663893	6.127551	2.62	39.8516	2052933
Namibia	2007	3937.49	2.51788	23.6723	37.9	12.8842	32.4109	6.339719	6.15641	2.63	50.7337	2080690
Namibia	2008	4012.41	2.44017	24.4537	35.8	13.7367	35.0905	5.95443	3.3858	2.7	53.1585	2110784
Namibia	2009	3908.14	3.76604	22.1247	33.3	11.1183	26.073	14.18306	2.335891	2.63	47.3038	2143499
Namibia	2010	4085.71	2.39673	22.6844	31.1	9.72	21.4397	5.744315	5.24991	2.61	47.4919	2178964

Namibia	2011	4242.36	2.17826	20.8143	29.2	8.73	19.3618	4.744817	3.68417	2.59	41.0013	2217609
Namibia	2012	4372.8		21.8965	28.3	8.65187			2.11256	2.62	42.5939	2259400
South Africa	1991	4708.03		17.1559	45.9	20.3125	19.0828		4.9777		21.7504	35933121
South Africa	1992	4512.27		15.6505	45.2	18.9058	16.6257		5.0311		21.3433	36690925
South Africa	1993	4472.49	0.211713	14.6905	45	16.1583	16.7845	0.044822	6.44085		22.4782	37473704
South Africa	1994	4519.51	0.219772	15.1508	45.1	15.5833	17.1886	0.0483	6.64475		22.1028	38283135
South Africa	1995	4560.64	0.260506	15.8807	45.7	17.8958	16.8444	0.067863	9.215369		22.7725	39120219
South Africa	1996	4652.37	0.257673	16.2847	46.6	19.5208	16.4959	0.066395	12.16667	3.38	24.7293	40000400
South Africa	1997	4667.48	0.340395	16.511	47.8	20	15.4805	0.115869	11.40223		24.5955	40926159
South Africa	1998	4582.61	0.391193	17.0944	49	21.7917	15.6025	0.153032	14.91115	3.1	25.6529	41899733
South Africa	1999	4578.79	0.415802	15.4549	50.3	18	16.262	0.172891	12.81851		25.3347	42923500
South Africa	2000	4652.34	0.374984	15.1437	51.4	14.5	16.1692	0.140613	9.16105	3.19	27.8709	43999992
South Africa	2001	4682.78	0.370703	15.0514	52.3	13.7708	16.0704	0.137421	8.068899		30.1275	44909504
South Africa	2002	4788.06	0.472008	14.7001	52.9	15.75	17.1269	0.222792	6.58596	3.14	32.9233	45533552
South Africa	2003	4866.92	0.400759	15.4808	52.8	14.9583	16.099	0.160608	9.099319	3.18	27.8801	46116438
South Africa	2004	5028.8	0.292898	15.9814	52.1	11.2917	15.3407	0.085789	9.906321	3.16	26.4225	46664768
South Africa	2005	5234.31	0.285077	16.788	51	10.625	14.79	0.081269	7.2257	3.14	27.3804	47198374
South Africa	2006	5465.96	0.279433	18.3365	49.5	11.1667	14.6578	0.078083	6.52508	3	30.006	47730922
South Africa	2007	5706.28	0.292141	20.1498	46.7	13.1667	14.6018	0.085346	6.06828	2.99	31.4766	48257413
South Africa	2008	5848.04	0.425883	23.0767	45.3	15.125	15.511	0.181376	3.5885	3.02	35.8808	48793126
South Africa	2009	5697.23	0.386985	21.5585	39.8	11.7083	15.8228	0.149757	4.5783	2.98	27.3102	49319989
South Africa	2010	5794.24	0.289468	19.3281	35	9.83333	16.798	0.083792	5.57099	2.89	27.3645	49991323
South Africa	2011	5923.99	0.355934	18.9651	34.2	9	16.7737	0.126689	3.71998	2.91	29.283	50586738
South Africa	2012	6003.46		19.1554	33.3	8.75			3.33615	2.83	28.257	51189245
