**DEFICIT FINANCING AND ECONOMIC GROWTH IN SUB-SAHARAN AFRICA**

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**IGBINEDION UNIVERSITY, OKADA, EDO STATE, NIGERIA**

**OCTOBER, 2021**

**DEFICIT FINANCING AND ECONOMIC GROWTH IN SUB-SAHARAN AFRICA**

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## BEING A THESIS IN THE DEPARTMENT OF BANKING AND FINANCE, MALLAM SANUSI LAMIDO SANUSI COLLEGE OF BUSINESS AND MANAGEMENT STUDIES, SUBMITTED TO THE SCHOOL OF POSTGRADUATE STUDIES, IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF THE DEGREE OF Ph.D. (FINANCE) OF IGBINEDION UNIVERSITY, OKADA, EDO STATE, NIGERIA

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### OCTOBER, 2021

##### Declaration

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Signature Date

##### Certification

We, the under-signed, hereby certify that this thesis titled “Deficit Financing and Economic Growth in Sub-Saharan Africa” was written by **Abubakar Alasan Billyaminu**, Matriculation Number PG/18/021883, under our supervision/examination and that same meets the regulations governing the award of Doctor of Philosophy (Ph.D.) Degree in Finance of the Igbinedion University, Okada, Edo State, Nigeria.

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##### Dedication

This thesis is dedicated to God Almighty for His Grace, protection and guidance, also for His divine inspiration as to how to go about doing this research.

##### Acknowledgements

All glory and honor to Almighty God for the good things He is doing in my life before, during and after completion of my doctorate programme.

I sincerely appreciate my Supervisor, Dr. Stephen E. Ughulu and Co-Supervisor, Prof.

S.M. Aguwamba whose tireless efforts and enthusiasm, despite their tight schedule, found it pleasant all the time to correct, guide, mentor and advice me in the course of writing this thesis. I will forever owe you a debt of gratitude. I thank and love you both.

My special thanks go to Prof. Raphael I. Adeghe, Dean, Mallam Sanusi Lamido Sanusi College of Business and Management Studies. God bless you, Sir. I also express my gratitude, with gladness, to Prof. D.G.E Mbaegbu, former Coordinator, Post Graduate Studies in the College, Dr. Kingsley O. Atu, the current Coordinator, Dr. I.P.J. Ugiagbe, Dr. (Mrs.) M. Josiah, and all the lecturers in the College, for their roles in modeling me in the course of seminars presentation and their personal love. God bless you all.

I am greatly indebted to all the members of my family for their support and contribution in one way or the other during the course of this study. Special thanks to my parents, Engr. and Mrs. Abubakar A. Alasan, my fiancée, Habiba Bawa, and to my lovely siblings, Mrs. Barakat Oyaighua, Mrs. Fatimat Mukhtar Bawa, Mrs. Kuburat Jimoh, Abdul-Halim and Mujidat for their wonderful love and support throughout the programme. God bless you all.

To my numerous friends, Nurudeen, George, Preye, Mubarak, Ben Charles,Mr Ernest, Benjamin, Igbe Osaro, my colleagues, Dr. O.B. Agbadua, Mr. S.I. Okolie, Mr. A.A. Musa, and well-wishers, my special gratitude to you all for your love and care.

I am immensely grateful to you all.

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#### ABSTRACT

This study carried out an in-depth investigation of the effects of deficit financing on economic growth in the Sub-Sahara African countries, using Cameroon, Kenya, Nigeria and South Africa as the sample size. The longitudinal research design was used since the data obtained for the variables of the study covered a timeframe of 35 years - spanning from 1986 to 2020. Real GDP denoting economic growth served as the dependent variable, while government budget deficit, government domestic debt, government external debt, government external reserves, and broad money supply represented the explanatory variables. Both the fully modified ordinary least squares and panel regression methodologies were deployed to analyze the study’s data. Some of the findings of the study showed that all the variables became stationary at first difference and that there existed a long run relationship among the study’s variables. The random effect results which emanated from the panel regression exercise showed that domestic debt exerted positive and significant impacts on economic growth in Cameroon, Kenya, Nigeria and South Africa, respectively. External debt exerted positive and significant impacts on economic growth in Kenya and Nigeria but affected economic growth in Cameroon and South Africa negatively. External reserves also impacted economic growth positively in Kenya and Nigeria but it affected economic growth negatively in Cameroon and South Africa. Based on the foregoing findings, the study concluded that deficit financing still remains the best option for attaining the much desired rapid and sustainable economic growth in the Sub-Saharan Africa provided the proceeds of the borrowed loans are deployed to those infrastructural and productive facilities that are likely to generate future streams of income that would augment domestic savings that are largely perceived to drive industrialization. It is therefore strongly recommended that policy makers in the Sub Sahara African countries should ensure that state-owned enterprises borrow through government guarantees to execute those critical projects (such as the construction of long bridges, standard gauge railway systems, etc) that are most likely to yield future streams of income that would facilitate industrialization and, invariably, accelerated and sustainable economic growth. The governments should also maintain optimum levels of foreign debt as evidence has shown that excessive external debt service payments hinder the abilities of the borrowing countries to pursue meaningful economic growth agenda. When these recommendations are considered and implemented, the Sub Sahara African countries would no doubt become key players in the global economy. This study widens our horizon on the efficacy of deficit financing in improving the state of the Sub-Sahara African economy.

**Keywords:** Deficit Financing, Economic Growth, External Debt, Domestic Debt, Budget Deficit, Broad Money Supply, External Reserves.

**Word Count:** 417 Words.

#### CHAPTER ONE GENERAL INTRODUCTION

##### Background to the Study

Rapid and sustainable economic growth is of great essence to all contemporary countries of the world, especially the emerging ones in Sub-Saharan Africa. The reason for this may not be far-fetched. Economic growth entails economic capacity to increase the production of goods and services with the available stock of capital and other factors of production within the economy (Nnanna, Englama & Odoko, 2004; Ughulu, 2021). Thus, economic growth involves increases in per capita income which leads to the attainment of a high standard of living comparable to that obtainable in the advanced countries (Todaro & Smith, 2011; and Ughulu & Ajayi, 2020). In this context, it can be argued with reasonable justification that sustainable economic growth fuels economic development that every country earnestly desires. Evidently, however, no country has been found to be self-sufficient in the financial resources needed for the attainment of this level of economic development. This is where the issue of deficit financing comes in handy.

Deficit finance means generating funds to cover the deficit that results from spending that exceeds income. Loopholes are closed by borrowing from the public through the sale of bonds, by printing new money or borrowing externally. Deficit financing remains a veritable tool for the promotion of economic growth and development for countries all over the world, especially emerging countries such as Nigeria, Kenya, Cameroon and South Africa (Onuorah & Ogbonna, 2014). Obviously, deficit financing has helped to correct budget deficits in these countries over the years. Indeed, deficit financing if efficiently used by a borrowing country, will result in increases in domestic savings and, invariably, economic growth.

In this regard, Deficit finance can be seen as an attempt to stimulate the country's economy by increasing government spending beyond available revenue (Onwioduokit & Inam, 2018; CBN, 2013). Fiscal deficit is a phenomenon caused by an imbalance in the national budget. The imbalance can be either positive or negative (Festus & Sabiu, 2019). This phenomenon seems to have come to stay in many economies of the world including the Sub-Sahara African countries. Since the late 1970s, sub-Saharan Africa has experienced significant government deficits, which sparked controversy among policymakers, researchers and economists (Okoli, 2014). In Nigeria, for example, the culture however becomes seemingly entrenched overtime from 1970; the country faced fiscal deficits and a continuing boom in public sector spending. According to Aworinde, (2020) Nigeria’s external debt profile rose to $2.2billion. The budget deficits of the 1970s were justified on the grounds that it was largely for post-war rehabilitation, reconstruction and reconciliation (Okolie, 2014). Backed with huge wealth from oil, the country resorted to extravagant spending; the mismanagement of the oil boom of the early 1970’s led to the return of deficit financing in the 1980s. From 1982 down to 1983, there was a persistent decline in crude oil export earnings which resulted in fiscal deficits that were funded through huge loans after significantly drawing down the nation’s external reserves (Nwanna & Umeh, 2019). The level of external debt rapidly rose from $9.0 billionin 1980 to $17.8 billion and $25.6 billion in 1983 and 1986 respectively (Olusegun, Olufemi & Olubunmi, 2020).

Like every other developing country, Kenya also experienced budget deficits due to dwindling resources owing to low tax revenues, unchanged salaries and low savings. The trend in both domestic and external borrowing by the Kenyan government has been increasing for the past two decades or so, while economic growth has shown fluctuating trends (Kosimbei, 2009). External debt rose from Ksh2.04 billion in 1970 to Ksh1.14

trillion in 2014 while domestic debt rose from Ksh1.16 billion in 1970 to Ksh1.08 trillion in 2014. Annual growth rate was 5.9% in the period 1978-1979 but dropped to 3.1% in the period 1979-2001 and later increased to 4.4% in the period 2002-2014 (Ondongo, 2018). Between 2017 and 2018, Kenyan foreign debt stood at Ksh 2.4 trillion. There was an increase from Ksh 2.1 trillion in June 2017. This translated to an

upsurge of external debt stock by 12.6%. As of January 2021, the external debt from

Kenya accumulated to more than 3.8 trillion Kenyan shillings (Ksh), approximately 35.6

billion U.S. dollars. The value was equivalent to 52 percent of the country's total debt ([www.ceicdata.com](http://www.ceicdata.com/), 2021).

Fiscal policy in some Sub-Sahara African countries such as Nigerian, Kenya, Cameroon,

South Africa, Senegal and Malawi was expansionary, and as a result was vulnerable to

external shocks (Owoye & Onofowora, 2017). As a result, more than a third of sub-

Saharan African countries have suffered fiscal deficits since the 2008/2009 global

financial crisis, accumulating debt in oil exporters, middle-income countries and sub-

Saharan low-income countries income level. For example, the rate of change in public

sector debt from 2007 to 2012 in the oil-exporting Sub-Sahara African countries

including Chad - 26 percent; Nigeria - 12.7 percent; and Angola - 21.4 percent.

Senegal's public debt change rate for Middle-Income Countries stood at 23.5 percent,

South Africa 25.4 percent, Ghana 31percent, Cape Verde 73.9 percent, Mauritius 56.2

percent, Lesotho 50.6 percent, while for low-income countries include Malawi 41

percent, Tanzania 40.6 percent, Sierra Leone 43.2 percent and Ethiopia 43.5 percent (Kelikume, 2016).

The attainment of certain macro-economic objectives such as rapid and sustainable economic growth, low inflation rate, low and affordable foreign exchange rate, and balance of payments equilibrium are basic fundamentals or preconditions for

investments to take place. Unfortunately, most Sub-Sahara African countries are characterized by low revenue, continuously rising inflation rate, balance of payments disequilibrium, among other. This is evident in the huge infrastructure gaps currently prevailing in the region. According to IMF (2019), there is a financing gap of 4% of gross domestic product in the Sub-Sahara African region. However, Coulibaly and Gandhi (2018) posit that the historical experience of the region shows that many countries require significant investment for the development of the region. This suggests that the region will have to overcome an average annual funding gap of 12% of GDP. Given the region's low savings rate, it can be difficult to earn around $230 billion a year. To meet this formidable challenge, many countries in the region have used external financing as a means of mobilizing the resources they need for their own investments. Consequently, the reason for borrowing is to make up for the lack of domestic resources to accelerate economic growth and development (Labonte, 2018). Countries are examining external debt due to a lack of government funding to undertake many capital projects.

Based on the foregoing, it is important to note that, deficit financing in any economy has

its implications. This can be positive or negative as argued by various schools of

thoughts. For example, the neo classical, Keynesian and Ricardian schools of thought

attempt to explain the impact of fiscal policy on macro-economic management

(Mashakada, 2013; Onwe, 2014). Specifically, the classical school of thought suggest

that there is no need for government intervention in the market suggesting that the market will adjust to the economy via its internal mechanism; it also suggests that the fiscal deficit negatively affects economic growth, raising real interest rates and displacing private investment from the economy (Onwe, 2014). On their part, the Keynesian school of thought recognizes the need for government intervention to correct

the potential instability in the economy which the market system is incapable of adjusting. The belief in this philosophy especially in the post-depression years sprouted the use of fiscal policy measures to achieve full employment, which is the ultimate goal of macroeconomic policy that has established a new face in economic reasoning and

policies (Nwaeke & Korgbeelo, 2016; Eze & Nwambeke, 2015; Onwe, 2014). The

Ricardian equivalence theorem stated that deficit financing has no direct impact on the

economy. Barro (1989) posited that because increased public consumption has to be

paid, the reduced taxes in the current year must correspond with the same increase in

the present value of future taxes thereby leaving public consumption and interest

rates unchanged. Based on the foregoing, there seem to be different opinions on the

macroeconomic impact of budget deficits in the literature, as the relationship between

budget deficits and macroeconomic variables such as growth, unemployment, exchange

rates, and inflation may or may not be negative.

Debt crisis is a repel effect of excessive accumulation of large quantum of debt which becomes a difficult task if not impossible to pay back and in turn degenerated into imbalances in the local and international political economy (Matuka & Asafo, 2018). With minute consequential effect on the real sector, manufacturing, production, mining and all other arms of the economy; the thrust of the study therefore is to investigate empirically the Impact of deficit financing on economic growth in sub-Saharan Africa, especially in relation to Kenya, Nigeria, South Africa and Cameroon for the period 1986 to 2020.

##### Statement of the Research Problem

Deficit financing and economic growth is one of the most recalling issues facing the Sub-Saharan region in recent times. According to Ayuba and Khan (2019), this is because despite the several fiscal policy measures introduced by governments in curbing

excessive deficit coupled with the huge quantum of domestic and external loans, the Sub-Sahara African countries still remain at bay with citizens suffering from high levels of unemployment and insecurity, while poverty remains widespread both in urban and rural areas.

