

# **Comparison of Macroeconomic Performance of Selected sub- Saharan African Countries**

**Omobola Alagbe**

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Prof. Dr. Elvan Yılmaz  
Director

I certify that this thesis satisfies the requirements of thesis for the degree of Master of Science in Marketing Management.

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Assoc. Prof. Dr. Müstafa Tümer  
Chair, Department of Business Administration

We certify that we have read this thesis and that in our opinion it is fully adequate in scope and quality as a thesis for the degree of Master of Science in Marketing Management.

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Prof. Dr. Serhan Çiftciöglü  
Supervisor

---

Examining Committee

1. Prof. Dr. Serhan Çiftciöglü

---

2. Assoc.prof.Dr.Müstafa Tümer

---

3. Asst.prof.Dr. Ihan Dalçi

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## **ABSTRACT**

This study investigates the comparison of economic performance in four selected African countries which includes South Africa, Cameroon, Kenya and Ghana and attempts to analyze the nature of the effects of selected parameters on long run economic growth both at individual country level and also collectively. The sample period of the analysis is in between 1980-2010.

The results presented in this study is on the comparative analysis that was done based on long term average and the short term average measures of the economic growth ranging from 1980-1990, 1991-2000 and 2001-2010 respectively, looking into six macroeconomic parameters that include inflation, investment rate, rate of trade openness, government debt, gross inflow of FDI and government consumption expenditures all as a percentage of GDP in order to compare the performance of all these countries according to these parameters, in addition econometric analysis was carried out based on all of these parameters in order to test for their relationship with growth rate of GDP. Multiple regression analysis has been applied both at individual country level and also collectively utilizing panel estimation method for all the four countries in the sample of the study.

From the regression analysis for the individual country results suggested that investment, FDI, government debt, government consumption expenditure has a positive relationship with growth, On the other hand inflation and trade openness has been found to have a negative effect on growth for all the countries, all of these results are significant for all the countries except for inflation, export and government

consumption expenditures. But in the case of Cameroon inflation was found to affect growth in a negative way but the result shows a significant result for Cameroon. Furthermore the panel results show for all the countries together as Investment, FDI, Debt, consumption expenditures have positive effects on growth, inflation has a negative effect on growth, and the result shows that all of these are significant except for inflation and government consumption expenditures.

**Keywords:** Growth rate, Investment, Inflation, Exports, Foreign direct.

## ÖZ

Bu çalışmada Güney Afrika, Kamerun, Kenya ve Gana ve hem bireysel hem ülke düzeyinde hem de topluca uzun dönem ekonomik büyüme üzerinde seçilen parametrelerin etkilerinin niteliği analiz girişimleri içeren dört seçilmiş Afrika ülkelerinin ekonomik performansının karşılaştırılması incelenmiştir. Analizi örneklem dönemi 1980-2010 arasındadır.

Bu çalışmada sunulan sonuçlar altı makroekonomik parametrelere bakarak, uzun vadeli ortalama ve sırasıyla 1980-1990, 1991-2000 ve 2001-2010 arası dönem ekonomik büyümenin kısa vadeli ortalama ölçümlere dayanarak yapıldığını karşılaştırmalı analizine olduğu enflasyon, yatırım oranı, dışa açıklık oranı, devlet borçları, DYY ve GSYH yüzdesi olarak kamu tüketim harcamalarının bu parametrelere göre tüm bu ülkelerin performanslarını karşılaştırmak amacıyla brüt girişimi dahil, ek olarak ekonometrik analiz yürütülmüştür. GSYH büyüme oranı ile ilgili kısmını test etmek için diğer tüm bu parametreleri esas. Çoklu regresyon analizi bireysel ülke düzeyinde hem de topluca çalışmanın örneklemini tüm dört ülke için.

Bireysel ülke sonuçları için regresyon analizinden yatırım, DYY, devlet borçları, kamu tüketim harcamaları dışarı yandan enflasyon ve ticaret açıklık bütün ülkeler için büyüme üzerinde olumsuz bir etkiye sahip olduğu tespit edilmiştir. Üzerinde büyüme ile pozitif bir ilişki vardır önerdi, Tüm bu sonuçlara enflasyon, ihracat ve hükümet tüketim harcamaları dışındaki tüm ülkeler için önemlidir. Ancak Kamerun dışarıda durumunda olumsuz bir şekilde büyümesini etkiler bulunmuştur ancak sonuç Kamerun için önemli bir sonucunu göstermektedir edildi. Ayrıca panel sonuçları birlikte tüm

ülkelerin Yatırım olarak, DYY, Borç, tüketim harcamaları büyüme üzerinde olumlu etkileri vardır fro gösterir, enflasyonun sonucu tüm bu enflasyon ve hükümet tüketim harcamaları.

**Anahtar Kelimeler:** Büyüme oranı, Yatırım, Enflasyon, hracat, do rudan yabancı.

To my family and the Almighty Jehovah God who kept me alive to this very moment

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## **LIST OF SYMBOLS OR LIST OF ABBREVIATIONS**

<b>%</b>	Percentage
<b>EXP</b>	Exports
<b>INF</b>	Inflation
<b>INV</b>	Investments
<b>FDI</b>	Foreign Direct Investments
<b>C.EXP</b>	Consumption Expenditures
<b>GR</b>	Growth

# Chapter 1

## INTRODUCTION

There are has been a lot of literatures and studies on the economic performance of African countries, all explaining the crawling growth of this region in comparison to the rest of the world. African economic has been known for its flaws and a low standard of living over the past decades.

The countries in terms of growth have suffered a chronic failure and it thus seems that the poor economic performance of this region cannot be solved with any macroeconomic theory. The history of Africa has been so `retarded.

Jeven (2010) explained that the economic performance is not a chronic failure but a recurring one, which means that every effort made to survive to attain a positive growth, will still be back to a declining state of negative value of output. African economy has been down from history cause of the lack of so many factors like retarding policies, lack of institutional qualities, and closed system of trade and government interventions. The reason for these retarding policies was because Africa politicians made up these policies to serve their own interest and not the interest of the development of the economy at large. However, the problem of ethnic diversities also has caused more havoc to the growth of these

countries.

Growth in this region over the years has caused major attractions for many scholars, but the question is why are rich countries like America getting richer and poor countries like Ghana and Cameroon getting poorer. The reason behind the slow growth and the lacking behind all other developed are purely based on lack of openness, innovations, human capital accumulation, good institutions, and poor policy management. Economic performance of these regions have been a crucial topic in almost all other part of the world and a center of attraction to scholars and researchers, the performance of these countries have been characterized by a low average or negative average income, it has been said that almost 60% of Africa citizens are living below 2 US dollars per day, and being categorized as the poorest continents with endowed resources. Africa lack of market oriented policy, gave evidence to the slow of growth and the negative figures in GDP from the past decades.

However there has been a tremendous change in the performance of Africa countries over the last two decades especially in the early 80s and late 90s but the challenge there is that, will this positive growth be permanently sustained.

Most Africa countries have a lot in common ranging from the dependence on agricultural produce and the dependence on a large deposited of natural resources, we will still finds out that countries with almost the same characteristics often do not perform in the same way. However, the recent involvement in International trade by Africa countries has given it a hedge and a change of history in the world of negative GDP to a positive one.



Before the global recession, GDP growth of Africa countries increases but after the global trouble, with the recession in place left these countries with a fall in their exports and as this happens the figure of debt rise up leaving these countries with a significant deteriorating external balance. But for the last two decades African countries are experiencing a significant long term growth from the help of globalization of capital, trade openness with a reduction in inflation figures. For the last 5 years African countries has been said to have a positive growth which is now giving this region a name as the 10<sup>th</sup> most growing continent after Asia.

The structure of this study will take the following: Chapter two will give an overview of the theoretical background to the theories of economic growth, determinants of economic growth and also the review of past literatures on the impact of investment on growth, trade openness on growth, FDI on growth, inflation on growth, debt and government consumption expenditures on growth and also reviewing the policies adopted by the government of the chosen countries in this study.

Chapter 3 focuses on explaining data and methodology used in this study. This study is an empirical research, which is built on time series data collected figures from Cameroon, Ghana, Kenya and South Africa in order to compare the economic performance of these countries. Statistical methods were used such as simple arithmetic averages, multiple regressions analyses and panel data analyses. Also in this chapter the hypothesis were formed.

Chapter 4 comprises of the individual macroeconomic performance, showing the individual results of the simple arithmetic averages. Also in this chapter the figures were compared in between the countries so as to understand the level of performance of these countries.

Chapter 5 presents the individual regressions result, which tested two equations each for all the countries chosen in this study. The first equation measures the effects of investment, inflation, FDI, openness, government expenditures all as a percentage of GDP on growth, the second equation tested all of these variables again with central government added to the first equations.

Chapter 6 presents the panel regression results for the countries all together with this same equations, testing for the effect of all of these variables at the cross country level.

Chapter 7 consists of the conclusion that can be drawn from this research and the findings about the hypothesis tested which also includes the explanation of the policy implications of all these variables.

## **Chapter 2**

### **LITERATURE REVIEW**

#### **2.1 Introduction**

There are have been many study on the economic performance of Africa countries which explains the poor performance of Africa countries over the decades, many of the studies concluded on poor policy that has been adopted by policy makers in most of these countries. This chapter gives an overview of past research work on the economy performance of most economic indicator chosen for this study.

Garner (2006) gave an explanation that the slow growth experienced in the last few decades is synonymous with an underdevelopment and a non-existence economic growth, explaining the low average income or the negative value of GDP over the decades, his study shows that from 1975-2004 GDP value of Africa countries were in negative values, which implies that these countries were not only performing poor but also lacking behind the high income organization for economic cooperation and development countries (OECD).

Sachs and Warner (1997) also gave an overview of the source of slow growth of Africa countries, the study was based on the period of 1965-1990 and results were concluded upon that colonial legacy, ethnic divisions, high proportions of land in the tropical climates and poor choices of economic policies is the driver behind the poor performance of these countries. Their conclusions indicated that countries that are geographically isolated from the world market are tending to grow more slowly than the others.

Ndamibiri et al (2012) in their work that was based on a panel data of 19 countries for the period of 1982-2000, gave an insight into the determinants of economic growth in Africa countries, and the research found out that physical capital formation and vibrant exports contributed to the growth of these countries. There are basically two theories that explain the sources of positive economic growth and they include: the exogenous and endogenous growth theories. These theories are the back bone of which all other theories are built on.

## **2.2 Endogenous and Neo -Classical (Exogenous) Growth Theories**

Endogenous growth theory talks about the long run economic growth that is determined from internal forces like accumulation of human capital (labor), policies both fiscal and monetary which measures growth as a result of the progress of this forces as they contribute to growth.

Aghion and Howitt(1998) explains that for a positive and sustainable long run economic growth, there has to be a consistent technological knowledge advancement which can be inform of new goods, new markets and new processes. The neoclassical model was developed by Solow (1956), which explained that the building block of this model is an aggregate production functions. The model explains the diminishing return of capital, which means that if capital stock is being increased and there is no increment to the use of the capital, it will cause economic growth to be ceased at some point. He denoted the functions with:

$$Y=f(K, L),$$

Where, Y = is the final output of the economy with the function of K (capital) and L (labor).