Swaziland	1991	1995.8	4.31688	14.9446	53.7	16.0167	18.6048	18.63545	7.082391		59.2592	887248.2
Swaziland	1992	2013.22	4.0942	19.0385	54.8	15.9208	16.3136	16.76247	8.3625		57.3492	907945.8

Swaziland	1993	2034.79	3.85806	17.4027	57.1	14.3458	13.5034	14.88463	2.3224		57.2856	926222.7
Swaziland	1994	2043.92	4.11899	16.6818	60.2	14.25	18.3139	16.96608	0.4807		63.6787	944225.2
Swaziland	1995	2099.84	3.24523	15.4161	63.9	17.0542	14.8031	10.53152	4.765599		60.0157	963425.1
Swaziland	1996	2133.84	1.9051	16.332	67.6	18.6667	12.903	3.629406	12.24149	1.83	59.3548	984510.7
Swaziland	1997	2151.41	1.52467	16.5361	71.3	19.5	15.9528	2.324619	12.37467		61.3508	1006762
Swaziland	1998	2160.37	2.13	19.1039	74.5	19.5	13.0393	4.536901	11.39003	1.85	67.1738	1028693
Swaziland	1999	2182.83	1.77243	16.6769	77.4	17.4167	12.3145	3.141508	11.32784		64.9999	1048153
Swaziland	2000	2188.75	0.842373	18.1168	79.5	14	12.9805	0.709592	1.7915	1.79	74.3267	1063717
Swaziland	2001	2191.34	2.00805	22.9663	80.7	13.25	22.6141	4.032265	7.30789		85.4407	1074762
Swaziland	2002	2214.99	1.81672	19.3022	81.5	15.25	22.0269	3.300472	3.2303	1.92	95.7115	1082182
Swaziland	2003	2252.65	2.21239	20.6029	81.7	14.625	26.0812	4.894669	7.335	1.68	100.949	1087933
Swaziland	2004	2303.66	1.02715	15.2708	81.1	11.2917	17.1904	1.055037	7.84636	1.45	84.9294	1094754
Swaziland	2005	2339.29	1.68877	15.0393	80.1	10.625	20.1932	2.851944	5.851	1.41	87.0669	1104640
Swaziland	2006	2387.13	1.17424	12.8138	75.6	11.1667	15.2828	1.37884	5.862061	1.66	76.6161	1118255
Swaziland	2007	2434.36	1.6372	12.2908	74.4	13.1667	18.4495	2.680424	5.090611	1.65	75.6694	1134974
Swaziland	2008	2450.83	2.31841	11.0478	73.2	14.8333	8.52087	5.375024	2.175799	1.76	59.361	1153925
Swaziland	2009	2440.1	1.81596	10.2923	67.2	11.375	-2.67187	3.297711	3.92677	1.75	58.839	1173675
Swaziland	2010	2445.08	2.63929	10.2102	61.2	9.75	-0.53707	6.965852	5.24076	1.98	55.8861	1193153
Swaziland	2011	2413.95	3.35854	9.57356	57	9		11.27979	2.8948	1.81	66.575	1212155
Swaziland	2012	2341.38			55.7	8.75			-0.65199	1.93		1230979
Tanzania	1991	297.142	22.4894	25.9997	100.1		9.07475	505.7732			10.2621	26337386
Tanzania	1992	289.035	30.2217	26.9635	99.5		10.0184	913.3512			12.4418	27235995
Tanzania	1993	282.972	23.0709	24.8934	98.8	31	3.72468	532.2664	5.7227		17.9831	28157097
Tanzania	1994	278.426	22.1152	24.439	97.8	39	6.43061	489.0821	4.916599		20.614	29067463
Tanzania	1995	279.938	16.9936	19.5959	96.6	42.8333	7.59122	288.7825	15.4055		24.0747	29944314
Tanzania	1996	284.729	13.4991	16.4718	94.7	33.965	10.3599	182.2257	12.9877	1.77	19.9372	30780441

Country	Year											
Tanzania	1997	287.267	12.481	14.7211	92.2	26.27	9.22741	155.7754	10.1793		16.2181	31586173