From a general viewpoint, individuals have assumed that the current state of Sub-Sahara African economy is linked to deficit financing and mismanagement of both external and internal debt on the part of the governments in the region (Akinmulegun, 2014). A critical review of the budget in sub-Saharan Africa has shown that it is counterproductive to see multiple overlaps in the budget without substantial impact on the population classified as "capital projects". Consequently, the debt must be linked to the capital project (IMF, 2012). However, these recent historic advances have witnessed declining per capita income, rising hunger and speedy environmental degradation in Sub-Saharan African region (IMF, 2012). These are all indicators that economic growth has not created opportunities to benefit citizens. While many Asian countries and other developing countries are making remarkable progress in addressing these challenges and reducing their external debt burden, developing countries such as Sub-Saharan African region (Aliyu, 2019). Overall, poor countries' debt burden continues to accumulate and economic growth has been sluggish with destructive environmental degradation, low infrastructure, chronic poverty and civil war (World Bank, 1989).

In addition, the socio-economic problems facing the region are exacerbated by the misuse of credit that most governments in the region do not use wisely (Ndungu, 2016; Isah, 2012). The growing debt of many sub-Saharan African countries continues to raise concerns about their development, given that borrowing has not yielded the expected results in terms of the increased investment required for growth (Bakare, Adesanya & Bolarinwa, 2014). As a result, rising debt repayment levels severely limit these

countries' ability to finance important imports and new development projects. The continued dependence of many sub-Saharan African countries on foreign debt to cover their fiscal deficits has raised concerns and has led to ongoing debate over the impact of foreign debt and investment on growth (Adesuyi & Falowo, 2013). This has led to an alarming debt crisis threatening the region. For example, total external equity increased from $213.4 billion in 2010 to $367.5 billion in 2013 (Ali, 2014). According to the IMF's Global Economic Outlook (2017), total government debt (% of GDP) rose from 23% in 2013 to 62% in 2016. Despite large borrowings from many sub-Saharan African countries, the lack of investment in infrastructure and other key areas has not changed much.

Various propositions and theories raised by economists such as Adam Smith (1776), John Maynard Keynes (1936), David Ricardo (1951) holds true in the Sub-Saharan region. However, these theories are conflicting. This has led to mixed findings which have made the construct to be more confusing than suppose.

Despite relentless efforts by scholars to come with a stand still solution on the ills attributable to deficit financing, most submissions raised by some scholars seems to be a mirage and does not give a true picture of the current events of the Sub-Saharan region, particularly the Nigerian economy (Ibrahim, 2015). Again, while some researchers such as Nwanna and Umeh (2019), Solawon and Adekunle (2018) believe that deficit financing has a significant effect on the economy; others such as Sulaiman and Azeez (2012), Nwanne (2014) believe that there is no significant effect on the economy. This remains an empirical issue. A major reason for the conflicting result may be traced to various estimation techniques and variables that have been used by these different scholars.

Based on the foregoing issues, the question is, can we conveniently say that the huge quantum of loan borrowed by the governments of Sub-Saharan Africa to ensure economic growth in the region has stimulated Sub-Saharan Africa’s economic growth from 1986 to 2020? Better still, to what extent has deficit financing affected economic growth of Sub-Saharan Africa? These questions still lingers in the heart of many.

In a bid to provide answer to this pressing issue, the researcher is inspired to investigate deficit financing and its effect on the growth of the Sub-Sahara African countries during the period 1986 to 2020. The idea is to ascertain if deficit financing has promoted economic growth in these countries. In doing this, the study made an attempt to identify the causality flow between deficit financing and economic growth.

##### Objectives of the Study

The main objective of the study is to examine the impact of deficit financing on economic growth in Sub-Sahara African countries including Kenya, Nigeria, South Africa and Cameroon for the period 1986 to 2020. The specific objectives of the study are to:

1. Empirically examine the impact of external debt on economic growth in Sub- Saharan Africa.
2. Investigate the impact of domestic debt on economic growth in Sub-Saharan Africa.
3. Evaluate the impact of budget deficit on economic growth in Sub-Saharan Africa.
4. Ascertain the extent to which external reserves have affected economic growth in Sub-Saharan Africa.
5. Examine the impact of broad money supply on economic growth in Sub-Saharan Africa.

##### Research Questions

In line with the specific objectives of the study, the following research questions were raised:

1. To what extent has external debt impacted on economic growth in Sub-Saharan Africa?
2. How has domestic debt impacted on economic growth in Sub-Saharan Africa?
3. To what extent has budget deficit impacted on economic growth in Sub-Saharan Africa?
4. How has external reserves impacted on economic growth in Sub-Saharan Africa?
5. To what extent has broad money supply impacted on economic growth in Sub- Saharan Africa?

##### Statement of Hypotheses

The following null hypotheses are formulated for the study as a guide to achieve the specific objectives enunciated in 1.3 above:

Ho1: External debt has noimpact on economic growth in Sub-Saharan Africa. Ho2**:** Domestic debt has no impact on economic growth in Sub-Saharan Africa. Ho3: Budget deficit has no impact on economic growth in Sub-Saharan Africa.

Ho4**:** External reserves have no impact on Economic Growth in Sub-Saharan Africa. Ho5**:** Broad money supply has no impact on Economic Growth in Sub-Saharan Africa.

##### Significance of the Study

This study aptly captured the impact of budget deficit in the Sub-Sahara African region as it addresses the issues of deficit financing and its impact on economic growth of the region. The outcomes of the study would be of great importance as follows:

* + 1. Findings from the study could aid policy makers, shareholders, financial managers, academic scholars to ascertain whether the Sub-Sahara African economy is fit despite the fact it is faced with deficit financing issues.
    2. The study would fill a research knowledge gap as it extended the period captured to the year 2020 (i.e. the most recent available data at the time of the analysis)
    3. The study would add to the rich collections of empirical studies conducted in the Sub-Sahara African context
    4. The study would serve as input to subsequent scholars, analysts and researchers that intend to further examine the effect deficit financing and economic growth in the Sub-Saharan African context.

##### Scope of the Study

**Geographical Scope:** The geographical scope of this study covered the entire 53 Sub- Sahara African economies [(w](http://www.data.worldbank.org/)w[w.data.worldbank.org,](http://www.data.worldbank.org/) 2021). However, Nigeria, Kenya, South Africa and Cameroon constituted its focus. The reason for choosing these four countries is based on the fact that each of the countries represents each of the four regions in Sub-Saharan Africa. Again, they are ranked among the leading countries in Africa in terms of GDP (Didia & Ayokunle, 2020). However, the countries’ economies are still in the lowest ebb in terms of infrastructure (Ekpo & Umoh, 2018; Didia & Ayokunle, 2020).

**Conceptual Scope:** The study examined the impact of deficit financing on economic growth in Sub-Sahara African countries. To this end, deficit financing is the independent variable in the study measured by external debt, domestic debt, budget deficit, external reserves and broad money supply while economic growth measured by real gross domestic productrepresented the dependent variable.

**Time Scope:** The study focused on the impact of deficit financing on economic growth, proxied by Real Gross Domestic Product (RGDP), in Sub-Sahara African countries for the period of 1986 - 2020. The choice of the study period was based on the fact that this period actually marked the structural changes in governments’ policy frameworks.

##### Limitations of the study

The major limitation or difficulty encountered by the researcher during the course of carrying out the study was the dearth of accurate data. For example, the data found in the CBN Statistical Bulletin were at variance with those contained in the National Bureau of Statistics – the two Federal Government designated agencies for the collation of data. The researcher had to resort to the World Bank Development Index to augment those of the CBN. Also, the lockdown occasioned by the COVID-19 pandemic was another huge limitation faced by the researcher.

##### Definition of Operational Terms Economic Growth

Economic growth is a macroeconomic concept representing an increase in real national income that is maintained for two consecutive quarters in a year. Stable growth is a macroeconomic policy objective as it leads to increased level of living and high level of unemployment.

##### Deficit Financing

Deficit financing means raising money to cover a deficit that results from spending more than income. That gap is filled by borrowing from the public through the sale of bonds or the issuance of new currency.

##### Domestic Debt

Domestic or internal debt consists of liabilities that a country’s citizens and government owe. It is the amount of money raised by the government in local currency and from its own residents.

##### External Debt

External debt is the portion of a country's debt that is borrowed from foreign [lenders](https://www.investopedia.com/terms/l/lender.asp),

including deposit money banks, governments, or international financial institutions

(IMF, 2020). These loans plus [interest](https://www.investopedia.com/terms/i/interest.asp) must be paid in the currency in which they were

made.

##### External Reserves

External reserves (also known as international reserves or balance of payments assets)

are external assets that are readily available and controlled by a country's monetary

regulatory agencies (IMF, 2020).

##### Broad Money Supply

The broad money supply is the totality of money in the economy which is in a usable form (CBN, 2020). It includes the narrow money supply (M1), i.e. circulating banknotes and coins plus balances on demand deposit with the deposit money banks plus quasi money (M2) in an economy.

#### CHAPTER TWO LITERATURE REVIEW

##### Introduction

This chapter is dedicated to a review of extant literature in relation to the subject of investigation. Specifically, it covers the conceptual issues, empirical review of some studies in the extantliterature, and theoretical framework. It is worth mentioning that each of the sections in the chapter contain have sub-sections which are geared towards giving thorough and scholarly explanations and submissions on the constructs. The essence is to identify and fill the perceived gap in existing body of knowledge otherwise known as research/knowledge/literature gap.

##### Conceptual Issues

This section takes into account the various underlying issues that revolve around the deficit financing and economic growth. Various issues extensively discussed include the following:

##### Economic Growth

Economic growth can be defined as change in the amount of real output and income in an economy overtime. An economy grows because it receives more goods and services increased resources and uses the resources more efficiently (Nzotta, 2014). According to him, growth occurs when a country experiences advances in technology and technical knowledge which leads to increases in productivity and output. Growth is also advocated with rising living standard of the population overtime and increase in the wealth of the citizens (Oyejide, Soyede & Kayode, 2016). In the views of Muhammad, Sofia, Syed and Abbas (2014), output or economic growth means the steady process by which the productive capacity of the economy is increased over time to bring about rising levels of national output and income. It can be said that economic growth has

three components. Capital accumulation, population growth and ultimately workforce growth and technological progress (Ekperiware & Oladije, 2017).

##### Economic Growth in Nigeria

According to Ekpo and Umoh (2018) the Nigerian economy has had a truncated history. In the period 1990-1970, the gross domestic product (GDP) recorded 3.1 percent growth annually. During the oil boom of 1970-78, GDP grew by 6.2% per year, a significant growth. However, in the 1980s, GDP grew negatively. During the period from 1988 to 1997, a period of restructuring and economic liberalization, GDP recorded a positive growth of 4.0 in response to economic adjustment policies. As opined by Iya, Aminu and Gadbo (2014), after liberation, industry and manufacturing showed positive growth rates except for the period 1980-1988. Industry and manufacturing grew minus 3.2 percent and 2.9 percent, respectively. Agricultural growth during 1960-1970 and 1970- 1978 was unsatisfactory (Ifeanyi & Umeh, 2019; Iya, et al, 2014). In the early 1960s, the agricultural sector was hit by low raw material prices, and in the 1970s, agricultural growth was negatively affected by the oil boom. The boom in the oil sector has drawn the workforce from the rural sector to the urban centers (Anyawu, 2017).

Agriculture's share of GDP fell from 63% in 1960 to 34% in 1988, not because the industrial sector's share increased, but because the agricultural sector was ignored. So it is not surprising that by 1975 the economy had become a net importer of stocks, obvious growth in industry and production from 1978 to 1988; It was associated with activity in the mining sub-sector, especially in the oil sector. (Bamidele & Joseph, 2019). The accumulation of capital in the economy was unsatisfactory. The ratio of gross domestic product (GDP) to GDP was 16.3% and 22.8% respectively in 1965-73 and 1973-80, but dropped to almost 14% in 1980-88 and increased to 18.2% in 1991-98. Gross national saving was low and consisted mainly of government savings, especially during the

period 1965-80. Current account balances before official transfers are negative for 1965- 73, 1980-88 and 1991-98 (Ndubuisi, 2017). The economy in no way experienced double

- digit inflation for the duration of the 1960s. By 1976, however, the inflation charge stood at 23 percent. It reduced to 11.8 percent in 1979 and jumped to 41 percent and

72.8 percent in 1989, 1995, respectively. However, via way of means of 1998, the inflation charge had fallen to 9.5 percent from 29.0 percent in 1996. Unemployment charges averaged nearly 5 percent for the duration 1976-1998.

However, statistics on unemployment in particular should be interpreted with caution (Ndekwu, 2003). Most job seekers do not use the labor exchange except for the inherent distortions of the labor market. Based on some basic indicators, it can be concluded that the economy developed well over the years, immediately after independence and during the oil boom. However, in the 1980's the economy was in distress and up to the 21st century the country has experienced significant growth in her economy (Ezeabasili, Isu & Mojekwu, 2011). The economy has been characterized with inflation, high unemployment rates, and recession. All data and analysis on the general performance of the Nigerian economy is from the work of (Ekpo & Umoh, 2018).