Petra George and his colleagues summarized the determinants of economic growth using the Solow 1956 model to explain the macroeconomic indicator, explaining that the assumption of these two theories ( endogenous and the exogenous) model are constant return to scale, subsist-ability of capital and labor, technology as an exogenous variable and endogenous growth models explain the convergence and the divergence debate which suggested that convergence will not be experienced due to the increasing return to scale. Their study emphasized the following explanatory variables as the determinants of economic growth and they include the following: investment, human capital, innovation and R&D, economic policies, openness to trade, FDI, institutional framework, and geographical location.

The study of Ghura (1997) confirms the reality of the endogenous growth type theory at least for the case of Cameroon, the study which was based on private investment and endogenous growth model, this study indicated that aggregate production functions shows an increasing return to scale, increment in investment shows a positive relationship with growth, human capital accumulation also shows an interesting results on growth and the role of economic policies on growth also shows a positive sign.

Yanikkaya (2003) investigated the relationship between trade openness and economic growth, conclusions were based on the cross sectional analysis for the sample countries over the last three decades, using two groups of trade openness measures, they found out that trade liberalization does not have a single and straight forward relationship with growth and they also found that trade barriers are positively and significantly associated with growth especially in developing countries.

Alexander and Ellin (2009) in their study investigated the relationship between trade openness and growth, taking into consideration 6 countries in Asia, measuring their performance before and after the crisis of 1990 and 1997 respectively. They found that the more closed an economy is, the higher the effects of crisis, which means that there is a positive relationship between economic growth and trade openness.

Vikesh and Subrina (2004) explained in their study the relationship between inflation and economic growth, literatures were reviewed which confirms that it has a negative effects on growth, the study which was based on testing this concept , in the case of Fiji and the test revealed that a weak negative correlation exists between inflation and growth above threshold level.

Athukorala (2003) reviewed his study that measures relationship between FDI and economic growth, a study that uses time series data from the period of (1959-2002), on the performances of Sri Lanka. The result shows that, though as generally theoretically accepted that FDI has a positive relationship with growth, their analysis found out that it is not so in the case of Sri Lanka due to lack of good governance, corruption, political instability and poor institutional setup.

Suma (2007) explained in his work why the poor countries are getting poorer and the rich getting richer, from the analysis of the history of African countries debt, he said that the debt crisis of these countries started in 1980s as a result of domestic mismanagement, rampant corruption and the two oil prices shock in the early 1970s. He further explained that the resources that would have been used for a re- investment in to the economy, is used as a debt service or for embezzlement amongst African leaders.

Scoeman (2008) studied the impact of the dynamics of foreign debt on the economy in south Africa testing the relationship and the effects with dis -effect of debt on the economic performance of this country, the ordinary least square method was used to test the relationship between these variables, result shows that debt has a positive relationship up to 35% on the economy and at the same time, also has a negative impact in the long run. Foreign debt can be explained to be like a two hedged sword that is used as a tool for the economic development of a country, it also serves as a stumbling block that leads to slow in growth of the same country in the long run. This can be explain through the interest rate that is charged on a borrowed capital, since all borrowing countries will have to pay back their debt in foreign currency, for an underdeveloped countries, it will so much have a negative effects on their growth in the long run because paying back in foreign currency will mean that they have to pay more from their gain that would have been use as a re-investment. Paying back 20% out of 30% gain from economic activities as a payback on debt will slow down economic growth.

Talking about debt overhang and its impact on the economic growth, TiTo Cordella et al study the effect of debt on highly indebted poor countries and non-highly indebted countries and found out that for less indebted countries, that debt above some certain levels will affect growth negatively while for the highly indebted even if debt grows to certain level is of no matter to them.

Kalima recorded in her work that the debt crisis of most African countries are likely to be linked to the unfair terms of trade, falling price of goods in the commodity market which affected exports and revenue were shortened and



lack of good institutions which can affect the inflow of investment, all of these in place could not allow Africa countries to keep going other than to rely on foreign cash inflow that arises to a high debt in the region.

Frimpoong and Abaiye (2006) in their study on the impact of government debt on the economic growth of Ghana for the period of 1970-1990 found out that debt has a positive relationship on the GDP growth of Ghana but the service of debt has negative effects on growth.

Were (2001) in her study of the impact of external debt on economic growth and private investment in Kenya for the period of 1970-1995, describing Kenya as one of the HIPC's countries with a consistence rise in debt causing the deterioration in the economic performance, results indicated that accumulation of debt has a negative effects on growth and private investment which also is the confirmation of the debt overhang in Kenya.

Morrissey and kweka (2000) study the impact of public expenditures on Tanzania for the past 30 years and result found out that consumption expenditures have a positive relationship with growth most especially in associated with private consumption.

Deveraja et al 1996 also focused their attentions on the link between public expenditures and economic growth and they found that increase in the current expenditures has a positive link and it is statistically significant to growth.

### **2.3 Economic History of Ghana**

James and Shaeeldin (1990) in their work gave an overview that Ghana's economy is one of the most advanced economy amongst all the other African countries after the independence in 1957, they commented that the economy fell, living it with nothing but a ruin, concluded that all of these happened due to a bad economic management, external conditions, weather and faulty internal policy.

Henri and Wiggins in their work have been able to establish and study the economic development of Ghana over the last 30 years. They realized that Ghana has been able to sustain its positive growth through the economic reformation in 1983 that led to greater investments in the agricultural sectors and the reduction of poverty, donor from the community and the application of new technology into the processing of agricultural products.

Nathan associates (2009) explained the growth success of Ghana which can be traced back to the successful; implementation of macroeconomic restructuring policy, increase in public and private sector investment and a new price mechanism for petroleum products. It's also explained that the poor monetary and fiscal policies of South Africa are the cause of the jeopardy experienced in its growth which can also lead to the decline in the social and economic gain of the past.

## **2.4 Economic History of Cameroon**

Cameroon has made progress in terms of economic growth since its independence with an endowed variety of climate and agricultural environment, mineral resources and a large population, Cameroon; blessed with all these resources should be growing at a pace faster than its growing now, this was due to its political instability, corruption and poor economic management.

Aloysius Ajab Amin (2002) studied the sources of economic growth of Cameroon for the period of 1960-1997 and found out that Cameroon's economic performance for the last two decades has been a pleasing one, during those periods of positive booming performance; agriculture was a dominant force providing export of about 85% and accounted for 34% of GDP which also employs 80% of it labor, the economy declined in the mid-1980s as a result of the fall in the world prices for its main export commodities, poor domestic economic management, an unproductive investment that leads to wastage in the government expenditures and government intervention in some sectors which complicated the government policy.

## **2.5 Economic History of Kenya**

Legovini (2002) explained in his work that the economic history of Kenya is divided into two phases, first phase is from 1963 to early 1980s after the independence, the first phase is characterized by a positive economic performance and a huge gain in social outcome, the second phase which is from 1980 period until now is characterized by slow or rather a negative growth, He explained that the failure was due to losses in social welfare, trade shocks, government dominance, structural change and poor economic responses, increased of role

politics over economic policy which leads to a significant rising poverty. However the reason for such economic performance in the first phase was the results of favorable Factors in agriculture which increases the export commodities that provides foreign exchange earnings that favored investment and capital imports.

## **2.6 Economic History of South Africa**

The South Africa economy is purely dominated with agriculture and gold mining giving it world recognitions most especially in Europe, making south Africa the largest in Africa, in economic wise.

Plessis and Smit (2006) gave an overview of South Africa economic performance since 1994; they explained that the transition to a democracy has created a turnaround in the economic performance of the country, focusing on the realistic performance, causes and economic stability. The apartheid government contributed to the 10 years poorest economic growth during 1984-1993, but since the democratic government took over, economic has grown on an average of 3% from 1994 compare to 0.3% during the apartheid era. The performance of the country can also be measured from sectorial perspective, which categorized the production of sectors in the economy into three: primary, secondary and tertiary. The contribution of the primary sector which includes fishing, mining and basically agriculture, the production performance of these sectors has also been positive since 1994, the tertiary sector is the backbone of the good economic performance, seeing that it produces 2 times better than the rest of the other sectors, this sector is mostly comprises of the service sectors.

## **Chapter 3**

### **DATA AND METHODOLOGY**

#### **3.1 Data**

The basis of my analysis is on time series data from different countries, all of the data used in this study was collected from the World Bank data base ([www.worldbank.org](http://www.worldbank.org)), the data used includes both qualitative and quantitative data according to their relevance to this study, they includes data on Inflation , investment ,export, GDP rate, public consumption expenditures, external debt, foreign direct investment data, all as a percentage of GDP. This study utilizes annual data from the period of 1980-2010 for four countries which include Ghana, South Africa, Cameroon and Kenya.

#### **3.2 Methodology**

All the data figures gotten from the World Bank databank were analyzed using the excel software in Microsoft word 2010 in arriving at the averages of all the macroeconomic indicators which includes annual growth rate, inflation rate, savings, investment, share of export gross inflow of FDI, government consumption expenditures, and central government debt, all as a percentage of GDP in order to make comparison between the four countries over the chosen years. In arriving at the averages for each of the countries the years were divided into three subs section which ranges from 1980- 1990, 1991-2000 and 2001-2010, comparison were made based on this sub sections. There are two methods used in

this study to test the hypothesis. These are multiple regression analysis which is the time series data (OLS) and the cross sectional data analysis (panel regression) in other to test for the effect of the macroeconomic indicators variables on growth rate.

The independent variable in this study were put on the right side of the equations which includes investment as a percentage of GDP, inflation, gross inflow of foreign direct investment as a percentage Of GDP, government consumption expenditures as a percentage of GDP, government debt as a percentage of GDP as well and the dependent variable is the Annual growth of rate. The analysis was done on the effect of independent variables on the dependent variable, which was analyzed through E-view software. In order to see the effect of all of these variables on growth, two equations were set up, with first measuring the effects of investment as a percentage of GDP, inflation, export ( trade openness), gross inflow of FDI as a percentage of GDP, government consumption expenditures as a percentage of GDP on the growth rate of GDP and the second equation estimate the effects of investment as a percentage of GDP, inflation, trade openness ,gross inflow of FDI and government central debt on the rate of growth. These equations can also be written as this:

$$\text{GDP Growth}_t = a + b_1 (\text{investment/GDP})_t + b_2 (\text{inflation})_t + b_3 (\text{Export/GDP})_t + b_4 (\text{Government consumption expenditures/GDP})_t.$$

$$\text{GDP Growth}_t = a + b_1 (\text{investment/GDP})_t + b_2 (\text{inflation})_t + b_3 (\text{export/GDP})_t + b_4 (\text{FDI/GDP})_t + (\text{government central debt/GDP})_t.$$

### **3.3 Hypothesis tested**

Based on the theoretical background in the literature reviews considering the former studies of economic growth and its determinant, the following hypothesis were tested to see their effects on growth for the countries selected in this study.

An increase in the Share of Investment (% of GDP) will affect GDP Growth Rate Positively

An Increase in the inflation rate will have a negative effect on growth rate.

An Increase in the degree of trade openness (% of GDP) will have a positive effect on growth.

An Increase in the Gross of FDI (% of GDP) will affect the Rate of Growth Positively.

An Increase in the Government Expenditures (% of GDP) will positively affects the Rate of Growth.

An Increase in Government Debt as a Percentage of GDP will Decrease the rate of Growth.