Tanzania	1998	290.65	10.8377	19.5525	89	22.8925	12.4908	117.4557	10.0927	2.08	12.3977	32378333
Tanzania	1999	297.349	10.3288	17.051	85.1	21.8942	9.802	106.6841	14.00377		12.5297	33183058
Tanzania	2000	304.359	10.5193	16.3547	80.5	21.5775	13.2801	110.6557	15.65354	2.08	13.3649	34020370
Tanzania	2001	314.547	12.4143	17.0006	75.4	20.0573	14.1096	154.1148	14.90983		17.0066	34895206
Tanzania	2002	328.525	11.8708	16.763	70.5	16.3982	16.8342	140.9159	11.08037	2.1	17.5808	35806500
Tanzania	2003	342.05	14.9564	18.8085	65.7	14.517	18.4406	223.6939	9.21343	2.13	18.5626	36760704
Tanzania	2004	359.037	13.9448	22.1558	61.2	14.1403	20.025	194.4575	9.4045	2.08	19.6513	37765253
Tanzania	2005	374.999	10.8344	24.6578	57.2	15.2489	17.8836	117.3842	10.21433	2.11	20.8228	38824421
Tanzania	2006	389.082	13.3056	27.2193	53.6	15.6521	17.5871	177.039	8.40113	2.16	22.5625	39942441
Tanzania	2007	404.978	16.9303	29.2099	50	16.0704	16.3866	286.635	9.04489	2.12	24.2417	41119787
Tanzania	2008	422.44	11.4148	29.3536	46.9	14.9821	19.0316	130.2977	4.703699	2.02	25.1425	42353855
Tanzania	2009	434.704	13.9055	28.4304	44.2	15.0305	20.1905	193.3629	2.8883	1.91	23.2279	43639795
Tanzania	2010	451.547	13.085	31.5162	41.5	14.5459	24.8714	171.2172	8.34574	1.92	27.8332	44973321
Tanzania	2011	466.368	10.3174	36.0591	39.3	14.9619	20.5757	106.4487	2.2709	1.87	31.0574	46354550
Tanzania	2012	483.482			37.7	15.4605			-0.5406	1.81		47782977
Zambia	1991	660.282	29.3351	11.3651	114.7		4.64479	860.5481			34.6126	8038234
Zambia	1992	633.774	35.9488	10.5684	114.6	54.5667		1292.316	-111.14		36.3913	8229452
Zambia	1993	661.298	28.7201	11.4724	113.9	113.308		824.8442	-70.004		33.5695	8423029
Zambia	1994	590.078	22.9932	11.3229	112.6	70.5583		528.6873	15.957		36.0049	8625470
Zambia	1995	559.43	62.7696	12.4354	110.8	45.5333		3940.023	10.6037		36.0168	8841349
Zambia	1996	582.99	19.8423	11.2477	109	53.7833		393.7169	10.7102	1.44	31.3258	9073331
Zambia	1997	586.276	16.6551	13.0689	107.2	46.6917	9.5456	277.3924	22.273		30.1214	9320064
Zambia	1998	559.916	11.5432	14.816	105.3	31.8	1.18689	133.2455	7.341499	1.64	26.9032	9577432
Zambia	1999	557.147	20.9956	14.6315	102.7	40.5167	1.94816	440.8152	13.729		27.2196	9839151
Zambia	2000	561.793	25.6551	15.9314	99.4	38.8	-0.94611	658.1841	12.7696	1.64	26.476	10100950

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Zambia	2001	574.438	16.3617	17.5667	95.3	46.2333	-1.56063	267.7052	24.8395		28.1377	10362147
Zambia	2002	578.789	22.7852	20.5861	90.5	45.198	7.06036	519.1653	22.9647	1.69	28.5044	10625422
Zambia	2003	593.437	18.4468	24.1747	85.6	40.571	10.5786	340.2844	19.1694	1.68	28.3358	10894515