##### Economic Growth in Kenya

The Kenyan economy performed modestly in 2011 and realized growth in gross domestic product (GDP) of 4.4 percent compared with expansion of 5.8 percent in 2010 and 2.7 percent in 2009 (Okelo, Momanyi, Lucas & Alia, 2013). This was hugely contributed to by agriculture and forestry, electricity and water supply, mining and quarrying, financial intermediation, wholesale and retail trade, repairs, and transport and communication. For the first three months of 2012, the economy performed sluggishly registering real growth of 3.5 percent, or 140 basis points below 4.9 percent growth in the corresponding period in 2011 (Ojong & Hycent, 2013). Real GDP growth is

projected to stabilize at 5.2 percent in 2012. Monetary policy focused on achieving and maintaining low inflation (CBK, 2013). The twelve month inflation rate slowed down from 18.31 percent in January 2012 to 10.1 percent in June 2012 on account of reduced food inflation and fuel inflation in the year to June 2012 and prudent monetary policy stance. The annual average inflation, however, rose to 16.0 percent in June 2012 from

15.1 percent in January 2012 and 6.9 percent in June 2011(CBK, 2013; Odongo, Odhiambo & Ombok, 2019). Monetary policy tightening started in March 2011 and was sustained through June 2012 to contain domestic inflation. Money supply, M3, growth decelerated to 15.5 percent from 19.3 percent in September 2011, and reserve money grew by 17.6 percent in the year to June 2012; against target growths of 18.7 percent and

14.2 percent, respectively. The Kenyan econometric parameters are thus intertwined such that an improvement in money supply results in an improvement in the gross domestic product and vice versa as indicated by inflation rate changes (CBK, 2013).

##### Economic Growth in Cameroon

According to Fambon, Mkay, Timnou, Kouakep, Dzossa and Tchakoute (2016),

Cameroon has the largest population by some margin in the Central African region and

is the region’s leading economy. In its first twenty-six years after independence in 1960

its per capita GDP grew at 2.5 per cent per year, reaching a maximum value of

US$1,356 in 1986 (Bonga, Chirowa & Nyamapfeni, 2015). At the time, it was one of the wealthiest sub-Saharan African countries outside of South Africa. However, this is not the case with GDP growth continuously during this period. Per capita growth from 1960 to 1977 averaged only 0.4% per year, but with the discovery of oil and the start of production in 1978, per capita growth since 1977 by 1986 an average of 5.4% per year. This growth burst was not sustained, and ever since 1986 Cameroon’s per capita GDP has been significantly lower (Brender & Drazen, 2018). The next 28 years were not a

period of permanent decline. However, since 1990, Cameroon's GDP per capita has not exceeded US$1,000. They are relatively healthy in sub-Saharan Africa. But given its resources, its economic record is disappointing. In the views of Becketti and Morris (2018), prior to oil exportation in the 1960s, Cameroon **took** an interventionist approach to industrialization and economic development. Trade policy kept import prices high, terms of trade were stable, and agricultural exports expanded rapidly. During this period, real GDP growth averaged 3.1%, but the per capita growth rate was much slower as the population grew by an average of 2.4%. Growth during this period was also very irregular (Ghura, 1997). Private investment as a percentage of GDP increased from 11% in 1963 to about 19% in 1977. In contrast, the public investment-to-GDP ratio remained very low at 2%. During this sub-period, government revenues were around 18% of GDP, and the average overall budget deficit was as low as 1% of GDP (Ghura, 1997).

With oil production and exports in 1978, real GDP grew by about 8.8% per year during

this sub-period, largely driven by increases in oil production, which rose from less than

5 million barrels in 1978 to over 66 million barrels in 1986 (Ari & Koc, 2018). The oil

sector also contributed significantly to the national budget, with oil imports rising from

CFA 20 billion in 1980 (1.4% of GDP or 9% of total revenue) to CFA 330 billion in

1985 (9% of total revenue and 41% of GDP and total revenue). Total government

revenue increased from about 17% of average GDP in the 1965-77 of sub-period to 21%

over the 1978-86 sub-period (Ghura 1997). From the late 1980s to the early 1990s, the

Cameroonian economy was hit by a serious economic crisis with a 40% decline in real GDP. Economic activity declined in some sectors, especially construction and public works, but also in cash crops, retail and oil (Njimanted, Akume & Mukete 2016). There were three main causes of the deterioration of Cameroon's economic and financial situation during this period. (I) Prices of the US dollar and associated export products

such as oil, cocoa, coffee and cotton continue to decline. (Ii) A related increase in the effective real exchange rate against the US dollar. (Iii) Decrease in national oil production (Doe, 2016). The terms of trade decreased by about 40% between 1986 and 1992 (Ghura 1997), and the effective real exchange rate between 1985 and 1992

increased cumulatively by about 40% (Ghura 1997; Ali & Koc, 2018). The reason for

this is that inflation caused by expanded fiscal policy and the 50% rise in the French

franc against the French franc in 1994 provided great opportunities (Ezejelue, 2019). At

that time, the government aimed to curb inflation and restore growth, with the

expectation that the competitiveness of exports from rural and urban areas would

provide sufficient primary and overall budget surpluses and passed a stabilization and

structural reform program supported by the World Bank. Promote public savings to fund

priority public and social spending (Fambon, 2010). In 2020, Cameroon's real GDP

growth rate was 2.8%. Cameroon's real GDP growth has fluctuated significantly in

recent years, but has tended to decline between 2001 and 2020, reaching 2.8% in 2020

[(www.worldbank.org,](http://www.worldbank.org/) 2021).

##### Economic Growth in South Africa

The South African economy has changed radically since the advent of democracy. It recorded an average annual economic growth of 3.3% annually between 1994 and 2012, well above the average annual growth rate of 1.4% between 1980 and 1993 (Babu, Kiprop, Kalio & Gisore, 2014). However, the growth rate is slightly below the global economic average of 3.6%. South Africa's gross domestic product in 2012 was 77% higher in real terms than in 1994, with a corresponding increase in the global economy of 90% (Osoro, 2016). On per capita basis, the country’s real GDP was 31% higher by the end of the period (Aizenman & Rhee, 2016; Akum, 2011). Currently, South Africa has the highest growth rate, with agriculture, forestry and fisheries making the largest

contribution to the rise. That is, crops and gardening products (Industry Development Corporation, 2013).

##### Real Gross Domestic Product (RGDP)

RGDP is the dependent variable of the study and is referred as to the market or money value of all goods and services produced in a country at a particular period of time adjusted for inflation rate (Achegbulu, 2012). It measures the economic size of a country as well as how fast the nation’s economy is growing. It is an important indicator or measure of economic stability (Monogbe, 2015).

Achegbulu (2012) states that fluctuations in Nigeria's gross domestic product (GDP) are being used to measure the level of economic stability in Nigeria. Hassan and Okorafor (2013) believe that gross domestic product is one of the measures of economic stability in Nigeria, as economic stability refers to an economy that is experiencing constant economic growth. To calculate GDP, all you have to do is add up the various economic factors that are a measure of all goods and services produced between 1970 and 2013 (Mohammed, 2016). Throughout the period, economic growth trends during the reporting period continued to rise, with slight fluctuations. It shows how inefficient budget deficits affect economic stability and was used based on existing literature and theory.

##### Deficit Financing

Whenever a country has a budget deficit, the issue of deficit finance is the focus of scholars, as fiscal experts think of ways to fund such budget deficits in order to wipe out the negative effects on the economy. As such, they may resort to deficit financing (Ekpo & Umeh, 2018). Deficit finance is an economic state in which government spending is more than her earnings and hence ventures into borrowing either from domestic or external sources in order to finance her obligations while the repayment of such fund is

to be made at an agreed period of time with some conditions. Thus, deficit finance can be seen as an attempt to stimulate the country's economy by increasing government spending beyond sources of income (Monogbe, 2015; CBN, 2013). This means that deficit financing is said to be an avenue of financing undertaken by a corporation or government to make up for a shortfall in revenue. Governments and businesses can use deficit finance to provide financial incentives (Egwakhe & Osabuohien, 2018).

According to Adesuyi and Falowo (2013), deficit finance is defined as a net increase in the circulation of funds if such an increase arises from a deliberate government policy aimed at promoting economic activity that would not otherwise have occurred. Effectively employed, deficit financing could be a very powerful tool of capital formation to most developing countries. In the same vein, Bhatia (2014) see deficit financing as some or all of those debt obligations as far as data are available and for the purpose for which the government needs them. It is imperative for government to incur debt to oil the wheels of economic development and carry out the day to day administrative functions.

Nzotta (2014) defines deficit financing as the creation of funds to cover the deficit with planned income overspending according to government policy or with loans from internal or external sources that must be repaid with interest over a specified period of time. Deficit financing is defined in finance as government spending in excess of revenues which is financed by borrowing. Nzotta (2014) views deficit financing as a situation in which excess funds from federal government spending that exceed revenues for a specified period are financed by borrowing from the population. Deficit financing can also be thought of as selling debt securities to finance expenses that exceed income. This funding method can also be viewed as a non-bank government source of funding (Inam & Ime, 2017).

CBN (2013) defines fiscal deficit financing as the practice of paying more than the government receives as revenue, the difference being that the economy is compensated by borrowing more money than it gets through taxes, funds, deficit income. In the opinion of Ijirshar, Joseph and Godoo (2016), deficit financing, however, may also result from government inefficiency, reflecting widespread tax evasion or wasteful spending rather than the operation of a planned countercyclical policy.

From the perspective of the Indian Commission, deficit financing means adding the deficit directly to the country's total expenditure through the fiscal deficit, whether it is income or capital accounts (Hussain & Haque, 2017; Sundell & Lemdal, 2011). . The rationale for this stage is that government spending exceeds income received in the form of taxes, national entrepreneurs' income, loans from the public, deposits and various other sources (Monogbe, 2015). The government can fill the deficit by accumulating a balance or borrowing from the banking system (central bank). Thus, financing the deficit involves (i) withdrawing the cash balance that the government has accumulated in the past, (ii) borrowing from the central bank, and (iii) issuing a new currency by the government through the central bank (Monogbe, 2015).

Nwanna and Umeh (2019) described deficit financing as the conscious attempt made by the federal government to correct budget deficit through either internal or external sources, or a combination of both. He added that, whether these deficits are in income or capital accounts, they are added directly to the country's total expenditures through fiscal deficits. The essence of such a policy is that government expenditures exceed revenues received in the form of taxes, revenues of state-owned enterprises, and loans from government deposits and funds and then miscellaneous sources with a view to ascertain the deficit or surplus (Udoffia &Akpanah, 2016).

Based on the foregoing, the inability of the government revenue to take care of its spending necessitates increases in debt servicing cost. This gap must be funded. It is this funding gap that is called deficit financing (Sulaiman & Azeez, 2016). Three options are available to the government at any point in time to finance this gap. They are, increase in taxes, borrowing and realization of government assets. In Nigeria, funding through taxation is always very difficult considering the low tax compliance (Victoria, Emmanuel, Obinna, Esther & Akinde, 2016). The other option is realization of government assets. This option is also not very feasible considering the lack of assets to realize. Apart from this challenge, the government when it has assets to realize has to get the right and willing investors that will want to buy the assets. But this option does not at all increase the indebtedness of the government (Monogbe, 2015). Most times, the only option available to the government is to borrow to cover the gap which can be done through internal or external borrowing. Worthy of note is that deficit financing in any economy has its implication. This can either be negative or positive as argued by various schools of thoughts.

##### Sources of Financing Fiscal Deficit

Government all over the world always looks out for different options to financing its fiscal deficit. According to Victoria, et al, (2016), the two main sources are:

Borrowing: The fiscal deficit can be met by borrowing from domestic sources or external sources (foreign governments, foreign organizations, etc.).

1. **Internal Sources**: The government may decide to source for funds necessary to cover the deficit, the treasury or finance ministry must borrow either from internal source through the sales of federal Government Securities (FGS) such as treasury bonds through a tender system (Omoruyi, 2005). This is the preferred government method of raising funds, as it does not add to net foreign debt, because the

government is not borrowing from overseas. However, there is a disadvantage to this form of debt financing. When the Federal Government sells FGS it competes with the private sector for domestic savings, creating what is referred to as a “crowding out effect’’ (Anyanwu, 1993).

1. **External Sources**: Where the internal source of financing is not adequate, the federal government may decide to source for funds from international financial markets to augment domestic borrowings (Ubi & Iyang, 2018). When using this method, the Reserve Bank sells new GS to overseas buyers, and receives foreign funds. This method of financing the deficit adds to foreign debt when interest is paid on the securities (net income component of the balance of payments). The government may decide to borrow funds from overseas to reduce the crowding out effect (Anyanwu, 1993). Under a floating exchange rate such borrowing has no significant impact on the domestic money supply. However, exchange rates and domestic interest rates can be affected; further, it adds directly to foreign debt (Monogbe, 2015). This is the preferred government method of raising funds, as it does not add to net foreign debt, because the government is not borrowing from overseas. However, there is a disadvantage to this form of debt financing. When the Federal Government sells FGS it competes with the private sector for domestic savings, creating what is referred to as a “crowding out effect”.

**Minting of Money (Ways and Means):** This implies printing of new currency (high- powered money) by the apex bank for example Central bank of Nigeria. The public may as well borrow from Central Bank of Nigeria (CBN) against its securities to meet the fiscal deficit. Money printing may refer to money creation to increase the money supply (Ugwu, 2017). Central Bank of Nigeria (CBN) issues new currency for the purpose of financing its fiscal deficit. This means of financing is highly inflationary: when the

government spreads the money, there is an increase in the money supply; if the economy is near full employment, demand inflation occurs rapidly, as there is too much money chasing a limited supply of goods (Anyanwu, 1993). From the foregoing, although borrowing (external or domestic) is considered the best source because it does not increase the money supply, which is considered the main cause of inflation, the use of methods and means is actually important (Anyanwu, 1993).

**Use of Foreign Exchange Reserve:** Foreign exchange reserves (also known as foreign exchange reserves or foreign exchange reserves) are cash and other reserve assets held by the Central Bank of Nigeria that can be used primarily to balance the country's payments, influence currency exchange rates and maintain confidence in the currency using US dollars (Akinmulegun, 2014).