## **Chapter 4**

# **COMPARISON OF MACROECONOMIC PERFORMANCE OF CAMEROON, GHANA, KENYA AND SOUTH AFRICA**

### **4.1 Introduction**

This chapter introduces the macroeconomic indicators variables that are chosen for these selected countries in order for comparison to be made based on their performances on these variables. The key variables chosen in this study includes investment, export. Imports, current account balance, foreign direct investment, savings, annual growth rate of GDP, inflation, external balance, government consumption expenditures and external debt, all of these variables are used as their share of percentage with growth(GDP).

Comparisons were made for the sample period of (1980-2010) as well as three sub periods that includes 1980-1990, 1991-2000 and 2001-2010 Furthermore the averages of these periods were calculated using the Microsoft word excel and the graphs were plotted based on the figures of each parameter gotten from the World Bank Data Base. The averages of these parameters were compared along with the graph, so as to see how these countries performed with respect to each other.



## 4.2 long term Average annual growth rate for 1980-2010

Table 1: Annual growth rate

<u>Period/countries</u>	<u>Cameroon</u>	<u>Ghana</u>	<u>Kenya</u>	<u>South Africa</u>
<u>1980-2010</u>	<u>2.6</u>	<u>4.0</u>	<u>3.4</u>	<u>2.5</u>

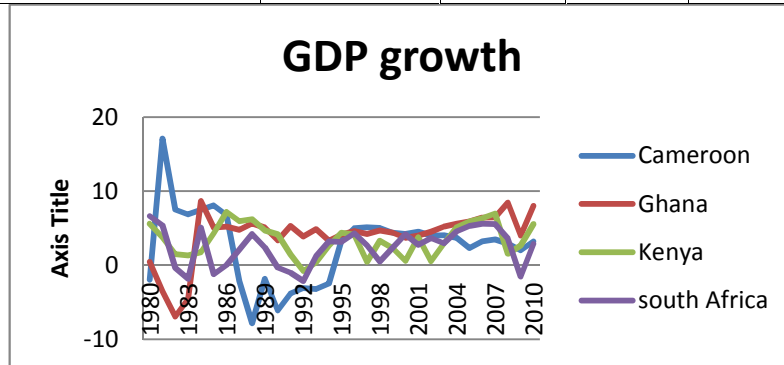


Figure 1: Annual Growth Rate

Table 1 strictly shows that the growth performance of South Africa has been much lower than the rest of the countries; being much impressive compared to Kenya and Cameroon with 3.4% and 2.6% respectively over the last 30 years. There are many reasons behind the differences in the economic performance of countries; one of the reasons is the rate of savings and investment (Cifticioglu and Karaaslan 2004). However it is worth looking into the saving and investment rate of these countries so as to gain the proper knowledge of the cause of high and lower growth rate of GDP of these countries.

### 4.3 Average annual growth rate of GDP

Table 2: Periodical Annual growth rate

Period/countries	Cameroon	Ghana	Kenya	South
1980-1990	3.1	2.1	4.2	2
1991-2000	1.5	4.3	1.9	1.8
2001-2010	3.3	5.9	4.1	3.5

Table 2 shows that Kenya's performance is much more impressive than the rest of the countries in the first sub- period, but we will see that Ghana has been on an increasing rate since second period until the last period. The most striking comparison between these countries is that in the second period of 1991- 2000, almost all the countries experienced a fall in the level of GDP except for Ghana that increases from 2.1 to 4.3%.

### 4.4 Saving rates as a percentage of GDP

Table 3: Saving Rate (% of GDP)

Periods/countries	Cameroon	Ghana	Kenya	South Africa
1980-1990	23.8	4.8	18.3	28
18991-2000	18.4	7.5	13.5	19
2001-2010	18.5	6.9	8.5	19

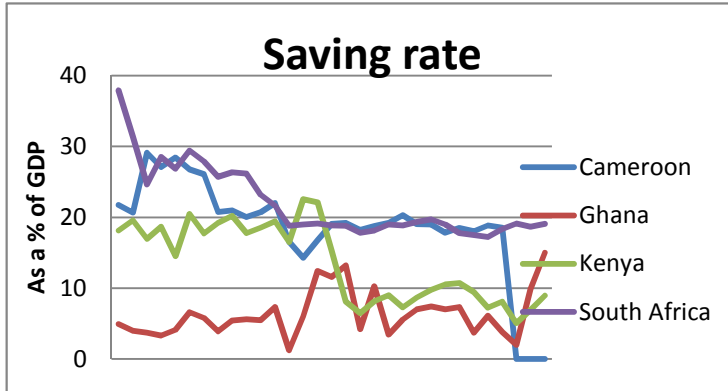


Figure 2: Annual Domestic Saving Rate.

It is believed that countries with a high saving rate will experience a positive change in its growth through investment (waithima). Saving is expected to have positive effects on growth with an increase in the rate of capital accumulation (Cifticioglu and Karaaslan2004). From table 3 we will discover that saving rate was high for all the countries in the first sub-period except for Ghana which has the lowest savings rate, since the high rate of savings in the first sub- period, savings has been seen to be declining until the third period except for Ghana which increases in the second sub-period but later experienced a fall in its saving rate as well. Furthermore in comparison, we will see that the level of savings in South Africa has been very impressive compared with others like Ghana with the lowest level of savings.

## 5 Average Rate of investment

Table 4: Investment Rate (% of GDP)

Period/countries	Cameroon	Ghana	Kenya	South Africa
1980-1990	23.3	8.4	23.3	23
1991-2000	14.7	21	17.6	16.5
2001-2010	18.6	24	18	19

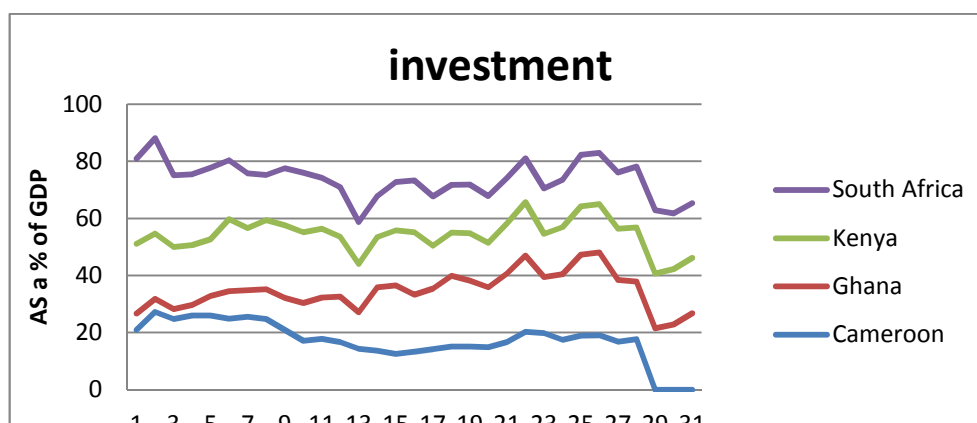


Figure 3: Annual Domestic Investment Rate

It is obvious from the table that almost all the countries invested quite a lot of the share of their GDP during the first sub-period except for Ghana which invested very low compare to others, the second and third sub-periods shows that all the countries invested low compared to the previous years except for Ghana which invested low in the first period but kept on an increasing rate till date.

## 4.6 Average gross inflow of FDI

Table 5: FDI (% of GDP)

period/country	Cameroon	Ghana	Kenya	South Africa
1980-1990	0.92	0.2	0.4	-0.1
1991-2000	0.47	2	0.6	-0.3
2001-2010	1.6	3.3	0.5	1.8

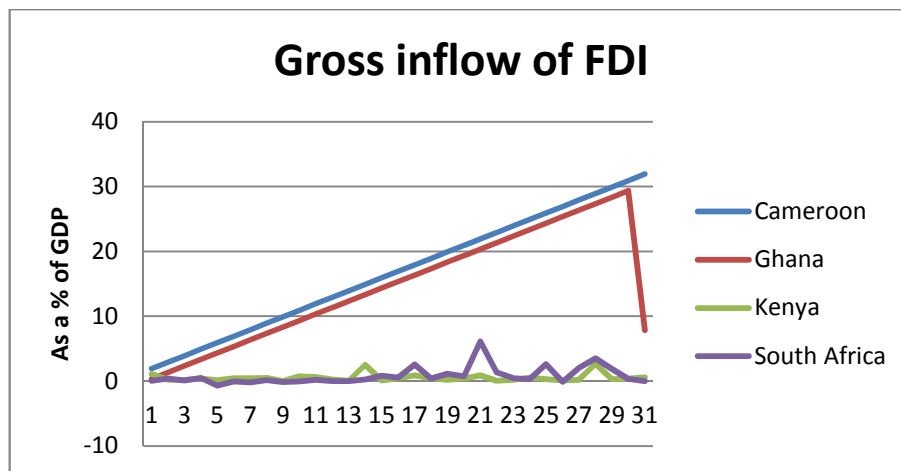


Figure 4: Annual Foreign Direct Investment

From table 5 we will see that Ghana's allowance to foreign direct investment compared to other countries is relatively higher than the rest of the countries', with South Africa having a negative figure in the first two sub- periods. However FDI in Kenya has flaws, according to Legovini (2002) says the world economy forum of Africa competitiveness rated Kenya 22<sup>ND</sup> out of the 24 countries of being politically instable which implies that the atmosphere is not conducive for foreign investment. Ghana's FDI on the other hand has been below 2% while South Africa has a negative FDI but has a 1.8 contribution to growth form foreign

investment.

#### 4.7 Average Inflation rate

Table6: Inflation (% of GDP)

Periods/countries	Cameroon	Ghana	Kenya	South Africa
1980-1990	6.5	46.1	9.4	15.7
1991-2000	5.7	25.4	15.6	10.3
2001-2010	2	27	5.9	7.4

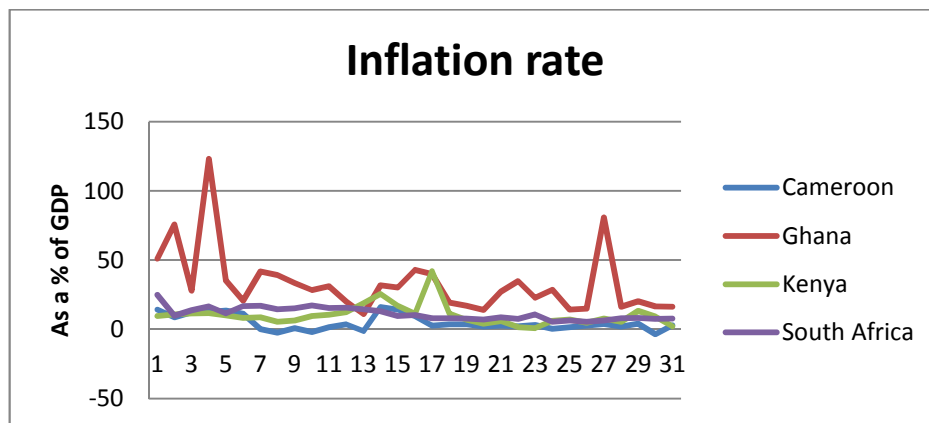


Figure 5: Annual Inflation Rate

From table 6 it is obvious that inflation in all of these countries is very high except for Cameroon that is below 8%, but for the period of 2001-2010 inflation has been reduced in all of the countries except for Ghana that experienced a 2% increase from 25.4% to 27%.