Zambia	2004	609.824	22.4278	23.6282	80.9	30.7271	17.1592	503.0062	12.7593	1.68	37.7776	11174668
Zambia	2005	625.854	17.9026	22.3929	76.5	28.2095	15.6493	320.5031	9.885099	1.56	34.5662	11470052
Zambia	2006	647.362	15.3933	20.7807	73	23.1532	25.7424	236.9537	14.13363	1.69	38.4909	11781605
Zambia	2007	668.642	10.0815	20.6161	69.8	18.8891	17.1987	101.6366	8.231799	1.79	40.9126	12109611
Zambia	2008	689.335	8.42943	19.5222	67.1	19.0632	14.704	71.05529	6.6176	1.77	35.3746	12456586
Zambia	2009	709.999	10.2295	19.5708	64.4	22.0631	25.4764	104.6427	8.667801	1.71	35.0131	12825039
Zambia	2010	741.442	6.16685	21.0667	62.9	20.9163	31.3349	38.03004	12.41454	1.67	46.7762	13216941
Zambia	2011	767.911	5.79737	23.4293	58.7	18.8368	30.2708	33.6095	12.40432	1.86	46.0431	13633765
Zambia	2012	798.26			56.4	12.1498			5.56418	2		14075131
Zimbabwe	1991	697.99	4.66184	20.5854	51.5	15.5	13.9571	21.73275	-7.8417		23.8835	10733068
Zimbabwe	1992	620.708	12.1893	22.3628	53.4	19.7708	11.4895	148.579	-22.2939		27.2273	10981252
Zimbabwe	1993	614.392	7.8541	23.5917	55.4	36.3308	21.2029	61.68689	8.742498		30.7196	11210821
Zimbabwe	1994	658.339	8.47623	21.3715	57.2	34.8608	18.8999	71.84647	12.5967		34.6	11428605
Zimbabwe	1995	647.442	7.20826	24.5773	59.1	34.7317		51.95901	12.1379		38.2363	11639325
Zimbabwe	1996	702.052	4.48571	18.0405	60.5	34.2342		20.1216	12.8003	2.27	36.1301	11846109
Zimbabwe	1997	708.92	4.12957	18.0497	61.4	32.5467		17.05335	13.8107		37.5953	12045841
Zimbabwe	1998	718.418	4.34122	20.6015	61.6	42.0558		18.84619	10.2362	2.13	43.3931	12229480
Zimbabwe	1999	703.612	3.75996	2.5537	61.3	55.3858		14.1373	-3.1339		37.4086	12384670
Zimbabwe	2000	675.6	2.7752	11.798	60.8	68.2083		7.701735	12.3418	1.72	38.1598	12503636
Zimbabwe	2001	680.801	2.49512	12.1178	59.9	38.0208		6.225624	-38.6865		34.9589	12586810
Zimbabwe	2002	617.593	3.27328	10.1725	58.9	36.4792		10.71436	-103.581	1.6	31.8348	12640924
Zimbabwe	2003	511.331	3.39405	13.8138	57.8	97.2917		11.51957	-334.408	1.55	32.3971	12673072
Zimbabwe	2004	480.878	3.38742	5.10781	57.4	278.917		11.47461	-3.46301	1.55	34.4698	12693112

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Zimbabwe	2005	452.789	6.80223	2.00044	57.1	235.675	46.27033	-66.442	1.21	33.5486	12710640
Zimbabwe	2006	436.644	5.14538	2.22468	57.2	496.458	26.47494	-600.222	1.2	35.9562	12724248
Zimbabwe	2007	420.169	9.19875	5.0784	57.8		84.617		1.23	37.7854	12740163
Zimbabwe	2008	344.742	14.6468	3.28591	58.7		214.5287		1	41.4669	12784065
Zimbabwe	2009	362.4	12.8838	10.7095	59.6		165.9923		0.98	29.2776	12888938
Zimbabwe	2010	391.55	10.4456	14.001	59.3		109.1105		1	47.6373	13076928
Zimbabwe	2011	419.236	7.83082	12.4495	58.6		61.32174		1.14	49.4109	13358721
Zimbabwe	2012	428.536			55.7				1.29		13724320