##### External Debt

Part of the national debt borrowed from foreign creditors, including commercial banks, governments or international financial institutions, is external debt (Williams, 2016). These loans, including interest, are usually paid in the currency in which the loan is made. To earn the necessary currency, borrowers can sell and export goods to lenders (Bakare, Adesanya, & Bolarinwa, 2014). External debt can be defined as debt to non- residents that must be paid in foreign currency, food or services (Victoria, et al, 2016). Nigeria's external debt comes primarily from multilateral institutions, the Paris Creditors' Club, the London Creditors and Claims Clubs, bilateral and private sector creditors and other sources. Udoffia and Akpanah (2016) conceptualized foreign debt as the combination of financial, technical vis-à-vis managerial requirements resulting from outside the country, aimed at supporting economic growth and development and are repayable at determined future date in foreign currency. They added that, external debt result from a country’s inability to meet its maturing obligations.

According to Focus Economics (2019), foreign debts comprises of loans obtained from International Institutions, governments of other countries, corporate bodies clubs, as well as non – corporate bodies. These external debts are actually directly or indirectly related to the financing of trade accounts, development projects, and funds to complete the official balance of payments schedule. In other words, external debt is part of a country's total debt borrowed from foreign creditors (institutions) and may include intentional financial institutions, commercial banks located abroad, and foreign governments. International financial institutions include the World Bank and the International Monetary Fund (IMF). Money borrowed from a foreign lender (usually Europe, North America or Japan) includes interest and must be paid in the same currency in the currency in which the borrower is borrowed, so the borrowing country may be required to export goods to the lending country (Merriam-Webster, 2019). The construct can also be viewed as the amount of funds both the government and her agencies in a country borrowed from external bodies either directly or indirectly with the sole intention to balance trade (Merriam-Webster, 2019). However, due to inadequate financial resources coupled with some relative advantages accruable from such deals, countries depend on one another to enhance their economic growth so as to achieve sustainable economic growth (Afolabi, Kolade& Enaholo, 2017). Invariable, internal savings alone may not be able to cushion all the required infrastructures that can spur economic growth, industrialization, and rehabilitation of developing countries such as Nigeria. Therefore, developing countries rely on external financing to augment the developmental vacuum and meet economic growth needs that internal savings are unable to meet (World Bank, 2017).

Matuka and Asafo (2018) opined that, as the gap between domestic debts and servicing of such debt widens, debt accrues and this makes the country to incessantly resort to

borrowing so as to stay afloat. In another direction, such situation result to multiplier effect on the economy. That is, continuous demand for foreign currency may result to devaluation of domestic currency and appreciation of foreign currency since repayment of such loans is domesticated in foreign currency (Pechman, 2018). On the overall, such situation may result to debt crisis. As such, debt crisis is said to occur where the amount of debt owed to foreign country is so huge that it cannot sufficiently cover the principal amount which disrupt the whole economic system. In other words, during this situation the borrowing country is unable to repay the principal amount borrowed. Ugwu (2016) defined external debt as national debt of a country or state made up of external debts. Jhingan (2014) defines public debt- national debt as a debt which the state owes the nationals of other countries. External debt refers to the portion of national debt borrowed from foreign creditors such as commercial banks, governments, and international financial institutions (Arnone, Bandiera & Presbitero, 2015).

Ogunmuyiwa (2016) argued that if government does not want to compromise macroeconomic stability by printing more money and its taxing capacities limited, then debt option remains the only avenue to raise money. Three reasons were adduced by him on why debt may be preferred to taxation or money printing (Seignorage). Firstly, debt allows tilting by allowing more equitable manner in which a country can exploit investments with long term gestation. Secondly, by smoothing a more efficient procedure for conducting counter-cyclical policies or meeting emergency spending needs are achieved. Thirdly, is the stability advantage of debt over taxation and seignorage (Ogunmuyiwa, 2016). In view of the above, during depression, it is expected that external debt will counter the depression by stimulating the economy, through injection of fund into it. The use to which the fund was put and the return relative to the cost of acquiring it is the most important thing in debt not the amount involved. This is

embedded in external debt management which according to Adams (2014) is a continuous and carefully planned schedule of acquisition, development and retirement of loans acquired either for developmental purpose or to support the balance of payment.

Furthermore, Bhatia (2017) defines external debt as obligations owed to foreign government, firms, institutions and individuals. Bamidele and Joseph (2013) assumes external debt to be a domestic source of funding that does not originate domestically and does not come from local citizens, whether businesses or individuals. External debt is meant to accelerate economic growth when domestic resources are inadequate hence the need to supplement with fund from outside (Hamead, Ashraf & Chandwary, 2018). It is a means of filling domestic saving gap, especially in face of dwindling revenue of government from domestic sources, especially associated with changes in prices of primary commodity export, with associated reduction in foreign exchange earnings (Anyanwu, 2014). That is to say, external debt become imperative when domestic saving is below investment needs of a nation and other contingencies as opposed to other alternatives like taxation and seignorage, which distorts macroeconomic stability. The absorption capacity of the nation should be taken into consideration while accumulating debt. This is done by taking into account debt GDP ratio (Roch, 2015). Debt at a moderate level stimulates economic growth but is said to discourage public investment as it soaks up resources from government budget and reduces the amount of money available from productive investment (Ishola, Olaleye Ajayi & Giwa, 2013). Debt servicing reduces the availability of fund for poverty alleviation, education and development of critical infrastructure especially when the borrowed fund were not invested in productive ventures and return from the investments are below what is required for their servicing.

Ishola, et al (2013) stated that debt overhang and uncertainty in the economy have been identified as the consequences of large stock of debts. To them, debt overhang resulting from the pressure of interest payment on debt stock, soak away returns to settle foreign creditors and the pace for economic growth becomes slow as debt servicing becomes a tax on output. When the significance is very strong, the debtor is considered "on the wrong side of the curve". The wrapper debt curve refers to the ratio of the amount of debt repaid to the amount of debt, that is, the ratio of debt repayment to total debt. Uncertainty results because the presence of large external debt makes macroeconomic environment unstable. This has multiple effects on policy and institutional framework, with scarce investment, limited access to international financial market and capital flight. However, Okoye and Ani (2016) quoting Samuelsson, 1984; identified – avoidance of waste and inefficiency in the economy and proper setting of social priorities so as to ensure that correct social programmes are selected from among competing ones as two fiscal discipline the nation must abide to avoid the aforementioned pitfalls. They equally identified reasons why nation run into problem in external debt management to include: Firstly, mismanagement of foreign debt and the national economy through selection of inappropriate economic and macroeconomic policies. Secondly, the relationship between the interest rate on a given loan and marginal productivity of the loan are usually not healthy. The implication of the above is that while the loan is due, the return from the loan is far below what is required to service the loan and pay off the principal. Thirdly, the domestic savings generated must be at a rate exceeding her domestic investment needs (Okoya & Ani, 2016). However as opined by Wanjiru (2017), domestic savings alone does not guarantee a nations ability to pay external debt as borrowing also arise as the need for a nation to finance increased imports. Ability to repay external debt means that a nations’ current asset must move

from deficit position to surplus, a position Nigeria achieved last in 1981. Fourthly, are externalities which the debtor nations have little or no control, such as, sharp rise in international interest rate.

In debt servicing and repayment, the issue of exchange rate readily comes to mind. Exchange rate refers to the price one country’s currency in terms of another foreign currency (Ezejelue, 2019). The exchange rate is a conversion factor, a multiplier or a ratio depending on the direction of conversion (Piana, 2018). There may be appreciation or depreciation in exchange rate. A smaller or reduced exchange rate (appreciation) might imply a strong domestic currency is good because it makes it cheaper to pay for import products and debts. However, a weaker currency can actually result in economic benefits such as: expected increased export as exports are cheaper, domestic firms will benefit from increased sales especially in exporting industries. This may lead to job creation and lower unemployment. It also improves current account deficit as importation of goods are discouraged due to higher prices of imported items while exportation is encouraged. The above assertion is in line with Aliyu (2019) who asserts that appreciation of exchange rate results in increased import and reduced export while depreciation would expand export and discourage import. Frequent fluctuation in exchange rate as witnessed in Nigeria implies that debts acquired would require much naira value before the debt could be serviced or repaid (Ayadi & Ayadi, 2018). This is always the case as the time between debt acquisition and repayment are in years within which there had been depreciation of the exchange rate, as observed from a look on the trend of exchange rate in Nigeria which had showed great instability.

More explicitly, Matuka and Asafo (2018) defined external debt crises as the true reflection of the difficulties and strains arising from the servicing of external debt. This may result from inability to generate enough resources to meet commitment in debt

servicing. The burden is measured in terms of the proportion of current resources (income) devoted to financing past consumption (Medina, 2018). The more the resources earmarked for debt servicing; the less the resources available to ensure sustained economic growth and development. Thus, the burden increases when a disproportionately large proportion of current resources are used to pay off external debt. The opposite occurs when external debt can be repaid without compromising the needs of domestic economic development (Ndubuisi, 2017).

##### Categories of Foreign Debt

Sub-Saharan Africa’s foreign debt from the viewpoint of borrowers is classified into three (3) major components; namely:

1. **Public Debts**: Public debt otherwise known as sovereign debt refers to external obligations of federal or state government individuals, businesses, firms, as well as other government. In other words, it is any financial obligations assumed by the government of a country where she agrees to make interest and principal repayment on a predetermined date (Mansor, 2016). The need for public debt arise from public sector deficit due to reasons such as large infrastructural investments, war, development financing, natural disaster, economic crises, budget deficit as well as the ever-increasing ordinary public expenditure (Shkolnyk & Koilo, 2018).

**Publicly – Guaranteed Debts**: These are external debts where principal repayments are guaranteed by a government or by an entity of the public sector in the debtor country (Osasohan, 2018).

**Private – Non – Guaranteed Debts:** These are external Obligations which are not guaranteed for repayment by the government (Osasohan, 2018).

1. **Official Debt:** This account for debt owed to Paris club debt, multilateral debts and bilateral debts.

**Paris Club**: Much of Nigeria’s foreign debt is owed to fifteen (15) creditor countries belonging to the Paris club. The Paris Club debt consists of government- to-government lines of credit or market-based term loans, guaranteed by various export credit agencies in the Obafemi creditor countries. (two thousand and thirteen). The Paris Club is a group of creditor countries that provide an informational forum where countries struggling to repay their public debt meet with creditors to reorganize their debts. It is an informal group with no permanent members, operating on the principle of consensus (Ugwu, 2017). The members of the Paris club, to which Nigeria is in debt, are: Australia, USA, Spain, Israel, France, Switzerland, Germany, Denmark, Italy, Netherlands Bas, Japan, United Kingdom, Belgium, Russia and Finland. . The total amount owed by club members as of Dec 31, 2004 is US$35.9.billion (Obademi, 2013).

**Multinational Deb**t: This is the second type of creditor. These are development loans issued by multilateral financial initiatives (e.g. World Bank Group, African Development Bank Group (AfDB), European Investment Bank Group (EUI), IFAD and the ECOWAS Fund) at both levels of government (federal and state) and their agencies. The total amount Nigeria owes to multilateral institutions in December 2004 was $2.8 billion (Obademi, 2013).

**Bilateral Debt:** Bilateral debts are debts owed to countries that are not members of the Paris club, but debts are not insured by the Export Credit Agency (Omoruyi, 2005).

1. **Private debts:** It consists of uninsured short-term trade liabilities acquired through bill collection and account opening. Commercial bank debt acquired through

loans/letters of credit (Onakoya & Ogunade, 2017). In this case, the loan represents the debt of the London Club.

**London Club**: This is a group of commercial banks that have come together to negotiate billing limits for debtor countries. The London Club's debt is the commercial bank's term loan delays. This also includes overdue letters of credit, promissory notes, account openings, dividends and air transfers. As of December 2004, Nigeria's total debt was $1.4 billion (Shkolnyk & Koilo, 2018).

Ajandali and Tatahi (2018) posit that medium/long term external debts are essentially bilateral and multilateral loans contracted from the international financial markets. Such loans are obtained on concessionary terms with longer repayment periods and lower interest rates. They consist of obligations whose maturity is between one and five year’s medium term and over five years for long-term debts.

##### Domestic Debt

Domestic or internal as well as national debt consists of liabilities that a country’s citizens and government owe. This is the amount collected by the government in local currency and collected from its citizens. In general, domestic debt consists of two categories: bank borrowing and non-bank borrowing (Obiwuru, Okwu & Ekezie, 2013). Bank loans consist of loans to central bank governments. Although borrowing from central banks is generally discouraged, there comes a time when governments must rely on central banks non-bank loans (Havi & Enu, 2018). The securitization liabilities are provided to the public by the government through the issuance of government bonds such as government bonds (TB), developed stocks, and bonds. The maximum duration of tuberculosis is one year, typically 3 to 12 months, or 91 to 364 days (Obadan, 2014). This includes the aggregate obligations of federal, state and local governments to transfer obligations to citizens and businesses within the country. Basically, the concept

of domestic debt in Nigeria includes debt instruments issued by federal, state and local governments and denominated in local currency, but excludes contractor debt and supplier loans due to government, contingent debt and inter-institutional debt (Bazza, Binta & Alhaji, 2018).