## 4.8 Average share of export as a percentage of GDP

Table 7: Export (% of GDP)

Period/countries	Cameroon	Ghana	Kenya	South Africa
1980-1990	25.2	11.7	25.7	28.4
1991-2000	21.2	28.3	27.2	24
2001-2010	23.5	33.8	26	30

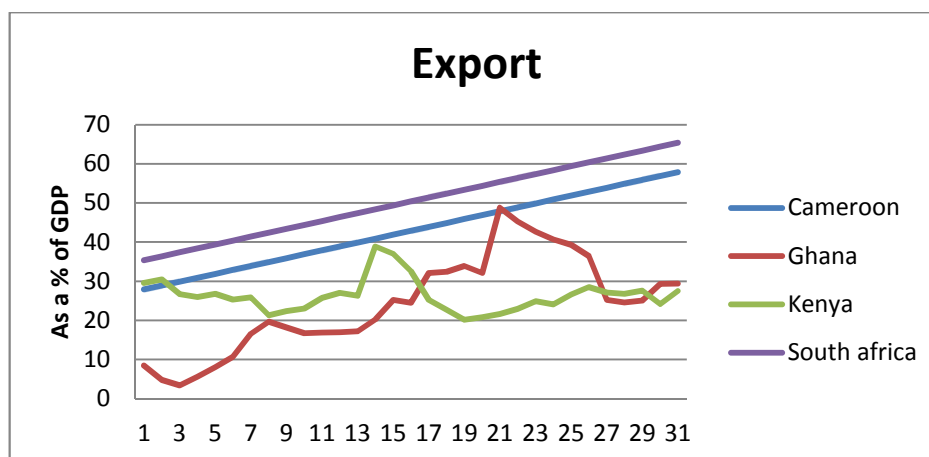


Figure 6: Annual Export Rate

Export of south Africa was the largest in the first period of 1980-1990 and followed by Ghana which exports increase from 1991-2010, Kenya for the most of the period increases its export by 4% in the second sub period and it decreases again in the third sub periods we can see that most of all the Countries are trying to increase their level of export at different level because the relationship between economic growth and export cannot be underestimated.

## 4.9 Average share of import as a percentage of GDP

Table 8: Import (% of GDP)

Periods/countries	Cameroon	Ghana	Kenya	South Africa
1980-1990	24.6	15.3	30.6	23.3
1991-2000	17.5	41.7	31.4	21.3
2001-2010	24.6	50.4	35.5	29.6

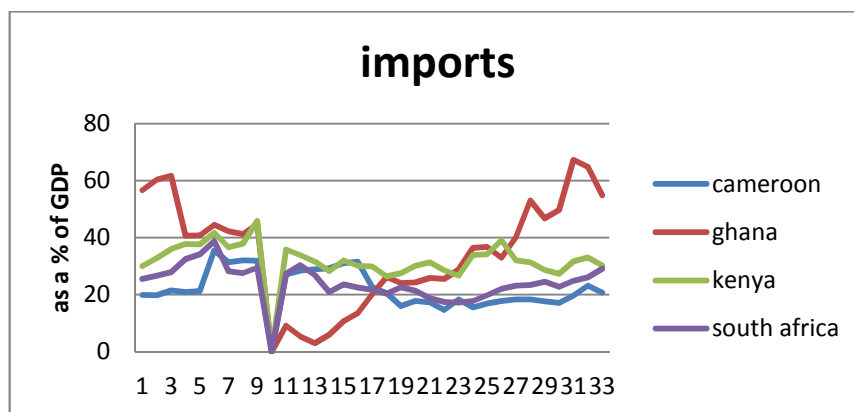


Figure 7: Annual Import Rate

The implication of higher import over export is a negative balance of trade which has a negative impact on the economic performance as a whole, leading to a current account deficit. Comparing then difference between the import and export rate of these countries, can be clearly seen from table 7 and 8 which shows that Cameroon has tried to strike a balance by exporting as much as it is importing, Ghana on the other hand has been on importing more than it's exporting throughout the periods. However Kenya and South Africa has also been importing more than their export but with minimal differences compared to Ghana.



#### 4.10 Average current account balance per GDP

Table 9: Current Account Balance (% of GDP)

Country	1980-1990	1991-2000	2001-2010
Cameroon	-5	-2.7	-2.6
Ghana	-2.8	-6.4	-6.3
Kenya	-5	-9.3	-2.6
South Africa	0.7	-0.2	-3.3

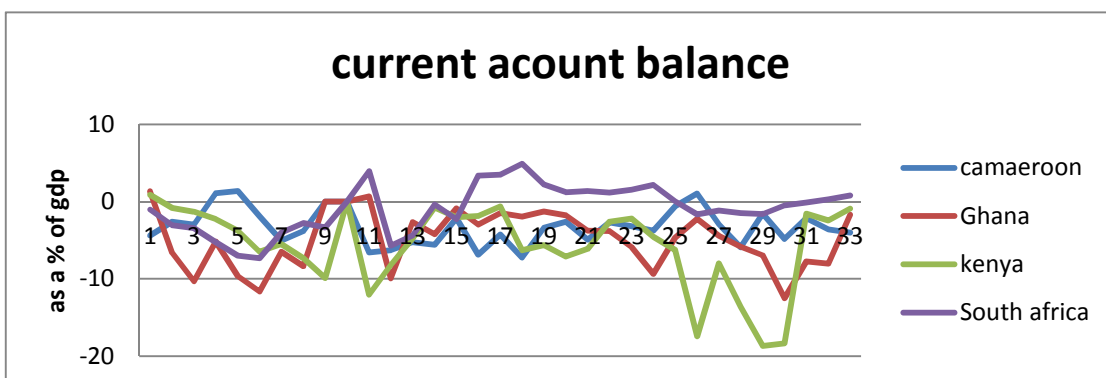


Figure 8: Annual Current Account Balance

Since the import of these countries has been higher than their export initially, Considering table 8 and table 9, it is expected that they all will have a negative balance because they buy more than they sell.

#### 4.11 Average of public consumption (Gov. expenditure/GDP)

Table 10: Public Consumption Expenditures (% of GDP)

Periods/countries	Cameroon	Ghana	Kenya	South Africa
1980-1990	10.3	9	18.4	17.6
1991-2000	10.3	11.6	15.5	19.2
2001-2010	9.9	11.4	17	20

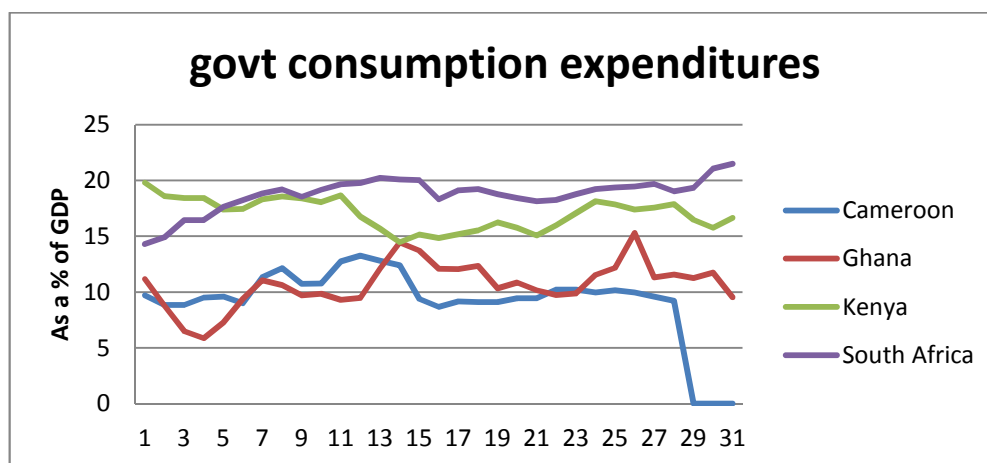


Figure 9: Annual Public consumption Expenditures

As we can see from table 10 we will see that all of these countries average public consumption expenditures is below 20%. Theory suggest that consumption expenditures affect the rate of growth positively, with Cameroon and Ghana consumption expenditures not exceeding an approximation of 11% of the total GDP and on the other hand Kenya and South Africa's expenditures are below 25% of the total share of GDP.

## 4.12 Average external balance/GDP

Table 11: External Balance (% of GDP)

Periods/countries	Cameroon	Ghana	Kenya	South Africa
1980-1990	0.6	11.7	23.2	28.4
1991-2000	3.8	28.3	27.2	23.9
2001-2010	-1.2	33.5	25.8	29.5

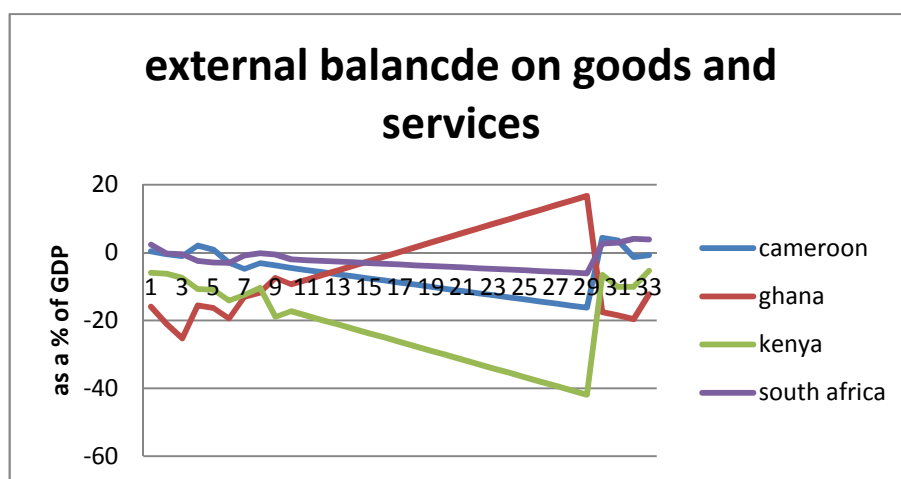


Figure 10: Annual External Balance

Table 11 shows that all the countries have a positive balance throughout the periods except for Cameroon in the third sub-period of 2001-2010.

### 4.13 Average Budget balance as a percentage of GDP

Table 12: Budget Balance (% of GDP)

Period/countries	Cameroon	Ghana	Kenya	South Africa
1980-1990	0.59	-3.6	-4.6	5.1`
1991-2000	3.8	-13.4	-4.2	2.1
2001-2010	-1.2	-16.9	-6.9	-0.1

Ghana and Kenya all through the period are in a deficit with their expenditures being more than their revenue but if we consider the GDP growth of Ghana we will find out that it's on an increasing level but with a little fluctuation, this can be explained with the strategy adopted by policy makers in the country by adjusting and drawing back the disequilibrium experienced in the short term to equilibrium in the long term.(Don- Hani 2011), Kenya on the other hand experienced a negative balance throughout the decades.

### 4.14 Average external debt/GDP

Table 13: External Debt (% of GDP)

Period/country	Cameroon	Ghana	Kenya	South Africa
1980-1990	3	14	15	19.3
1991-2000	14	24	25	30
2001-2010	24	34	35	40

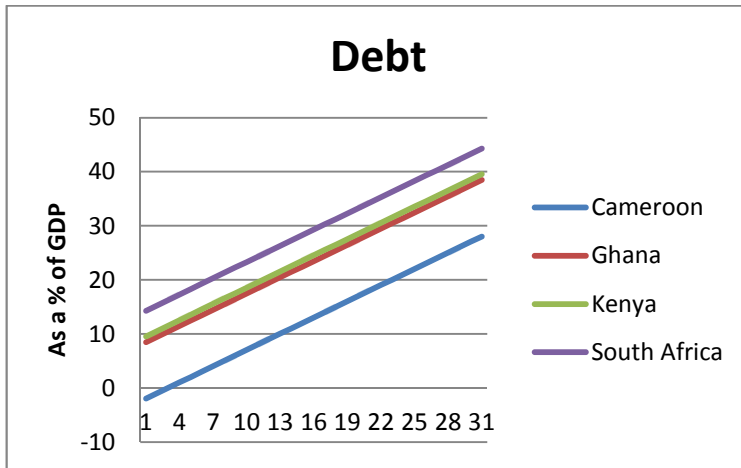


Figure 11: Annual Debt Rate

From table 13 it is glaring that debt has been on an increasing rate for all of these countries.

## **Chapter 5**

# **INDIVIDUAL REGRESSION RESULTS FOR EACH COUNTRY**

### **5.1 Introduction**

In this chapter, the regression results and their interpretations are presented for each of the country. In this study four countries were chosen in our sample, all from the sub-Sahara part of Africa which includes Ghana, South Africa, Cameroon and Kenya. Regression presented in this chapter consists of the multiple regression analysis, and the results were presented according to the estimation of equations analyzed in this study.

In the interpretation of results you can find the t-value of each estimated coefficient written in parenthesis under it. For the significant coefficients, if the coefficient is significant at 10% level it's value will be marked with a star (t-value)\* and if it is significant at 5% level the t-value is marked with a double star(t-value)\*\*.and at 1% level it will be marked with three stars ( t-value \*\*\*)

### **5.2 Regression Equations**

There are two regression cases for each of the country which is shown below



Government Debt (%of GDP)

Abbreviated in the E-

views as DEBT\_GDP.

The individual results for each of the selected countries which include Ghana, Cameroon, South Africa and Kenya are presented below separately for each country.

### **5.3. Cameroon**

#### **5.3.1 Case 1: The effects of Investment/GDP, Inflation, and Gross inflow of FDI, Exports/GDP and Government Consumption Expenditures/GDP on Growth rate of GDP in Cameroon.**

$$\begin{aligned} \text{GDP} = & 1.75 + 0.17*\text{INV\_GDP} - 0.046*\text{INF} - 0.047*\text{EXP\_GDP} + 0.055*\text{FDI} \\ & (0.4840) \quad (0.9476) \quad (-1.7900) * \quad (-0.4980) \quad (0.5238) \\ & +0.10*\text{CON\_EXP\_GDP} \\ & (0.2879) \quad \text{R-squared} = 0.4089 \end{aligned}$$

Estimation results presented above shows that there is a positive relationship between investment and GDP growth which is expected theoretically, this results implies that if there is a 1% increase in the level of investment rate as a percentage of GDP, it will increase GDP growth rate by 0.17%, likewise the result shows that there is a negative relationship between inflation and the GDP growth rate which is also theoretically expected, the result shows that if inflation increase by 1% it will decrease the rate of GDP at 0.05 approximately. Holding these two explained independent variables constant, we will also see that export has a negative impact on growth and government consumption expenditures as a percentage of GDP has



a positive effect on growth rate which implies that for a 1% increase in government expenditures it will lead to an increase of 0.10% in the level of GDP rate. However all the coefficients are not significant except for inflation at 10%. The variation of the independent variable is 41% variance on GDP growth rate.

### **5.3.2 Case 2: The Effect of Investment/GDP, Inflation, Export/GDP, Foreign direct Investment and Government Debt/GDP on the Growth rate of GDP.**

$$\text{GDP} = 1.69 + 0.11*\text{INV\_GDP} - 0.047*\text{INF} - 0.04*\text{EXP\_GDP} - 0.026*\text{FDI} + 0.14*\text{DEBT\_GDP}$$

(0.76)	(0.59)	(-1.87)*	(-0.49)	(-0.18)
(0.09)				

R-squared = 0.4259

From these results we will find out that investment/GDP also shows positive effects on GDP growth rate, which means that for every 1% increase in the level of investment as a percentage of GDP, it will increase growth rate by 0.11%. Holding all other variable constant, However inflation shows a negation sign which can be interpreted as, if inflation increases by 1%, it will negatively affect the rate of GDP by 0.04%. furthermore the result shows that export and FDI has a negative influence on growth but this result cannot be taken seriously because all the coefficients are insignificant except for inflation at 10% level of significance, while the result shows the positive sign for the relationship between debt and GDP growth rate. The variation in the independent variable explains 43% variation in GDP growth rate.

## 5.4.1 Ghana

### 5.1.4.1 Case 1: The Effects of Investment/GDP, Inflation, Export/GDP, Gross inflow of foreign direct investment, Government Expenditures/GDP on the rate of Growth.

$$\begin{aligned} \text{GDP} = & -8.3 + 0.13*\text{INV\_GDP} - 0.037*\text{INF} - 0.007*\text{EXP\_GDP} + 0.64*\text{FDI} + \\ & 0.55*\text{CON\_EXP\_GDP} \\ & (-1.41) \quad (0.92) \quad (-0.68) \quad (-0.07) \quad (1.0) \\ & (1.55) \end{aligned}$$

R squared =0.30

As we can see that this result shows a positive relationship for investment and GDP growth rate which means that for 1% increase in investment/GDP it will lead to a 0.13% increase in the rate of GDP, government consumption expenditure also shows a positive relationship which can be interpreted that if government expenditures/GDP increases by 1% it will lead to an increase in GDP growth rate by 0.55%. However inflation and export shows a negative sign, which means that there is no relationship between these two variables and GDP growth rate and none of this result are significant.

## **5.4.2 Case 2: The Effects of Investment/GDP, Inflation, Export/GDP, Foreign direct investment and Government Debt/GDP on Growth**

### **Rate of GDP**

$$\text{GDP} = -8.2 + 0.49*\text{INV\_GDP} - 0.009*\text{INF} - 0.04*\text{EXP\_GDP} + 0.4*\text{FDI} + 0.11*\text{DEBT\_GDP}$$

(-1.75)    (3.19)\*\*\*                    (-0.16)            (-0.44)                    (0.67)            (2.1)\*\*

R-squared= 0.36

From the above result we will see that inflation and export holding all other variable constant have a negative outcome but this result is not significant so it cannot be taken with seriousness, while investment shows a positive relationship with growth rate, analyzing this result can mean that a 1% increase in investment/GDP will lead to a 0.50% increase in growth rate. Debt also has a positive effect on the rate of growth, which means that if there is 1% increase in the level of government debt/GDP it will increase the growth rate by 0.11. Only two of this result is significant which are investment at 1% level and debt at 5% level. The variation of the independent variable on the dependent variable is 36%.

## **KENYA**

### **5.5. The Effect of Investment/GDP, Inflation, Export/GDP, Gross Inflow of FDI/GDP, Government Expenditures/GDP on the Growth Rate of GDP.**

$$\text{GDP} = -8.30 + 0.13*\text{INV\_GDP} - 0.037*\text{INF} - 0.007*\text{EXP\_GDP} + 0.6*\text{FDI} +$$

0.55\*CON\_EXP\_GDP

(-1.41) (0.92) (-0.68) (0.07) (1.00)

(1.55) R-squared 0.31

From the estimated result shown above we will see that investment is positive which will increase the growth rate by 0.13% if investment increases by 1%, inflation here has a negative effect on growth as expected theoretically and it will decrease the rate of growth by 0.03% if it increases by 1%, FDI also has a positive relationship with growth, from this result we will see that if FDI rate increases by 1% it will increase growth by 0.6% approximately. Furthermore export has a negative sign according to these results but none of these results are significant. None of these results are significant. The level variation of the independent variable on the dependent variable is 30%.

### **5.5.2 Case 2 the Effect of Investment/GDP, Inflation, export/GDP, Gross Inflow of FDI/GDP and Government Debt/GDP on the Rate of Growth.**

$$\text{GDP} = -8.29 + 0.49*\text{INV\_GDP} - 0.009*\text{INF} - 0.042*\text{EXP\_GDP} + 0.42*\text{FDI} + 0.119*\text{DEBT\_GDP}$$

(-1.75) (3.19) \*\*\* (-0.17) (-0.45) (0.67)

(2.11) \*\*

The result above shows that investment, FDI and debt has a positive relationship with growth considering their positive signs which will increase the rate of growth by 0.59, 0.42 and 0.11 respectively if they all increase by 1%. However inflation and export has a negative sign. All of these results are insignificant except

investment and debt at 1% and 5% level of significance respectively.

## **SOUTH AFRICA**

### **5.6.1 Case 1 The Effects of Investment, Inflation, Export, Gross Inflow of FDI and Government Expenditures on the Rate of Growth.**

$$\text{GDP} = 10.6 + 0.10*\text{INV\_GDP} - 0.09*\text{INF} + 0.11*\text{EXP\_GDP} + 0.25*\text{FDI} - 0.8*\text{CON\_EXP\_GDP}$$

(-0.10)    (4.5)                      (-0.37)            (-1.13)                      (0.68)    (-0.49) R-squared 0.18

This estimated results shows that investment, export and FDI has a positive effect on growth, which means that if all of these variables increases by 1% it will lead to a 0.10%, 0.11% and 0.25% increase on growth respectively. However inflation and government expenditures show a negative sign, none of these results are significant except for investment and export at 1% and 5% respectively. The variance of these variables is 18%.

### **5.6.2 Case 2 the Effects of Investment, Inflation, Gross Inflow of FDI and Government Debt on the Growth Rate of GDP**

$$\text{GDP} = -3.07 + 0.27*\text{INV\_GDP} - 0.12*\text{INF} + 0.47*\text{FDI} + 0.04*\text{DEBT\_GDP}$$

(-1.07)    (4.7)\*\*\*                      (-0.57)            (1.79)\*\*\*                      (2.5)\*\*\*

R- Squared 0.22

This result shows that investment, FDI and debt shows a positive effect on growth rate, increasing the rate of growth with 4.7%, 0.47% and 0.4% respectively.

Holding all these constant, inflation shows a negative effect on growth, decreasing the rate of growth by 0.57% if all increases by 1%. However all of these results are significant at 1% except for inflation.

## **Chapter 6**

### **PANEL REGRESSIONS RESULTS**

#### **6.1 Introduction**

This chapter considers the impact of all of the variables chosen in this study on growth on a cross sectional time series so as to overcome the bias caused by unauthorized heterogeneity. The result on the panel data for all of these countries were calculated according to the two equations drawn in chapter four, E-view 7 software was used so as to know the effects of all of these variables on growth for all of the countries together.

#### **6.2 Panel regression**

The panel data can be called a longitudinal and a cross sectional time series data. The panel data regression is a dataset in which the behaviors of entities (schools, states, countries etc.) are observed across time. Panel data measures the behavior of many entities together across time. The advantage of a panel data is that it allows the control of variables that cannot be easily observed and measures, panel data can includes many different levels of variables and analyze it.