Bakare, Adesanya, and Bolarinwa (2014) believe that domestic debt is regarded as a collective obligation of government and, if properly considered, should include obligations by state, state and local governments to transfer obligations to citizens and businesses. As a result, the Central Bank of Nigeria (CBN) is a banker and financial advisor to the federal government, responsible for domestic public debt management. Borivoje and Maričić (2015) reveal three principal reasons often advanced for government domestic debt. The first is for budget deficit financing, second, is for implementing monetary policy and the third is to develop instruments so as to saturate the financial market. As foreign debt is more difficult to repay and repay than domestic debt, and intellectual discourse is mainly focused on foreign debt, domestic debt is either completely ignored or briefly mentioned (Festus & Sabiu, 2019). However, this is only true when the size of domestic debt is not large and not when the size of debt is large and growing. Moreover, the impact of rising domestic debt on economic growth is not only cause for concern, given that Nigeria's rapid rise in domestic debt is driven by growing government spending, the need to finance the necessary fiscal offsets and intellectual controversy (Obiwuru, Okwu & Ekezie, 2013). Clearly, Nigeria not only faces increasing levels of public domestic debt, but also clearly has a high domestic debt (GDP) ratio when compared to other sub-Saharan African countries. The domestic debt of poor countries is justified in that it promotes the development of large and liquid domestic financial markets, protects the country from adverse external shocks and deters

foreign exchange risks. The ultimate goal is to ensure an effective economic growth and development (Evans & Egwakhe, 2016).

##### Budget Deficit

Budget deficit is said to occur when the government of a country spend more than their earnings when the overall expenditure of the government is much more than her total revenue. It is a financial state that occurs when a country spend more funds than they earn (Fatima, Ahmed &Rehman, 2018). This term is mostly used in explaining government funding rather than individual or business expenses. However, inefficiency and mismanagement between government expenditure and public revenue served as a determining factor responsible for deficit financing to bridge the gap (Nwanna & Umeh, 2019). Because the government has to pay its bills just as we do, it has a budget constraint. There are three sources to finance the government’s expenditures: taxing, borrowing or printing new money (Akinwumi & Adekoya, 2016). In several countries, when government spending exceeds tax revenues (government deficits occur), borrowing (issue of bonds) cannot cover the deficit and has to rely on printing money. As a result, when they run large deficit relative to GDP, the money supply grows at substantial rates, and inflation results.

Kuncoro (2017) opines that, if government expenditure surpasses its revenues, then a country has a budget deficit. In other words, deficits offset government savings. Budget deficits can also result from government spending in excess of the taxes it charges. Reduced tax revenues may lead to deficits without spending cuts to compensate for declining revenues (Rana, 2019). During a recession, the deficit widens when the government tries to spend money to stimulate economic growth. In this scenario, deficits

increase as the government significantly raises expenditures, whereas revenues are decreasing drastically (Ahmad, 2019). Unplanned expenses can also lead to fiscal deficits. Natural disasters can damage property as well as disrupt or delay economic activity, reducing a company's taxable profits (Rana, 2019). Eminer (2018) believes that financing an economy's fiscal deficit increases efficiency and added value, but can also put a strain on the economy. So it is a burden on society. Budget deficits can be financed by taxes, government loans, donor funds and/or issuance of money (Fatima, et al, 2017). Budget deficits funded through sale of bonds to the private sector impact on the bond prices negatively, driving up interest rates as a result (Ali, Mandara & Ibrahim, 2018). Budget deficit funding by tax financing means that an increase in government spending is funded by a related rise in the economy's tax revenues. Such a policy works by adversely impacting disposable income and thus private spending and expenditure (Menjo & Kotut, 2016). Another method for funding a government budget deficit is through money financing (Pechman, 2018). The central bank prints money and pays the government. The government is not obligated to pay interest or repay the principal on the amount paid. Since aggregate demand is determined by government spending, circulating money is often used in the economy. This leads to an increase in the fiscal wealth of the private sector and increases the broader money supply (Kosimbei, 2019).

##### Foreign Exchange Reserves

Foreign exchange reserves are cash and other reserve assets held by central banks or other monetary authorities that can be used primarily to balance a country's payments, influence currency exchange rates, and maintain trust (Okah, Chukwu & Ananwude, 2019). In financial markets, reserves are held in one or more reserve currencies, mostly in US dollars and less in euros (Ojong & Hycenth, 2013). Foreign exchange reserve assets may include banknotes, deposits, bonds, treasury notes and other government

reserve currency securities. Some countries hold a portion of their reserves in gold, and special withdrawal rights are also considered reserves. Often, for convenience, money or securities are held in central banks as reserves or other currencies, and foreign "holds" are marked or identified as belonging to other countries without actually leaving the central bank's vaults. Sometimes they can physically move home or to another country (Ahmad, 2019). Interest is not usually paid on foreign currency cash reserves or gold reserves, but central banks usually do receive interest on government securities (Aworinde, 2020).

Arguments for the accumulation of foreign exchange reserves are different. However, the most important argument is that the accumulation of foreign reserves leads to valued exchange rate, which stimulates the export sector. There are positive effects of the unbalanced (undervalued) real exchange rate (Engle & Granger, 2016). The accumulation of external reserves or forex in emerging countries is correlated with a higher rate of economic growth. When you have determined the financial variables (credit, money supply), the situation is completely different. The larger the stock of foreign exchange reserves to emerging countries greater credibility, the stability of their positions abroad, reducing the risk of speculative attacks, repayment of foreign debt and reduce financial costs (Okah, Chukwu, & Ananwude, 2019).

The accumulation of external reserves or foreign exchange not only increased the investment/GDP ratio, but also increased the share of exports and trade in GDP. The trade ratio to GDP has a positive correlation with the accumulation of foreign exchange reserves and a negative correlation with the domestic and foreign price ratios (Ojong & Hycenth, 2013). Concentrated accumulation of foreign exchange reserves has a stimulating effect on the long-term economic growth of developing countries and countries in transition period, but developed countries do not. The accumulation of

foreign exchange reserves is an important macroeconomic mechanism for long-term economic growth. A depreciation of the exchange rate leads to an increase in imports and profits in the export sector, increasing investment and economic growth based on higher exports (Momodu & Monogbe, 2017). It also results to a rise in prices of tradable goods and profits, because profits and non-tradable prices lag behind the increase in prices of tradable goods foreign exchange reserves can be considered a stabilizer output because they reduce the likelihood of falling output caused by a sudden outflow of capital or the depth of the collapse of output when it materializes sudden stop of capital inflows (Odubuasi, Uzoka & Anichebe, 2018). However, in developed countries, excessive stock of foreign exchange reserves is unwarranted if they can borrow the international financial capital market, when necessary.

Undervalued exchange rate is a common feature of most emerging economies as it should achieve a trade surplus to fund the repayment of foreign debt and sudden capital outflows. Many developing countries have pursued deliberate exchange rate depreciation as part of their overall export strategy (Osuka & Achinihu, 2014). By accumulating foreign exchange reserves and preventing the exchange rate from rising, consumption and imports can be suppressed, and exports, investment and economic growth can be promoted. A sustained rise in the real exchange rate will soon lead to a foreign exchange crisis (Osuka & Achinihu, 2014). Emerging economies have tended to devalue the ceteris paribus, an exchange rate achieved through rapid accumulation of foreign exchange reserves. As a result, there is a positive correlation between the accumulation of foreign exchange reserves, the share of investment in GDP and economic growth. In developing countries and emerging countries overvalued exchange rate is detrimental to economic growth (Odozi, 2018). Countries that have accumulated large stock of foreign exchange reserves had higher rates of economic growth. High

economic growth is usually in conjunction with a higher ratio in trade /GDP, and thus higher ratio in foreign exchange reserves/ GDP. One of the means to achieve the required level of international trade and generate income through foreign trade effects is to accumulate foreign exchange reserves, which leads to a fall in the exchange rate and an increase in exports. Countries with large foreign exchange reserves have lowered their real exchange rates, increasing their share of exports in GDP (Isah, 2012).

If the accumulation of foreign reserves leads to the depreciation of the exchange rate and results in a higher relative price of tradable (relative to earnings and non-tradable prices) and higher profit, founded expected to result in greater savings ratio in the investment/GDP. However, on the other hand, does not generate any depreciation of the exchange rate more investment, but only the depreciation caused by an active policy of accumulation of foreign exchange reserves (Sichula, 2012). If the exchange rate falls due to capital outflow, limited domestic savings will only be converted into capital outflow through investment. Therefore, the relationship between investment and foreign exchange reserves is stronger than the relationship between investment and currency depreciation. The relationship between the accumulation of foreign exchange reserves and the share of investment in GDP is very strong (Ojong & Hycenth, 2013).

Investment growth is related to foreign trade. In other words, a rise in the level in investment and production is associated with an increase in exports and output in the trading sector. This is a major benefit of accumulating foreign exchange reserves, as it not only increases investment, but also provides high return on investment and high capital productivity through increased participation in international trade (Obadan, 2014). The ratio of foreign trade to GDP depends on the level of development (GDP per capita) and the size of the economy (smaller countries are more involved in international trade and their share of GDP is growing faster). The ratio of foreign trade to GDP is

correlated with an increase in foreign exchange reserves, a fall in the exchange rate (the ratio of domestic prices to foreign prices), and a low level of non-trade compared to the price of trade goods (Ndubuishi, 2017).

One might think that the congestion of foreign exchange reserves leads to inflation. However, this is not the case when the accumulation rate of foreign exchange reserves does not exceed the economic growth rate. Slightly high inflation is not necessarily harmful, especially in developing and emerging economies (Gadbo, 2014). The accumulation of foreign exchange reserves is not inflationary and influence increase economic growth and employment, in contrast to the rapid depreciation of the exchange rate that occurs as a result of maintaining an over-valued exchange rate in the long run, which leads to foreign exchange crisis and inflation (Murwirapachena, Maredza & Choga, 2013). It is difficult to advocate the idea that successful economic growth leads to a rapid accumulation of foreign exchange reserves since the accumulation of foreign exchange reserves is one of the variables of economic growth. If successful economic growth accompanied by a rapid accumulation of foreign exchange reserves leads to economic growth, the question is whether; the accumulation of foreign exchange reserves is a necessary prerequisite for economic growth (Iya, Aminu & Gadbo, 2014).

##### Advantages of Holding Adequate Foreign Reserves

Adequate foreign exchange reserve remains one of the instrumental topics in finance and economics research due to its perceived effect on an economic system. Okoli (2014) agrees that when applied to the concept of international reserves, it helps to save, invest and create products in the case of potential crises, especially balance of payments crises. More explicitly, Udoffia and Akpanah (2016); Okoli, (2014); CBN (2014) outlined the following as advantages of holding adequate foreign reserves:(i) it tends to help the country to withstand trade shock which might set in unknowingly (ii) it may as well as a

cushion effects when an economy is faced with pressing economic problems in terms of unexpected foreign exchange rate variation or unexpected capital outflows for example, negotiation between Nigeria and Paris Club Debt (iii) it may also help to boost country credit worthiness when access to international market tends to either be difficult or impossible (iv) it may be used as a precautionary measure to fight against inflation or deflation (v) it play a very instrumental role in foreign trade settlements in that it can be used to finance trade deficit herein in exports exceeds import vi) it can be used to correct balance of payment disequilibrium (Udoffia & Akpanah, 2016; Okoli, 2014)

##### Broad Money Supply

This is a measure of money supply that includes cash and checking deposits (1) as well as near money. Hence, it is a broader money classification than narrow money supply (M1) because it include asset that are highly liquid. Simply put, Broad Money supply is simply defined as the total stock of money circulating in the economy (Prasert, Kanchana, Chukiat & Monekeo, 2016). Working money includes money in the form of currency, paper money, savings accounts, and other liquid assets. Money supply estimates help analysts and policy makers to formulate policies or change existing policies to increase or decrease the money supply (Prasert, et al, 2016; Tung, 2018). Valuations are important because they ultimately affect the business cycle and economy (OECD, 2014). There are several standard indicators of money supply, including currency, M1 and M2. Currency standards determine the amount of money in circulation and the balance of reserves (deposits held in banks and other depository institutions such as microfinance institutions in certain countries). M1 is defined as the sum of currency and trading deposits held by financial institutions, depository institutions, and financial institutions that receive funds mainly from public deposits such as commercial banks, savings and loan associations, savings associations and credit unions (Jamie, 2015;

Owoye & Onofowora, 2017). M2 refers to M1 plus deposits issued in amounts less than

$ 100,000 standard currency and retail market money. Data on monetary aggregates are reported in the Federal Reserve’s statistical release. In Kenya, this is done by the Central Bank of Kenya through its bi-annual monetary policy reports issued under the Central Bank of Kenya Act, CAP 491 (Ndungu, 2016).

Furthermore, money supply is considered to be the total amount of money in circulation in a country at any given time (e.g. currency and demand deposits). Currency in circulation is made up of coins and notes, while demand deposits or checking current accounts are those obligations which are not associated with any interest payments (in Nigeria before January, 1990) and accepted by public as a means of exchange, drawn without notice by means of cheques.' Money supply can be defined as those assets which represent immediate purchasing power in the economy, and hence function as a medium of exchange (Rana & Wahid, 2017). In Nigeria for instance, the tight money supply (M1) is defined as the foreign currency of the commercial bank minus the demand deposits of the commercial banks plus the domestic deposits of the central bank + the federal government deposits of the commercial banks. In simple terms, M1 is defined as M1 = C + D

Where M1 = narrow money supply C = Currency outside banks D = Demand deposits. Ajayi (2018) contends that M1 is the appropriate definition of money in Nigeria. In UK narrow money includes Mo, M1, and M2. Mo includes only notes and coins in circulation and in bank bills, M1 include notes and coins circulation and sight deposits with bank; and M2 includes not only notes and coins and bank current accounts, but also seven day bank deposits and some building society deposits. Broad money, on the other hand, includes narrow money assets but in addition; include those assets which have the quality of liquidity. They can be quickly and readily converted to cash and the

conversion is achieved with little or no loss in terms of either interest penalty or capital loss through force sale (Ajayi, 2018). In the Nigerian context, broad money (M2) is defined as M1 plus quasi-money.