#### **6.3 advantages of panel regression**

According to Kling, he explained that the advantages for the use of panel data regression is that, it considers more observations and wider range of problems with more degree of freedom and a less multicollinearity that improves efficiency. Panel data reduces the variance of true population parameters values

in comparison to its sample statistics and reduce unbiased estimators.

## 6.4 Case 1

### The Effect of Investment, Inflation, Gross Inflow of FDI, Exports and Government Consumption Expenditures on Growth Rate of GDP.

$$\text{GDP} = 0.27 + 0.20 * \text{INV\_GDP} - 0.025 * \text{INF} - 0.039 * \text{EXP\_GDP} + 0.086 * \text{FDI} + 0.025 * \text{CON\_EXP\_GDP}$$

(0.11)    (4.32) \*\*\*    (-1.35) \*\*    (-2.55) \*\*\*    (2.04) \*\*\*

(0.18)

R- Squared 0.21

The panel regression result here shows the effect of all the independent variable on GDP growth rate for all the countries, and the result shows that investment is positive, government consumption expenditures is positive and FDI is also positive holding all other variables constants, which means that a 1% increase in the variables will increase the rate of GDP. However inflation has a negative effect as expected and export is showing a negative sign as well but these results are all significant at 1% and 5% level except for government consumption expenditures.

### 6.5. The effects of investment, inflation, export, gross foreign direct investment and government debt on growth rate of GDP.

$$\text{GDP} = -1.15 + 0.22 * \text{INV\_GDP} - 0.019 * \text{INF} - 0.056 * \text{EXP\_GDP} + 0.071 * \text{FDI} + 0.074 * \text{DEBT\_GDP}$$

(-0.70)    (4.76) \*\*\*    (- 1.21) \*\*    (-3.27) \*\*\*



(3.17)\*\*\*      (2.24)\*\*   R- Squared 0.22

The result here for all the country together also show that investment is positive, FDI is positive and debt is also positive with inflation having a negative sign as expected and export decreasing the rate of GDP for these countries. However all of these results are significant at 1% level except for inflation.

## Chapter 7

### CONCLUSIONS

#### 7.1 Cameroon

GDP growth in Cameroon for the last 30 years has been just 2.6 and also experienced a fall in growth in the early 1991-2010 with 1.5%, inflation has been on an increasing level but there was a fall in the third sub period of 2001-2010, from the panel regression result, it was found that inflation has a negative effects on growth and the result was also significant, investment has been relatively high in the early decades but has been falling since then, results from the regression analysis for Cameroon shows that investment has a positive effects on growth but the result was a significant one except in the panel results which shows a positive effects and a significant results. FDI in Cameroon is very low with just about 2% of the total GDP rate, results from the regression shows that FDI has negative effect but was not significant except for the panel result that shows positive effects and the significance of FDI on growth. Furthermore export has been shown to have negative effects both on from the regression and the panel result but it was only significant from the panel results. However imports have been relatively very high which was up to 25% of the total GDP and also consumption expenditure is low.

## 7.2 Ghana

Ghana's growth has been on an increasing trend for the last 30 years with an average growth of 4% since 1980s but inflation has been dramatically high with almost 47% of the total GDP rate, but since 1990 the rate has been reducing but though still large with a double digit figures, savings has also been increasing with investment rising at a 12% higher than the rate in the 1980s, budget balance has been negatives throughout with current account balance being negative as well, export has been increasing over the years with imports higher than the exports, FDI and consumption expenditures at 3.3 and 12% respectively. The regression analysis results shows that investment and debt has a positive impact on growth and this result was so significant, the panel regression also give the same results. Export and inflation has a negative effects on growth with no significance according to the result but the panel result shows that investment, debt, and FDI has a positive effects on growth and so result are significant but on the other hand inflation and export are negatively related to growth with a significant results but consumption expenditures shows a positive effect with no significant.

### **7.3 Kenya**

The average growth for Kenya over the last 30 years has been 3.4% with a low inflation rate that's up to 15% but fell to 5.9% in the year 2001-2010, from the regression analysis it was found that inflation has a negative effect on growth, though the result should not be relied upon because it is insignificant except for the panel results which shows the negative impacts of inflation and it is also significant. Savings rate has been high since last two decades, budget balance being negative all through with a current account deficit and import being more than export with about 7%. Furthermore investment has been on a high trend of about 23% of GDP but fell to 18%, the result from the regression analysis shows that investment has positive effects on growth and also significant, FDI also show a positive effect on growth but the result was not significant but according to the panel regression results they are all positive and significant.

### **South Africa**

The average growth of South Africa is been just 2.5% over the past 30 years with inflation of 10-16% of GDP for the last two decades but also fell to 7.4% in the period of 2001-2010, saving rate has fell drastically since the first decade with reduction in the rate of investment, results shows that inflation shows a negative impact on growth but the result was not a significant one, investment on the other shows a positive and a significant results on growth. furthermore budget balance has been positive all through except in the last decades current account too with FDI being negative for the period of 2001-2010, government consumption, except result have shown that FDI is negative on growth but the result is not significant, however the export of south Africa is greater than

import. Result shows that export has a positive effect on growth but the result was not significant and debt has shown a positive effect on growth and the result is significant.

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## **APPENDICES**

## Appendix A - Individual Regression Estimation

Results for Cameroon

1.

Dependent Variable: GDP  
 Method: Least Squares  
 Date: 09/23/12 Time: 00:11  
 Sample: 1980 2010  
 Included observations: 31

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.757210	3.630082	0.484069	0.6326
INV_GDP	0.173844	0.183453	0.947623	0.3524
INF	-0.046841	0.026167	-1.790057	0.0856
EXP_GDP	-0.047525	0.095415	-0.498081	0.6228
FDI	0.055752	0.106436	0.523806	0.6050
CON_EXP_GDP	0.104892	0.364304	0.287926	0.7758
R-squared	0.408975	Mean dependent var		4.024813
Adjusted R-squared	0.290769	S.D. dependent var		3.415232
S.E. of regression	2.876166	Akaike info criterion		5.122778
Sum squared resid	206.8082	Schwarz criterion		5.400324
Log likelihood	-73.40307	Hannan-Quinn criter.		5.213252
F-statistic	3.459872	Durbin-Watson stat		1.370109
Prob(F-statistic)	0.016360			

Estimation Command:

```
=====
LS GDP C INV_GDP INF EXP_GDP FDI CON_EXP_GDP
```

Estimation Equation:

```
=====
GDP = C(1) + C(2)*INV_GDP + C(3)*INF + C(4)*EXP_GDP + C(5)*FDI + C(6)*CON_EXP_GDP
```

Substituted Coefficients:

```
=====
GDP = 1.75721008647 + 0.173844395896*INV_GDP - 0.0468411109948*INF -
0.0475246234104*EXP_GDP + 0.0557520472548*FDI + 0.104892429679*CON_EXP_GDP
```

2.

Dependent Variable: GDP  
 Method: Least Squares  
 Date: 09/23/12 Time: 00:15  
 Sample: 1980 2010  
 Included observations: 31

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.690887	2.222409	0.760835	0.4539
INV_GDP	0.110145	0.185913	0.592456	0.5589
INF	-0.047735	0.025505	-1.871615	0.0730
EXP_GDP	-0.044269	0.090081	-0.491433	0.6274
FDI	-0.026549	0.140423	-0.189067	0.8516
DEBT_GDP	0.147134	0.161852	0.909062	0.3720
R-squared	0.425989	Mean dependent var	4.024813	
Adjusted R-squared	0.311187	S.D. dependent var	3.415232	
S.E. of regression	2.834464	Akaike info criterion	5.093568	
Sum squared resid	200.8546	Schwarz criterion	5.371114	
Log likelihood	-72.95030	Hannan-Quinn criter.	5.184041	
F-statistic	3.710635	Durbin-Watson stat	1.322035	
Prob(F-statistic)	0.011949			

Estimation Command:

=====  
 LS GDP C INV\_GDP INF EXP\_GDP FDI DEBT\_GDP

Estimation Equation:

=====  
 GDP = C(1) + C(2)\*INV\_GDP + C(3)\*INF + C(4)\*EXP\_GDP + C(5)\*FDI + C(6)\*DEBT\_GDP

Substituted Coefficients:

=====  
 GDP = 1.69088707107 + 0.110145294548\*INV\_GDP - 0.0477349577164\*INF -  
 0.0442686234711\*EXP\_GDP - 0.0265494357989\*FDI + 0.14713394704\*DEBT\_GDP

RESULT FOR Ghana

1.

Dependent Variable: GDP  
 Method: Least Squares  
 Date: 09/23/12 Time: 00:18  
 Sample: 1980 2010  
 Included observations: 31

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-8.300418	5.869171	-1.414240	0.1696
INV_GDP	0.131876	0.143177	0.921072	0.3658
INF	-0.037356	0.054934	-0.680010	0.5027
EXP_GDP	-0.007500	0.100119	-0.074907	0.9409
FDI	0.644271	0.639653	1.007220	0.3235
CON_EXP_GDP	0.550909	0.354725	1.553057	0.1330

R-squared	0.309511	Mean dependent var	3.438827
Adjusted R-squared	0.171413	S.D. dependent var	2.203466
S.E. of regression	2.005744	Akaike info criterion	4.401893
Sum squared resid	100.5752	Schwarz criterion	4.679439
Log likelihood	-62.22934	Hannan-Quinn criter.	4.492366
F-statistic	2.241240	Durbin-Watson stat	1.137137
Prob(F-statistic)	0.081560		

Estimation Command:

=====  
 LS GDP C INV\_GDP INF EXP\_GDP FDI CON\_EXP\_GDP

Estimation Equation:

=====  
 GDP = C(1) + C(2)\*INV\_GDP + C(3)\*INF + C(4)\*EXP\_GDP + C(5)\*FDI + C(6)\*CON\_EXP\_GDP

Substituted Coefficients:

=====  
 GDP = -8.3004181294 + 0.131876347563\*INV\_GDP - 0.037355590558\*INF -  
 0.00749964009507\*EXP\_GDP + 0.644270922158\*FDI + 0.550908786322\*CON\_EXP\_GDP

2.

Dependent Variable: GDP  
 Method: Least Squares  
 Date: 09/23/12 Time: 00:20  
 Sample: 1980 2010  
 Included observations: 31

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-8.290351	4.737041	-1.750112	0.0924
INV_GDP	0.495944	0.155403	3.191349	0.0038
INF	-0.009387	0.056477	-0.166206	0.8693
EXP_GDP	-0.042505	0.095017	-0.447343	0.6585
FDI	0.422908	0.629490	0.671827	0.5079
DEBT_GDP	0.119601	0.056656	2.111015	0.0449

R-squared	0.357433	Mean dependent var	3.438827
Adjusted R-squared	0.228920	S.D. dependent var	2.203466
S.E. of regression	1.934889	Akaike info criterion	4.329962
Sum squared resid	93.59489	Schwarz criterion	4.607508
Log likelihood	-61.11442	Hannan-Quinn criter.	4.420435
F-statistic	2.781295	Durbin-Watson stat	1.364128
Prob(F-statistic)	0.039422		

Estimation Command:

=====  
 LS GDP C INV\_GDP INF EXP\_GDP FDI DEBT\_GDP

Estimation Equation:

=====  
 GDP = C(1) + C(2)\*INV\_GDP + C(3)\*INF + C(4)\*EXP\_GDP + C(5)\*FDI + C(6)\*DEBT\_GDP

Substituted Coefficients:

=====  
 GDP = -8.29035100476 + 0.495943721632\*INV\_GDP - 0.00938688300702\*INF -

$$0.0425052675513*EXP\_GDP + 0.422907986487*FDI + 0.119600917175*DEBT\_GDP$$

RESULTS FOR KENYA

1.

Dependent Variable: GDP  
 Method: Least Squares  
 Date: 09/23/12 Time: 00:21  
 Sample: 1980 2010  
 Included observations: 31

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-8.300418	5.869171	-1.414240	0.1696
INV_GDP	0.131876	0.143177	0.921072	0.3658
INF	-0.037356	0.054934	-0.680010	0.5027
EXP_GDP	-0.007500	0.100119	-0.074907	0.9409
FDI	0.644271	0.639653	1.007220	0.3235
CON_EXP_GDP	0.550909	0.354725	1.553057	0.1330
R-squared	0.309511	Mean dependent var	3.438827	
Adjusted R-squared	0.171413	S.D. dependent var	2.203466	
S.E. of regression	2.005744	Akaike info criterion	4.401893	
Sum squared resid	100.5752	Schwarz criterion	4.679439	
Log likelihood	-62.22934	Hannan-Quinn criter.	4.492366	
F-statistic	2.241240	Durbin-Watson stat	1.137137	
Prob(F-statistic)	0.081560			

Estimation Command:

```
=====
LS GDP C INV_GDP INF EXP_GDP FDI CON_EXP_GDP
```

Estimation Equation:

```
=====
GDP = C(1) + C(2)*INV_GDP + C(3)*INF + C(4)*EXP_GDP + C(5)*FDI + C(6)*CON_EXP_GDP
```

Substituted Coefficients:

```
=====
GDP = -8.3004181294 + 0.131876347563*INV_GDP - 0.0373555590558*INF -
0.00749964009507*EXP_GDP + 0.644270922158*FDI + 0.550908786322*CON_EXP_GDP
```

Dependent Variable: GDP  
 Method: Least Squares  
 Date: 09/23/12 Time: 00:25  
 Sample: 1980 2010  
 Included observations: 31

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-8.290351	4.737041	-1.750112	0.0924
INV_GDP	0.495944	0.155403	3.191349	0.0038
INF	-0.009387	0.056477	-0.166206	0.8693
EXP_GDP	-0.042505	0.095017	-0.447343	0.6585
FDI	0.422908	0.629490	0.671827	0.5079
DEBT_GDP	0.119601	0.056656	2.111015	0.0449
R-squared	0.357433	Mean dependent var		3.438827
Adjusted R-squared	0.228920	S.D. dependent var		2.203466
S.E. of regression	1.934889	Akaike info criterion		4.329962
Sum squared resid	93.59489	Schwarz criterion		4.607508
Log likelihood	-61.11442	Hannan-Quinn criter.		4.420435
F-statistic	2.781295	Durbin-Watson stat		1.364128
Prob(F-statistic)	0.039422			

Estimation Command:

=====  
 LS GDP C INV\_GDP INF EXP\_GDP FDI DEBT\_GDP

Estimation Equation:

=====  
 GDP = C(1) + C(2)\*INV\_GDP + C(3)\*INF + C(4)\*EXP\_GDP + C(5)\*FDI + C(6)\*DEBT\_GDP

Substituted Coefficients:

=====  
 GDP = -8.29035100356 + 0.495943721709\*INV\_GDP - 0.00938688297091\*INF -  
 0.0425052675729\*EXP\_GDP + 0.422907986126\*FDI + 0.119600917247\*DEBT\_GDP

RESULT FOR SOUTH Africa

1

Dependent Variable: GDP  
 Method: Panel Least Squares  
 Date: 09/23/12 Time: 00:27  
 Sample: 1980 2010  
 Periods included: 31  
 Cross-sections included: 4  
 Total panel (unbalanced) observations: 120

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.206352	2.039079	-0.101199	0.9196
INV_GDP	0.274428	0.061294	4.477274	0.0000
INF	-0.007996	0.021066	-0.379558	0.7050
EXP_GDP	-0.031932	0.028105	-1.136161	0.2583
FDI	0.034181	0.049771	0.686761	0.4936

CON_EXP_GDP	-0.059918	0.120939	-0.495438	0.6212
R-squared	0.187435	Mean dependent var	3.148751	
Adjusted R-squared	0.151796	S.D. dependent var	3.514064	
S.E. of regression	3.236382	Akaike info criterion	5.235496	
Sum squared resid	1194.055	Schwarz criterion	5.374870	
Log likelihood	-308.1298	Hannan-Quinn criter.	5.292097	
F-statistic	5.259300	Durbin-Watson stat	0.998144	
Prob(F-statistic)	0.000220			

Estimation Command:

=====

LS GDP C INV\_GDP INF EXP\_GDP FDI CON\_EXP\_GDP

Estimation Equation:

=====

GDP = C(1) + C(2)\*INV\_GDP + C(3)\*INF + C(4)\*EXP\_GDP + C(5)\*FDI + C(6)\*CON\_EXP\_GDP

Substituted Coefficients:

=====

GDP = -0.206351840237 + 0.274427992502\*INV\_GDP - 0.00799584917001\*INF - 0.031931905982\*EXP\_GDP + 0.0341809851565\*FDI - 0.0599177622225\*CON\_EXP\_GDP

2.

Dependent Variable: GDP  
Method: Panel Least Squares  
Date: 09/23/12 Time: 00:30  
Sample: 1980 2010  
Periods included: 31  
Cross-sections included: 4  
Total panel (unbalanced) observations: 120

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1.672707	1.558880	-1.073018	0.2855
INV_GDP	0.271267	0.058090	4.669744	0.0000
INF	-0.011744	0.020488	-0.573190	0.5676
EXP_GDP	-0.063362	0.025958	-2.440927	0.0162
FDI	0.057086	0.031778	1.796382	0.0751
DEBT_GDP	0.074512	0.029110	2.559695	0.0118
R-squared	0.229944	Mean dependent var	3.148751	
Adjusted R-squared	0.196169	S.D. dependent var	3.514064	
S.E. of regression	3.150591	Akaike info criterion	5.181764	
Sum squared resid	1131.589	Schwarz criterion	5.321138	
Log likelihood	-304.9058	Hannan-Quinn criter.	5.238364	
F-statistic	6.808230	Durbin-Watson stat	1.055683	
Prob(F-statistic)	0.000014			

## Appendix B- Panel Regression Estimations

1.

Dependent Variable: GDP  
 Method: Panel EGLS (Cross-section weights)  
 Date: 09/21/12 Time: 00:24  
 Sample: 1980 2010  
 Periods included: 31  
 Cross-sections included: 4  
 Total panel (unbalanced) observations: 120  
 Linear estimation after one-step weighting matrix  
 White cross-section standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.279618	2.518997	0.111004	0.9118
INV_GDP	0.202947	0.046913	4.326049	0.0000
INF	-0.025961	0.019155	-1.355341	0.1780
EXP_GDP	-0.039735	0.015560	-2.553745	0.0120
FDI	0.086614	0.042423	2.041683	0.0435
CON_EXP_GDP	0.025067	0.137673	0.182079	0.8558

### Weighted Statistics

R-squared	0.216082	Mean dependent var	3.739705
Adjusted R-squared	0.181699	S.D. dependent var	3.739159
S.E. of regression	3.192027	Sum squared resid	1161.550
F-statistic	6.284668	Durbin-Watson stat	1.067940
Prob(F-statistic)	0.000035		

### Unweighted Statistics

R-squared	0.165359	Mean dependent var	3.148751
Sum squared resid	1226.497	Durbin-Watson stat	0.991963

Estimation Command:

```
=====
LS(WGT=CXDIAG,COV=CXWHITE) GDP C INV_GDP INF EXP_GDP FDI CON_EXP_GDP
```

Estimation Equation:

```
=====
GDP = C(1) + C(2)*INV_GDP + C(3)*INF + C(4)*EXP_GDP + C(5)*FDI + C(6)*CON_EXP_GDP
```

Substituted Coefficients:

```
=====
GDP = 0.27961794761 + 0.202946931667*INV_GDP - 0.0259610088732*INF -
0.039735020746*EXP_GDP + 0.0866137931857*FDI + 0.0250674210367*CON_EXP_GDP
```

2.

Dependent Variable: GDP  
 Method: Panel EGLS (Cross-section weights)  
 Date: 09/21/12 Time: 00:28  
 Sample: 1980 2010



Periods included: 31  
 Cross-sections included: 4  
 Total panel (unbalanced) observations: 120  
 Linear estimation after one-step weighting matrix  
 White cross-section standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1.157457	1.645682	-0.703330	0.4833
INV_GDP	0.229903	0.048275	4.762332	0.0000
INF	-0.019412	0.015991	-1.213995	0.2273
EXP_GDP	-0.056640	0.017304	-3.273262	0.0014
FDI	0.071280	0.022425	3.178550	0.0019
DEBT_GDP	0.074958	0.033322	2.249490	0.0264

Weighted Statistics

R-squared	0.262721	Mean dependent var	3.805739
Adjusted R-squared	0.230385	S.D. dependent var	3.790367
S.E. of regression	3.135587	Sum squared resid	1120.837
F-statistic	8.124533	Durbin-Watson stat	1.130358
Prob(F-statistic)	0.000001		

Unweighted Statistics

R-squared	0.223948	Mean dependent var	3.148751
Sum squared resid	1140.400	Durbin-Watson stat	1.056128

Estimation Command:

=====  
 LS(WGT=CXDIAG,COV=CXWHITE) GDP C INV\_GDP INF EXP\_GDP FDI DEBT\_GDP

Estimation Equation:

=====  
 $GDP = C(1) + C(2)*INV\_GDP + C(3)*INF + C(4)*EXP\_GDP + C(5)*FDI + C(6)*DEBT\_GDP$

Substituted Coefficients:

=====  
 $GDP = -1.15745735667 + 0.229903438897*INV\_GDP - 0.0194124281891*INF - 0.056639842478*EXP\_GDP + 0.0712798104221*FDI + 0.0749575863282*DEBT\_GDP$

## Appendix C Data

**cameroon.**

year	exp/gdp	debt/gdp	GDP	con/		
				exp/gdp	inv/gdp	sav/gdp
			-			
1980	27.8847482	-1.965291	1.96529167	9.70075196	20.9828388	21.7437224
1981	28.8847482	-0.965291	17.0826822	8.85660198	27.1877091	20.6406155
1982	29.8847482	0.034709	7.51620261	8.83774433	24.7963165	29.0996029
1983	30.8847482	1.034709	6.86683057	9.49961822	25.9778457	27.0718601
1984	31.8847482	2.034709	7.47457254	9.58998423	25.9436609	28.4288299
1985	32.8847482	3.034709	8.06316167	8.99484196	24.884947	26.7579009
1986	33.8847482	4.034709	6.77166308	11.3366026	25.5128341	26.069766
			-			
1987	34.8847482	5.034709	2.14665021	12.1548227	24.6997633	20.7679842
			-			
1988	35.8847482	6.034709	7.82363197	10.7282015	20.8973123	20.9686505
			-			
1989	36.8847482	7.034709	1.81912051	10.7711142	17.0960126	20.0336025
			-			
1990	37.8847482	8.034709	6.10569765	12.7505372	17.8119784	20.68122
			-			
1991	38.8847482	9.034709	3.80859937	13.2746539	16.6726548	22.0316148
			-			
1992	39.8847482	10.034709	3.10000321	12.8125681	14.3053863	16.5367884