Quasi- money as used here is defined as the sum of savings and time deposits with the commercial banks. Thus, M2 is symbolically shown as M2 = C+D+T+S

Where;

M2 = broad money

C = Currency in circulation

D = Demand Deposits T = Time Deposits

S = Savings deposits

Time deposits as used here are those obligations of the banks on which interest is paid and which at least potentially or formally, can be made available to the depositors after some delays and notice. In the U.K, broad money is primarily represented by M2 plus M4 and M5 - M3 consists of M1 plus private sector holdings of sterling certificates of deposits; M4 includes bank deposit accounts which are a very close substitute for bank deposit accounts, and include national savings (other than National Savings Certificates, SAYE, and long-term deposits) (Anyanwu, 2017). It is important to note that narrow money could be preferred because they exclude investment balances which distort the usefulness of broad definitions, and they can usually be calculated more quickly. But broad money has two main advantages over narrow money. This includes funds that are not themselves a medium of exchange, but that can be quickly converted to a tradable currency, and are more stable as higher interest rates tend to force people to manage their cash and current balances more cautiously, causing a fall in the narrow money which in no way may reflect a change in transactional balances. In other words, higher

interest rates mean a greater opportunity cost in holding non-interest bearing cash and current account balances (Anyanwu & Oiakhenan, 2018). Omoke and Ugwuanyi's (2018) findings showed that there is a positive relationship between money supply and output, and the Granger causality test shows that money supply is not the cause of output whereas causality leads from output to money supply, showing a one-way relationship. The results showed that there is a positive relationship between money supply and output, and the Granger causality test shows that money supply is not the cause of output whereas causality leads from output to money supply, showing a one-way relationship.

##### Deficit Financing and the Sub-Saharan Economy

Deficit financing is one of the economic challenges facing both developed and developing countries. Sub-Saharan Africa has experienced significant government deficits since the late 1970s, which has sparked controversy among policymakers and economists (Anyanwu, 2017). The impact of a fiscal deficit on the economy depends on how the budget deficit turns out. If the government deficit is covered by loans from commercial banks, this will lead to an increase in interest rates, which will attract individual investors. When government budget deficits are financed through money creation or central bank borrowing, inflation can occur (Okoli, 2014). Deficit financing with external borrowings can have a negative impact, it is the increase in the exchange rate caused by foreign exchange inflows, which affects export performance and leads to deterioration of the current account (Ekpo & Umoh, 2018). It can also increase the country's external debt, leading to a debt crisis.

##### Deficit Financing and Economic Growth in Nigeria

Nigeria is a small open economy, into and out of which capital easily flows; the return of capital in a small open economy is determined by the global demand and supply for capital. Thus, an increase in the demand for capital in a small open economy due to

government deficit has a little effect on global demand and little or no effect on interest rate (Ojong & Hycenth, 2013).

Any upward pressure on interest rate causes fund to flow in from abroad and crowding out of private investment in such a case is minimal. But the inflow of funds from abroad does have an effect. An increase in the demand for the naira causes Nigeria naira to appreciate and increase the relative price of Nigeria export hence, net export are crowd out rather than domestic investment (Gatawa, Abdulgafar & Olarinde, 2017). In Nigeria, export is likely to absorb a significant part of the crowding out. Nevertheless, there is a short run increase in resources available to Nigerians because foreigner willingly lend to Nigeria at the global interest rate (Festus & Sabiu, 2019). This is however accompanied with an expectation of payment. In addition to crowding out export, deficit has other effect on an open economy situation. Firstly, increasing debt servicing cost is likely to necessitate high tax rate in the future if the debt has not contributed to increase productive capacity. Second government deficit have been financed, in part by an increase in foreign purchases of Nigerian asset, including government securities. Although, cost to future generation due to crowding out of private investment may be minimal, the burden may still be substantial because of consumption that must be forgone in the future in order to make interest payment to foreigners (Ekpo & Umoh, 2018). Meanwhile, no advance economy is either totally closed or totally opened. As a small open economy with a significant share of government and private debt held by non-resident, Nigerian must attend to the view of international investors. If non - resident loss confidence in Nigerian ability to service and repay its debt and to protect the value of Nigerian naira, future borrowing may be possible only at much higher interest rate (Ojong & Hycenth, 2013).

Historically, debt crises can be traced back to 1973 and 1979, triggered by oil price shocks that caused current account deficits in most underdeveloped, non-oil producing countries (Obadan, 2014). Prior to this incident, Nigeria had received a US$28 million loan from the World Bank for railway construction in 1958 and a US$13.1 million loan from the Italian government for railway construction of Niger Dam in 1964.

The first major US$1 billion loan, known as jumbo credit, was secured by the International Capital Markets (ICM) in 1978 (Adesola, 2009). Joha (1999) agrees with Adam Smith's view and argues that the external debt crisis in sub-Saharan Africa is best understood when viewed as an integral part of the 1982 global debt crisis.

Global debt crisis in 1982 caused by excessive borrowing of developing countries, reckless lending by international commercial banks in the 1970s, the collapse of world commodity (especially oil) prices in the early 1980s, and a surge in international interest rates (loan interest rates). It has become a global phenomenon, especially in developing countries**.** Hicks, Marshall, Chamberlin and Samuelson suggest that the current crisis that struck the African continent can be explained by distortions in the internal activity of the African economy and excessive reliance on developed countries (Bhatia, 2006). Over the last two decades, Nigeria has often borrowed large quantities at very low rates in the hope of taking a faster path to development through higher investment, faster growth and poverty reduction (Ezejelue, 2019). But in contrast, economic growth, employment and poverty are swaying backdoors in excess debt, as if it were the original intent of borrowing. It is clear that Nigeria's debt exceeds such limits, in order to support the economy in search of debt freedom or reduced debt burden, which promotes economic growth and consequently improves poverty levels, it is customary to limit these restrictions (Nwanna & Umeh, 2019).

It is sufficient to say that the available data on economic performance such as per capita income, poverty rate and unemployment rate suggest that most of the money was not used for the purposes for which they were raised (Bamidele & Joseph). Concerns have been heightened given the recent government credit history and the reality of the difficult economic situation associated with the decline in global oil prices from June 2014 to today, which is expected to increase the country's debt burden. For instance, Nigeria’s external debt outstanding stood at US$28.35 million in 2001 – about 59.4% of GDP rising from US$8.5 million in 1980 – about 14.6% of GDP (WDI, 2019).

The debt crisis peaked in 2003, with $ 2.3 billion devoted to Nigeria's external debt. In 2005, the Paris Club creditors group canceled 60% ($ 18 billion) of Nigeria's $ 30.85 billion debt. Despite the debt relief of US$18 billion received by Nigeria from the Paris club in 2005 the situation remains the same (Bakare, 2010). As at December 2014, Nigeria’s total debt stood at N11.24 trillion, up 11.54% from 2013 (Meristem, 2015). It appears the rate at which government seek for loans is on the increase with little to show for it given the country’s economic performance. The 2015 budget shows this trend with the continuation of this structure and a deficit of N756 billion (WDI, 2019).

##### Deficit Financing and Economic Growth in Kenya

In the early 1970`s, the federal government was able to finance all its recurrent expenditure without any form of foreign assistance. However, in the late 1970s, the federal government was not able to do so. This is as a result of the fact that the country experienced chronic fiscal deficits during this period (Ondongo, 2018).

To address the above shortfalls, the federal government had to seek for alternative sourcing of financing while ensuring that her expenditures are under check. Among source of public funding which the federal government adopted then include: widening the tax base, ensuring efficiency in tax collection, raising flexibility in the overall tax

system, lessening of foreign travels, reduction in budget allocation for hospitality, and other low priority sectors (BPS, 2014). However, the deficits persisted despite all the policies put in place by the federal government. Meanwhile, both government’s revenue and expenditure maintained consistent growth patterns. In relation to GDP, government revenue averaged 22.1% while expenditure was 26.5% resulting to a resource gap of about 4.4% from 1999 to 2014 (Osoro, 2016). Meanwhile, the proportion of domestic debt to the overall debt was estimated at 53.0% compared to the proportion of domestic debt to the overall debt being 47.0% as at 31st December, 2019. Again, Kenya`s public and publicly guaranteed debt increased from Ksh 2422 billion in 2014 to Ksh 5,431 billion in 2019 fiscal year (Otieno, 2019). This increase is attributed to the development of the economy in terms of population and infrastructure leading to high demand for funds to meet the government requirements.

##### Deficit Financing and Economic Growth in Cameroon

Cameroon falls among the many African economies which fell into a debt trap after the Oil shocks in the mid 1970’s. The worldwide rise in fuel prices led to the accumulation of cash reserves in western Banks (Fambon, 2010). In the face of recession in developed countries, there arose excess supplies over demand of credits, and thus a fall in the cost of loans. The low cost of loans, at the time, represented an opportunity for African economies which later on became a threat (Akum, 2011). This happened as the western economies emerged from recession and began to compete in the demand for credits. This growth in the demand for credits led to a rise in interest rates which affected the price to be paid by the Cameroonian economy in reimbursement of their foreign loans (Rapu, 2020). This phenomenon made foreign debts necessary.

During this time, the Cameroonian economy struggled to repay its external debt and at the same time promoted GDP (gross domestic product) growth**.** This situation has been

met with numerous programs through which international financial institutions sought to improve the situation either by awarding loans, changing the terms of existing loans, or cancelling loans (Akum, 2011)

The debt profile of the Government of Cameroon has been on the increase from 1986. Given the decline in government revenues due to fluctuations in oil prices in the international market and the absolute cruelty of successive governments, the government

had no choice but to borrow to fund its day-to-day operations (Ramzan, Saleem & Butt, 2016). Prior to 1986, Cameroon sustained a very high economic growth rate partly because of its rich diverse agricultural base coupled with petroleum production. The average annual growth rate of the gross domestic product (GDP) was 8%. This permitted the country to maintain a high level of per capita income despite the high population growth rate of 3%. Cameroon was then classified as a middle income country. However, since 1986 almost all the key economic indicators have been declining mainly due to the collapse of world commodity prices and internal (structural) problems (Doe, 2016). The major weaknesses of the economy of Cameroon were exposed, as the budget deficit increased despite many steps to reduce public expenditures with the hope of increasing revenue and reducing deficits. These efforts seemed to yield few positive results, partly because there has been no serious attempt at systematically controlling the budget and using fiscal policy to promote sustained economic growth (Owusu-Nantwi & Erickson, 2016).

GDP growth dropped only slightly from 3.5% in 2007 to 3.4 in 2008 despite the global financial crisis due to positive performance of the petroleum sector, as well as an increase in the supply of infrastructure and energy. This relative stability was also boosted by programs to improve on the agriculture, livestock, and fisheries sectors. But in 2009, the global financial crisis caught up with the country’s GDP growth. It dropped

to 2.4%, as the global recession pushed down prices and demand for the country’s major export commodities: Oil, wood, cotton and rubber. For many years, the country has faced the huge challenge of stabilizing its GDP (Owusu-Nantwi &Erickson, 2016). This goal could be achieved by improving on export diversification in order to reduce its dependence on oil revenues, as well as fighting against falling commodity prices through sufficient processing of raw material exports. (OECD, 2009)

At the end of April 2020, Cameroon's outstanding public and publicly guaranteed debt

were estimated by the National Credit Council at CFAF 8,826 billion, or 38.6% of GDP.

This outstanding debt is 5.4% higher than its level at end-December 2019 and 15.7% up

year-on-year ([www.businessincameroon.com](http://www.businessincameroon.com/), 2021).

According to the Treasury, national debt has increased by more than 34% in two years.

This includes funding (more than 578 billion CFAF), mobilizing public debt (638 billion

CFAF with government bonds), and accelerating the construction of key infrastructure.

The 99.6% of the public debt portfolio at end-April 2020 consisted of direct public debt,

evaluated at CFAF 8,791 billion, i.e. about 38.4% of GDP, including CFAF 1,049

billion in budget support. 0.4% of the debt at that period consisted of debt endorsed by

the State to the tune of CFAF 36 billion, i.e. 0.2% of GDP. At end of April 2020, the

direct public debt was made up of 75.7% of external debt and 24.3% of domestic debt

([www.businessincameroon.com](http://www.businessincameroon.com/), 2021).

##### Deficit Financing and Economic Growth in South Africa

As opined by Mashakada (2013), large budget deficits are at the heart of macroeconomic adjustments due to the evolving nature of the economies of Africa and other emerging economies. Like other developing countries such as Zimbabwe, Mozambique and the Democratic Republic of the Congo, South Africa has had a budget deficit for decades. The same budget deficit created many economic challenges, including price volatility,

high interest rates, poor economic performance, poor credit ratings, and uncontrollable debt. According to Murwirapachena, Maredza and Choga (2013), the South African government has embarked on a huge investment frenzy since the 1980s to achieve Pareto efficiency. For instance, the 2015/2016 total consolidated government expenditure was estimated at R1.4 billion whilst the revenue raised only amounted to R1.2 billion translating to a deficit of -3.9 per cent as affirmed by National Treasury (2015).

Nonetheless, despite the South African government's annual budget deficit, some economic challenges remain unresolved. These include high unemployment rates (South Africa reported 25.5%, inadequate location and inadequate infrastructure, rising public sector wage costs, inadequate income-generating capacity, and uneven service provision (Mihaljek, Scatigna & Villar, 2018). This is a clear indication that the South African performance in recent years fall short of expectations compared to peer countries such as Brazil, Turkey and India. Growth slowed sharply in 2016, averaging 1.4%, the lowest in two decades. A modest rebound in growth to 2.6% is expected in 2017. Critical evaluation of the fiscal position revealed that the economic deficit financing policy is a little bit fair. Unfortunately, this worsening outlook is partly due to delayed and still limited monetary policy adjustments, resulting in increased public debt, reduced foreign exchange reserves and the private sector. There is pressure on the financial system to put pressure on activities of the private industry (Kagiso & Maredza, 2017).

##### External Debt Profile in Sub-Saharan Africa

The external debt levels of Sub-Saharan Africa countries have been on the rise in the past two decades, generating concerns among analysts and policy-makers about a looming debt distress threatening the region (Mbah, 2016; Nouri & Samimi 2019). From a level of US$176.36 billion in 1990, the aggregate foreign debt stock for Sub-Saharan

Africa rose to US$235.94 billion in 1995, representing an increase from 58.2 per cent of the regional GDP to 72.0 per cent. From 1990 to 2013, the highest external debt-to GDP ratio of 78.2 per cent was recorded in 1994. Standing at US$213.44 in 2010, the total external debt stock rose by US$55.63 billion to reach US$269.08 billion at the end of 2010. External debt witnessed a rapid build-up from 2011 to 2013, to reach US$367.51 billion in 2013 (World Bank, 2015)

In recent times, the external debt profile in Sub-Saharan Africa has been worrisome. South Africa’s external debt reached nearly 188billion U.S dollars in 2019, which corresponded to the highest stock of foreign debt in Sub-Saharan Africa. Nigeria and Angola followed, each with debts of 54.8 billion and 52 billion U.S dollars. Overall, sub-Saharan Africa's external debt is on the rise. In 2019, the region's external debt burden was $ 625 million (statista.com, 2021).

##### External Debt Profile of Nigeria

Nigeria's external debt can be traced back to 1958, when the World Bank received a $ 28 million loan to build a railroad. The need for external debt was low between 1958 and 1977. In fact, during the oil boom of 1970’s, General Gowon, the then military head of state boasted that making money was not a problem to Nigeria but how to spend her money (Ndubuisi, 2017). Following fallen oil price of 1978, with its associated pressure on government finances, there arose the need to borrow to correct balance of payment difficulties and finance projects. A loan of 1billion US dollars referred to as ‘Jumbo loan’ was collected from international capital market (ICM) in 1978 bringing Nigeria total external debt to 2.2 Billion US dollars. States joined in external loan contractual loan obligation resulting in Nigeria’s external loan of N17.3 billion in 1986, forcing her to adopt structural Adjustment programme (SAP) an IMF sponsored programme aim at revamping the economy (Ayadi & Ayadi, 2018). By the year 2006, debt servicing has

become a big challenge that the then president Obasanjo had to campaign that no meaningful economic growth could take place in Nigeria with such debt burden and its servicing conditions. It was quite glaring that Nigeria cannot service her external debt and pay the principal which was described as “debt trap”. The federal government owes 75 percent while state owes 25 percent (Obadan, 2014).

Obasanjo argued that Nigeria must be granted debt relief, debt buy back, debt reduction or debt cancellation. As at December 2004, Nigeria’s debt stood at 34 Billion US dollars with 85% of the debt owed to Paris club, 8% to multi-lateral financial institutions – World Bank and African development Bank and the remaining 7% to London club of financial creditors amongst others. 18 Billion US dollars debt relief was granted to Nigeria in April 2006 (Momodu, 2014). As at June 2015, Nigeria’s external debt stood at 10.317 Billion US Dollars (Debt Management Office). Prior to 1978, Nigeria's external debt was very low at around $ 3.1 billion, accounting for just under 6.2% of GDP. But in 1977/78, when Nigeria experienced a temporary decline in oil revenues, the first $ 1 billion jumbo loan was raised from the International Capital Market (ICM) with grace and repayment periods of three and eight years, respectively, and a relatively high rate of interest, (LIBOR + 1.0 percent) compared with the existing debts that were largely from the multilateral and concessional sources with long maturity period and other more generous terms of repayment. At the peak in mid – 1989, LIBOR was 13.0 per cent. That loan was followed by the second Jumbo loan of $750 million in 1978/1979. Between 1979/1980, there was an up-turn in the global oil market which improved Nigeria’s foreign exchange inflow (Ndekwu, 2003). The easing of economic policies and the adoption of deflationary measures has led to mass imports of goods and services, resulting in the rapid depletion of reserves. Shortly thereafter, the global oil

market witnessed serious glut which brought down the price of crude oil with the attendant devastating impact on the Nigerian economy (Ojokwu, 2017).

The idea that oil surpluses would be short-lived has prompted both state and federal governments to borrow abroad. In blatant violation of Ordinance 30 of 1978, the external borrowing limit was set at US$5 billion (US$8.3 billion), and reckless and large-scale external borrowing from ICM was initiated to finance various projects. Moreover, the predominance of bulk imports and the reckless issuance of import licenses, and the complete ignorance of reserves and solvency levels, have led to massive accumulation of trade debt in both insured and uninsured trade credit.

Indeed, the reality and the magnitude of Nigeria’s debt problem did not dawn on the country until 1982 when creditors refused to open new lines of credit. This led the country to seek relief in the form of refinancing of the trade arrears (Odozi, 1996). The first of such exercise was in 1983 covering outstanding letters of credit as at 13th July, 1983 for $2.1billion. By 1988, the terms of notes issued for trade credit were renegotiated and the total amount of notes issued was $4.8 billion. As a result, external debt surged from $9 billion in 1980 to $17.8 billion and $25.6 billion in 1983 and 1986, respectively (Ntangsi, 2009). Since then, debt levels had risen to $35.9 billion by the end of 2004, despite all payments, prudent policies to sharply reduce additional external borrowing, and various debt management strategies including debt diversion and redemption. These events have completely changed the structure and nature of Nigeria's external debt from a source of long-term concessions to short-term/medium-term debt with tight maturities. Of the total debt outstanding, the value and share of the Paris Club debt increased progressively from $5.8 billion or 33.5 per cent in 1984 to $21.7billion or

66.5 per cent and $30.8 billion or 85.8 per cent in 1995 and 2004 respectively (Omodero, Egbide, Madugba & Ehikioya, 2020). On the contrary, the share of

multilateral debt as well as private debt (promissory notes and London Club Banks) have declined persistently over the years from a total of $11.5 billion or 66.5 per cent in 1984 to barely $5.1 billion or 14.2 per cent in 2004. The governments’ deliberate policies, including borrowing from concessional sources, strict adherence to multilateral loan repayment terms, and the London Club's debt transactions, which have almost completely paid off these debts, have caused the decline. The latter trend of debt sources (Omodero, et al, 2020). On the other hand, the conditions for debt reschedule at the Paris Club have created a difficult situation, not only making repayment difficult and very short, but also rapidly increasing the debt of this source over the years. Paris Club debt is official bilateral debt and export credit guaranteed by several export credit authorities.

##### External Debt Profile of South Africa

Foreign debt in South Africa South Africa‘s foreign debt rose since 1970, slowly at first, then dramatically during the early 1980s, before reaching a halt in 1985. In 1980, the total foreign debt of South Africa was $16 890 million, which, in rand terms, was 20.3% of the country‘s GDP. By 1984, foreign debt reached a peak of $24,298 million which in rands was 45.7% of the GDP (reflecting in part the decline of the rand against the dollar) (IMF, 2000). In 1985, though the dollar value of South Africa‘s debt declined slightly, the continued depreciation of the rand took the debt up to 50% of its GDP at about the time that South Africa stopped payment on short-term debts.

According to Edwards (1999), by June 1986, principal of nearly $500 million in short- term and $1.5 million in longer-term debt debts had been repaid (Bacchetta, Kenza & Yannick, 2019). However, in mid-1989, in spite of the repayment of some of the principal, the debt reached a peak at about $26 million. This was higher than might have been expected because some of South Africa‘s debt was held in hard non-dollar

currencies such as Swiss francs and Deutsche marks, which appreciated against the dollar after 1985 (World Bank, 2000).

The trend of and macroeconomic factors related to foreign debt in South Africa is illustrated in further that South Africa‘s total outstanding foreign debt increased from US$ 3 523 million at the end of 2006 to US$4 610 million at the end of 2007. The ratio of rand denominated debt to total debt increased considerably in 2007, passing from 39.7% to 40.2% (Antonio & Yasfir, 2019). In 2009, South Africa experienced its first recession since 1992, as the economy declined by 1.5% and the stock of foreign debt was US$4.32 million. The recession indicated that the South African economy is very susceptible to shocks in external demand as foreign debt plummeted by 1.08% in 2010 and debt increased in 2011 from US$4.5 million in 2010 to US$5 million (IMF, 2011). South Africa has borrowed profoundly after the apartheid regime as foreign loans showed a decreasing trend since 1997 to the year 2000. This could be as a result of participation in the global financial market posing a promising macroeconomic base in South Africa consenting international lenders to extent credit into South Africa (Alison, 2017).

##### External Debt Profile of Cameroon

The management of Cameroon’s external debt has been a major macroeconomic problem especially since the early 1980s. Despite government efforts to manage and minimize the catastrophic impact on the country's economy, national debt has increased over the years (Akum, 2011). These efforts range from various refinancing arrangements to debt conversion programs and the conscious allocation of key resources for debt repayment. Of particular concern to authorities is the associated high debt burden compared to the country's ability to repay debt (Ntangsi, 2009).

According to Adesola (2011), external debt capacity shows the ability of a debtor country to internalize its debt obligation without compromising its growth objectives. It also reveals the extent to which a country can meet its obligations with export revenues without resorting to exceptional financing, heavy delinquency, restructuring contracts, or some costly options that can create further distortions. If a country, as a result of unpaid arrears of debt, has to restructure its debt, adjust the economy, especially the consumption and investment patterns in order to establish an artificial savings – investment equilibrium, then it is obvious that its debt servicing capacity is low. Indeed debt sustainability remains an essential condition for economic stability. The total external debt of Cameroon was seen to be unsustainable around the late 1980s following heavy dependence on external resources to run the economy (Mbanga & Sikod, 2008).

This put a strain on the economy and had little or no resources to continue debt repayment, not to mention principal repayment. Donors had no choice but to reschedule and / or cancel most of the outstanding debt of countries that met some of the criteria set by the donor, such as: 2008). With this in mind, the International Monetary Fund (IMF) and the World Bank are implementing structural reforms as part of their structural adjustment and stabilization programs as a better long-term solution to the problems of economic growth and development of debtor countries including Cameroon. This policy package insisted on privatization and the liberalization of the economies of the indebted countries and gross reduction in public spending (ADI, 1996).Between the period 1970 and 2003, the total external debt of Cameroon increased from 14.23% to 96.3% of Gross Domestic Income (World Bank, 2012). As from 2005, and following progress in the debt reduction, rescheduling and cancellation initiative by the donor community, the total debt of Cameroon began to reduce gradually. In 2008, Cameroon's external debt to each donor was only about US $ 1.438 billion, almost 50% less than in the 1980s.

Cameroon's average real gross domestic product (GDP) has increased since 1970. Real gross domestic product was 141 billion FCFA in 1980 and approximately 284 billion FCFA in 2008 (Ntangsi, 2008).

In recent times, Cameroon’s level of public debt is worrying. Cameroon, a beneficiary of

the High Debt Poor Countries Initiative, significantly reduced its public debt in 2006.

But it has been in a lot of debt since then. The stock of public debt rose from 12% of

GDP in 2007 to 45.8% of GDP (about two-third external and one-third domestic) by

September 2020. Cameroon has the characteristics of a country at high risk of debt

distress (Akum, 2011). China has 61.3% of Cameroon’s bilateral debt, or 27.4% of its

total debt, and the ADB holds 30.1% of the multilateral debt, or 12.3% of its external

debt. Over indebtedness could be problematic because there is a need to support

economic recovery in 2021 and to carry out the major structuring projects envisioned in

its new national development strategy for 2020 to 2030. The present value of the

nation’s foreign debt (current US$) in Cameroon was reported at $8.2billion in 2019

(World Bank 2020).

##### External Debt Profile of Kenya

Kenya foreign debt stood at Ksh 2.4 trillion as at between 2017 and 2018. There was an increase from Ksh 2.1 trillion in June 2017. This translated to an upsurge of external debt stock by 12.6%. The upsurge was due to increase in international sovereign bonds disbursement, commercial syndicated loans and bilateral creditor’s disbursements (Republic of Kenya, National Treasury, 2018). Generally, external debt increased since the issuance of Eurobond. There has been gradual increase in multilateral while bilateral debts have been decreasing (Otieno, 2019; Adofu & Abula, 2010). Stock of commercial debt has gradually increased since the debut Eurobond. In the same period, there has

been gradual increase in multilateral debt while bilateral debt exhibited a declining trend. The loans from foreign commercial banks have been growing for instance in the year 2018 commercial bank loans expanded by 4.6% (Otieno, 2019).

Kenya experienced a negative economic performance growth of -4.66% in 1970. This trend reversed in 1971 where the growth up to 22% and 17% in 1972. From 1973, the economic performance declined to 0.88% in 1975. From 1991 to 1993 experienced the worst economic performance where the annual growth rate was 1.44% in 1991 and - 0.8% in 1992. During this period GDP growth stagnated, agricultural production decreased, inflation hit 100% and government budget deficit was more than 10% of the GDP (Mwaniki, 2016). The growth of GDP improved in 2004 and 2005 the country achieved a growth of 5.1% and 5.9% respectively. This growth in 2004 and 2005 was due to expansion in hospitality, service industry and construction and recovery of construction sector. In 2007, growth rate was 6.85% and due to post election violence in 2008, the country realized a paltry 0.23%. The GDP growth rate in 2015 was 5.72%, “while 2016 the country posted a growth rate of 5.87%”. The slight improvement in GDP growth was due to stable macroeconomic environment, robust improvement in agricultural inputs, growth in construction sector, finance and insurance and real estate (Mwaniki, 2016).