			-			
1993	40.8847482	11.034709	3.19999735	12.4038218	13.6711603	14.2857541
			-			
1994	41.8847482	12.034709	2.50000093	9.38074311	12.5711646	16.788354
1995	42.8847482	13.034709	3.29999615	8.67613682	13.2964772	19.077919
1996	43.8847482	14.034709	5.00000442	9.17476653	14.2402582	19.2301943
1997	44.8847482	15.034709	5.09999807	9.10012846	15.1304472	18.1987545
1998	45.8847482	16.034709	5.03925294	9.09257113	15.0453956	18.7694897
1999	46.8847482	17.034709	4.39381076	9.4587083	14.8591468	19.1972917
2000	47.8847482	18.034709	4.19999633	9.45687438	16.7208855	20.3122795
2001	48.8847482	19.034709	4.51427109	10.2364466	20.3113153	19.0170038
2002	49.8847482	20.034709	4.00904457	10.2217956	19.7891833	19.0060399
2003	50.8847482	21.034709	4.03099332	9.97473791	17.4958115	17.8234125
2004	51.8847482	22.034709	3.70185405	10.1642305	18.9095825	18.4794089
2005	52.8847482	23.034709	2.29665444	9.96731279	19.0683003	18.0522538
2006	53.8847482	24.034709	3.22214658	9.60106525	16.8149134	18.8655126
2007	54.8847482	25.034709	3.5	9.2290169	17.7196317	18.5336897
2008	55.8847482	26.034709	2.9			
2009	56.8847482	27.034709	2			
2010	57.8847482	28.034709	3.2			

## Ghana

year	exp/gdp	debt/gdp	GDP	con/exp/gdp	inv/gdp	av/gdp
1980	8.46634935	8.46634935	0.47169579	11.1640064	5.62400795	4.93559185
1981	4.75587247	9.46634935	-3.50306747	8.79023993	4.57274221	4.00545264
1982	3.33830727	10.4663493	-6.9236503	6.48112756	3.37763575	3.73390722
1983	5.55591809	11.4663493	-4.56373772	5.86128974	3.7497692	3.31670664
1984	8.04401328	12.4663493	8.64756926	7.25925053	6.87699974	4.15039107
1985	10.6544323	13.4663493	5.09161797	9.39839348	9.57000023	6.63501192
1986	16.5760499	14.4663493	5.19916007	11.0669483	9.36199979	5.80241818
1987	19.6626091	15.4663493	4.79489873	10.6342896	10.4339996	3.91105285
1988	18.1834227	16.4663493	5.62816974	9.70798947	11.2959998	5.41734144
1989	16.7426186	17.4663493	5.08587251	9.84480788	13.2089998	5.60839391
1990	16.8779042	18.4663493	3.32881823	9.31152685	14.4440009	5.47164774
1991	16.9635265	19.4663493	5.28182614	9.48313916	15.8789992	7.31773114
1992	17.2259395	20.4663493	3.87941917	12.1075673	12.8000001	1.2583122
1993	20.25393	21.4663493	4.85	14.4493556	22.2101702	6.04889543
1994	25.2586364	22.4663493	3.3	13.7233429	23.9577329	12.4538552
1995	24.4964405	23.4663493	4.11241894	12.0734807	20.0214147	11.591203
1996	32.1121807	24.4663493	4.60246096	12.0437087	21.2	13.2194156
1997	32.410294	25.4663493	4.19635788	12.3556337	24.8062125	4.22496054
1998	33.8713522	26.4663493	4.70039079	10.3241593	23.1093895	10.2525489
1999	32.0783392	27.4663493	4.39999654	10.8433464	21.0005345	3.45210967
2000	48.8022588	28.4663493	3.7	10.1716164	23.9986005	5.5546856
2001	45.2330164	29.4663493	4776568768	9.72236363	26.5994216	7.01959977

2002	42.6162525	30.4663493	4.58789898798	9.87276962	19.7	7.44326098
2003	40.6790423	31.4663493	5.2765Y654654	11.5332038	22.9369285	7.00786818
2004	39.3033253	32.4663493	5.675768798	12.1728121	28.3775071	7.31382322
2005	36.449217	33.4663493	5.90000385	15.3081651	29.0021402	3.72906003
2006	25.192717	34.4663493	6.4	11.3039193	21.6357464	6.0981707
2007	24.5250023	35.4663493	6.45973558	11.5590332	20.1076838	3.80360151
2008	25.0294297	36.4663493	8.43050408	11.2424251	21.4522983	1.99700879
2009	29.2910887	37.4663493	3.99147258	11.7337434	22.8619949	9.85133375
2010	29.4049075	38.4663493	8.00725713	9.53043896	26.8145281	14.9924752

### Kenya

year	exp/gdp	debt/gdp	GDP	con/exp/gdp	inv/gdp	fdi
1980	29.5169642	9.55072	5.59197621	19.8033753	24.5071406	1.08699717
1981	30.4598813	10.55072	3.7735442	18.5887513	22.9134417	0.20639839
1982	26.6574659	11.55072	1.50647826	18.4330328	21.8602148	0.2021411
1983	25.9499324	12.55072	1.30905024	18.4216544	20.9250655	0.39702333
1984	26.7498927	13.55072	1.75521698	17.3818333	19.811032	0.17368417
1985	25.298933	14.55072	4.30056181	17.4602923	25.3248237	0.47018351
1986	25.8483553	15.55072	7.1775554	18.319567	21.7680372	0.45206686
1987	21.3052214	16.55072	5.93710744	18.5687556	24.2894329	0.49406914
1988	22.3712136	17.55072	6.20318381	18.4057892	25.449041	0.00472068
1989	23.0330294	18.55072	4.69034878	18.0566078	24.8620776	0.75183689
1990	25.692606	19.55072	4.19205097	18.6424309	24.1640929	0.66446194
1991	27.0416323	20.55072	1.4383468	16.7713457	20.9705149	0.23099527
1992	26.2603742	21.55072	-	15.6822726	16.9208391	0.07740362

0.79949397

1993	38.9036302	22.55072	0.35319726	14.4799655	17.6104351	2.53235259
1994	37.0402808	23.55072	2.63278452	15.1549263	19.293243	0.10397683
1995	32.5917012	24.55072	4.40621652	14.842921	21.8197611	0.46747399
1996	25.200602	25.55072	4.14683926	15.1805674	15.0038227	0.90216173
1997	22.6863874	26.55072	0.47490192	15.5361522	15.1409881	0.47345296
1998	20.1692608	27.55072	3.29021372	16.2499609	16.6927164	0.1883759
1999	20.8327352	28.55072	2.30538859	15.7532967	15.5214149	0.40286332
2000	21.5875711	29.55072	0.59969539	15.0542923	17.4140906	0.87386426
2001	22.9315764	30.55072	3.7799065	15.9729118	18.7903405	0.04083175
2002	24.8979726	31.55072	0.54685953	17.0779999	15.1382159	0.21003798
2003	24.0868153	32.55072	2.93247555	18.1313186	16.4821494	0.54844503
2004	26.6102586	33.55072	5.10429978	17.860066	16.9624956	0.28618053
2005	28.5090302	34.55072	5.90666608	17.3802116	16.913313	0.11320191
2006	27.1117584	35.55072	6.33063281	17.5682114	17.9474253	0.22518012
2007	26.7785239	36.55072	6.99328515	17.8846837	19.0263172	2.67669387
2008	27.5584237	37.55072	1.52799606	16.4873272	19.2062422	0.31319887
2009	24.1520335	38.55072	2.64478264	15.7600679	19.4006814	0.38017073
2010	27.5209209	39.55072	5.55157184	16.6472441	19.2979589	0.57703061

**South Africa**

<b>Year</b>	<b>exp/gdp</b>	<b>debt/gdp</b>	<b>GDP</b>	<b>con/exp/gdp</b>	<b>inv/gdp</b>	<b>sav/gdp</b>
1980	35.380	14.29	6.620	14.29	29.8	37.8
1981	36.3802016	15.2914	5.36074056	14.8952573	33.3815083	31.3719825
			-			
1982	37.3802016	16.2914	0.38335398	16.4451506	25.0515396	24.6368011
			-			
1983	38.3802016	17.2914	1.84654896	16.4324324	24.7694753	28.4949664
1984	39.3802016	18.2914	5.09907549	17.6191862	25.0054271	26.8221456
			-			
1985	40.3802016	19.2914	1.21144037	18.2110995	20.5841788	29.4307127
1986	41.3802016	20.2914	0.01778689	18.8125449	19.0843068	27.8878158
1987	42.3802016	21.2914	2.10077779	19.1958636	15.7970078	25.7135836
1988	43.3802016	22.2914	4.20004266	18.5327252	19.8790153	26.3676384
1989	44.3802016	23.2914	2.39485981	19.1770369	20.8657164	26.1737321
1990	45.3802016	24.2914	-0.3177832	19.6645462	17.7329754	23.2078283
			-			
1991	46.3802016	25.2914	1.01830802	19.7804071	17.3971321	21.670582
			-			
1992	47.3802016	26.2914	2.13704172	20.2181479	14.746188	18.7872916
1993	48.3802016	27.2914	1.2336134	20.0761261	14.3136067	18.9760009
1994	49.3802016	28.2914	3.23409925	20.016385	16.8709035	19.1141219
1995	50.3802016	29.2914	3.11569572	18.3222034	18.1742372	18.8534931
1996	51.3802016	30.2914	4.30669621	19.0973759	17.2944903	18.8279373
1997	52.3802016	31.2914	2.64676432	19.2354136	16.6386193	17.7966548
1998	53.3802016	32.2914	0.51738274	18.7724274	17.0020104	18.1443514

1999	54.3802016	33.2914	2.3581286	18.4287993	16.3808265	18.9748342
2000	55.3802016	34.2914	4.15458852	18.1476284	15.9131724	18.8686647
2001	56.3802016	35.2914	2.73542315	18.2626195	15.2920516	19.3412378
2002	57.3802016	36.2914	3.66783761	18.7607913	15.872105	19.7082013
2003	58.3802016	37.2914	2.94907442	19.212408	16.6522467	18.9900962
2004	59.3802016	38.2914	4.5545434	19.3626247	18.0748167	17.7760051
2005	60.3802016	39.2914	5.27711699	19.4600282	17.9576878	17.4873113
2006	61.3802016	40.2914	5.60371769	19.6856212	19.689412	17.2420056
2007	62.3802016	41.2914	5.54775691	19.0167569	21.2724527	18.3381981
2008	63.3802016	42.2914	3.6185625	19.3287343	22.166345	19.1214417
2009	64.3802016	43.2914	-1.537311	21.0595228	19.5099149	18.6497954
2010	65.3802016	44.2914	2.88961888	21.4992369	19.2772768	19.0791506