##### Domestic Debt Management in Sub-Sahara Africa

The management of domestic debt by the Federal Government is a statutory obligation of the CBN but which is now handled by the debts Management office in the presidency. It is the Central Bank which is entrusted with the issuance and control of Federal Government the banks and the contractors (Obadan, 2014; Mbah, 2016). The management of domestic debt involves: i) advising the timing of flotation of debt instruments and terms of issue ii) advertising of public subscriptions to the issue iii)

collecting the proceeds of issue on behalf of Government and maintaining proper books of accounts in respect of receipts and disbursements iv) supervising the issue of certificates and warrants to the lenders v) paying of interest and principal on the due dates vi) management the ‘sinking fund’ set up to facilitate the redemption vii) providing information on regular basis and advising Government about the position and implications of domestic debt (Obadan. 2014).

##### Economic Indicators of Domestic Debt

Some economic indicators of domestic debt burden are the ratios of debt stock and the fiscal deficit to the Nation’s gross domestic product. The ratios were 5% and 6.9% in 1970 and 1974, respectively (Onakoya & Ogunade, 2017). By the middle and late 1970’s, when domestic debt instrument became veritable sources of financing the budget deficit of the Government, the domestic debt stock as a ratio of the gross domestic rose rapidly from 8%in 1975 to 2% in 1980 (Mbah, 2016). Therefore, the ratio rose more sharply, registering 39% and 41% in 1985 and 1991, respectively. Similarly, the annual fiscal deficit as a portion of the gross domestic product rose significantly, fluctuating between 4 and 10% during 1980 and 1986, and standing at 12.4% at the end of 1991 and presently is 40% of GDP. The lower the ratio of debt to the gross domestic product, the less harsh the debt repayment and service terms will be (Mbah, 2016).

##### Instruments of Domestic Borrowing

Government project are usually financed through the issuance of debt instruments which includes Treasury Bills, Treasury Certificates, Government Development Stocks, General Obligation Bonds, Revenue Bonds, and Special Assessment bonds. The most frequently used of the instruments are discussed, as follows:

1. Treasury Bills (TBS) - It is a highly liquid financial obligation of the federal government issued by the Central Bank of Nigeria in multiples of AD 1000.

Every week with an expiration of 91 days. They are the main tool for open markets in Nigeria (Monogbe & Okah, 2018).

1. Treasury Certificates- They is financial instruments just as Treasury bills, with maturity ranging from one to two years. The Treasury Certificate rates are usually higher than those of Treasury Bills. The major investors in Treasury Certificates are the discount houses, commercial and merchant banks (Monogbe & Okah, 2018).
2. Government development Stocks- Development stocks are capital market instruments. They are either medium or long-term, issued to finance development projects or plants. The longer the maturity the higher the yield. The principal investors in development stocks are the insurance companies, commercial banks, Central Bank of Nigeria and other types of institutions as mortgage banks. Federal Government stocks are debt raised by the country. The sale process is generally handled and administered by the Central Bank of Nigeria, which is governed by the Securities and Exchange Commission. The securities are authorized for listing on the stock exchange (Didia & Ayokunle, 2020).
3. Revenue Bonds- Revenue Bonds are issued by the state and Local Governments Councils. They are backed up by the pledge of revenues to be generated from the project being financed. Municipal bonds issued with a promise to pay principal and interest from the proceeds of the real estate to be built with the proceeds of issuance (Ayadi & Ayadi, 2018).

##### Domestic Debt Profile of Nigeria

During the review period, domestic debt increased astronomically, accounting for an average of 114.98% of bank deposits. In 1994, debt as percentage of bank deposits was

250 percent and reduced progressively to 74.94 percent in 2005and was as low as 7.62 percent of bank deposits in 2008 (Sulaiman & Azeez, 2016). In terms of tenor, the domestic debt was highly short tenured until recently. For instance in 1994, treasury bills accounted for 42% of domestic debt, treasury bond accounted for 48%, treasury certificate accounted for 9.16 percent and development stock accounted for 8.22 percent of domestic debt and this was the trend until 2007 (Omoke & Ugwuanyi, 2018). In 2002, treasury bill accounted for 62.93 percent, treasury bond accounted for 36.93 percent and development stock which is the long term instrument accounted for a mere 0.14percent of domestic debt. The result is that debt was used to finance recurring expenses that did not stimulate growth. But this situation reversed from 2007 as the contribution of treasury bills to domestic debt fell to 26.50 percent, Treasury bond accounted for 18.80 percent and federal government bonds which are the long term instrument accounted for

54.67 percent of the domestic debt (Adesuyi & Falowo, 2013).

##### Reason for Rising Domestic Debt Profile in Nigeria

Theoretically, there are three reason often advanced for government internal borrowings (Alison, 2017). The first is to finance the deficit, the second is to implement monetary policy, and the third is to develop the financial sector (providing tradable financial products to deepen the financial market). In Nigeria, several factors have been proposed to explain changes in the domestic debt profile from the 1960s to the present (Odozi, 2018; Rapu, 2016). The main factors have been high budget deficits since the 1980s, low production growth, significant spending growth, high inflation and a narrow income base. The federal government's financial transactions created a massive deficit from 1994 to 2008, averaging 1.93% of GDP. From an average deficit of 1.56 percent of GDP

for the period 1994-1979, it increased on average to 3.35 percent in 1999-2003 and then reduced to 0.86 percent of GDP in 2004-2008. A very remarkable feature of the government fiscal expansion was the financing of the excess expenditure from domestic debt averaging 114.98 percent of bank deposit between 1994 and 2008 (Omodero, et al, 2020).

Cross country relationship between fiscal deficits (as a portion of Gross Domestic Product) and the size of government debt markets confirm that countries with large fiscal deficits have issued more government securities in domestic markets (Mihaljek et al, 2019). Generally, the decline in government revenues was offset by borrowing from central banks using lending methods and instruments. These advances have contributed to the continued growth of debt volume by refinancing by placing new Treasury bills and Treasury bonds to pay holders of debt instruments that have never been paid by the federal government but are due, Adofu et al, (2019).

##### Domestic Debt Profile of Kenya

According to the IMF (2018), domestic debt accounted for 23% of total debt in sub- Saharan Africa between 1995 and 2000, up from an average of 20% between 1990 and 1994. Furthermore, the domestic debt to GDP ratio for these countries increased considerably from 12-16% in the same period (Bonga, et al, 2015). The shift in sub- Saharan Africa's total public debt structure to domestic debt underscores the need for governments to establish and implement sound domestic debt management strategies to mitigate the impact of rising debt levels. Economic theory suggests that a prudent level of borrowing in developing countries can contribute to economic growth (Patillo et al, 2018). Stiglitz (2017) argued that government borrowing could dampen investment,

reducing production and wages in the future. When productivity and wages are affected, the well-being of citizens is vulnerable. Buchanan (2018) opines that undertaking domestic debt will lead to a shift in tax obligations from the current generation to future generations. This shift from present to future taxation can mean a shift in tax burden from the present to future generations. Barro (2018) argues that the transition from current taxation to future taxation, implied by debt problems, does not impose any burden on later generations due to the phenomenon of operational generation transfer. In the context of broader macroeconomic public policy, governments are able to sustain both the level and rate of public debt growth in nature over the long term and serve in a variety of situations while achieving cost risk goals. You should strive to ensure that you can receive it (IMF, 2003). Lipsey (2016) defined economic growth as a positive trend in gross domestic product over the long term. This is expressed in terms of increase in Gross Domestic Product (GDP) that must be adjusted for the impacts of high level of inflation for it to be meaningful.

Kenya Debt Review: Prior to the 1980s, Kenya received major assistance in Africa. The main purpose was to build the infrastructure to integrate the large rural economy into the import substitution economy of Kenya at the time emerging import substitution Kenyan economy (Brender & Drazen, 2018). The 1990s witnessed a steady decline in development assistance to Kenya occasioned by a perception of poor governance and mismanagement of public resources and development assistance. Other factors include the end of the cold war and the collapse of the Soviet Union. These led to a debt crisis in the country in the early 1990s which turned Kenya into a highly indebted nation (Bazza, Binta & Alhaji, 2018). The loan issues were exacerbated in the 1990s by improper management of the macro economy, such as the Goldenberg scandal, which stole billions of shillings from Kenyans and reduced the influx of donors. As a result, the

government relied on occasional debt reschedules and high short-term domestic loans to cover its costs. The details of Kenya's debt burden remain difficult. In August 2008, the country's debt was 876 billion Kenyan shillings in a country of 36 million people, and there were many challenges (Stiglitz, 2017)**.**

##### Domestic Debt Profile of Cameroon

Domestic debts in Cameroon have been increasing consistently. According to IMF (2020), the public debts of Cameroon reached CFAF 8,488 billion at end of Dec, 2018. It further increased to around CFAF 9,429 billion as at end of September, 2019 (Didia & Ayokunle, 2020). Domestic debt increased due to large issuances of treasury bills (BTA) and government bonds (OTA) to offset lack of budget support, and SONARA’s (National Oil Refinery; which owns and operates the only crude oil refinery in the country) shift towards import financing using letters of credits from domestic banks (in place of external suppliers’ credits) (Didia & Ayokunle, 2020). External borrowings also increased due to payments to foreign-affiliated projects, with approximately 21 billion CFAF debt reliefs for rescheduled negotiations with China on paid loans and interest- free loans from China, despite a temporary freeze on payments. The composition of domestic debt has shifted towards shorter maturities with increased issuance of treasury bills and SONARA’s expanded use of letters of credits (Fatima, et al, 2018). Treasury bills account for around 27 percent of domestic debt, while BEAC statutory advances represent 20 percent. The share of float and arrears in domestic debt has continued to decline from 33 percent at end-2017 to an estimated 17 percent at end-September 2019. The average maturity of domestic debt (excluding free float and sonara debt) was 4.4 years and the weighted average interest rate was 3.6 percent. 76% of SONARA's domestic debt is short-term bank debt, 60% of which is letter of credit (World Bank, 2020). Cameroon's government bonds in 2020 were 9,681 million LCU (local currency

unit). Cameroon's government bonds increased from IDR 4,988 billion in 2001 to IDR 9,681 billion in 2020, increasing at an average annual rate of 6.47% (IMF, 2020).

##### Domestic Debt Profile ofSouth Africa

South Africa's debt management has come a long way since the 1970s, when the need to develop the debt and capital market was recognized (URT, 2017). Despite a well- established domestic market, imbalances persist and are manifested in poverty, unemployment, and high inequality. Therefore, the South African government is encouraged to allocate more resources to address these imbalances. Budget resilience needs to be further strengthened by promoting FDI policies and leveraging utilization rates in all major sectors of the economy (Wanjiru, 2017).

##### Budget Deficit and the Sub-Saharan Economy

##### Budget Deficit in Nigeria

Nigeria has operated on a budget deficit since 1981, except for 1995 and 1996, when the federal budget recorded a surplus. From 1981, deficits increased from N3.9 billion to N8.3 billion in 1986 and it further increased to N15.1 billion in 1989. From 1990, the rising trend of budget deficit continued except in 1995 and 1996 when the budget witnessed or registered a surplus of N1 billion and N32 billion respectively (World Bank, 2012). In 1998, the overall deficit jumped to N133.4 billion and in 2002, it increased up to N301.4billion. Starting from 2003, government budget deficit declined from N202.7 billion to N172.6 billion, N161.4 billion and N101.3 billion in 2003, 2004, 2005 and 2006 respectively. Another increase was witnessed from 2007 at N117.2billion to N1,153.5 billion in 2013 (CBN,2014). The 2021 budget deficit is estimated at N5.6 trillion (revised 2020 figure was N4.98 trillion), roughly 70% of FGN revenues and about 3.93% of nominal GDP. The growing fiscal deficit has necessitated the need to

borrow to plug the shortfall, significantly increased the debt stock, and expanded the cost of servicing outstanding debts ([www.pwc.com/ng](http://www.pwc.com/ng), 2021).

In recent times, the Federal Government has struggled to finance its budget mainly due to low revenue, which is susceptible to oil price volatilities. Over the last four years, FGN's total debt portfolio has nearly tripled from 10.9 trillion N in 2015 to 28 trillion N in September 2020. The FGN plans to borrow nearly N4.69 trillion (excluding multilateral/bilateral project-tied loans) to finance the over N5.6 trillion budget deficit. If this plan is executed, it will potentially expand the FGN’s total debt outstanding to more than N32 trillion by the end of 2021 ([www.pwc.com/ng](http://www.pwc.com/ng), 2021).

##### Budget Deficit in Cameroon

Cameroon has experienced periods of economic growth and decline. During the growth phase, public spending has expanded the size of the public sector. The decline, which began in 1986, was characterized by government spending exceeding revenues (Were, 2001). The government's reconstruction program has resulted in a desperate effort to significantly reduce public spending and increase revenues. The export boom of the late 1970s and the 1980s provided Cameroon with considerable resources including an oil windfall that was partly kept out of the state budget (Ntangsi, 2009).

The huge foreign earnings greatly affected both domestic and external accounts. The oil boom helped the government to constantly run surpluses with little foreign borrowing. The government heavily depended on oil revenue without explicitly showing so since some oil revenue was spent from extra budgetary account (Sundell & Lemdal, 2011). The expenditures from oil revenue pushed up prices of non-traded goods, which were fairly inelastic in supply, and because of the relative high price of the non-tradable to

tradable, there was increased appreciation of the real exchange rate (Amin, 2002). This greatly hurt the producers of primary products such as cocoa, coffee, cotton, etc. In 1986, the drop in export prices led by oil had a serious negative effect on the economy. The situation was worsened by the appreciation of Cameroon's real exchange rate, mainly because of the depreciation of the U.S. dollar and the Nigerian naira. Cameroon's foreign exchange earnings were drastically reduced and the decline had great impact on the state budget. Budgetary revenues fell sharply while there were increases in public expenditures (Sichula, 2012). The budget deficit was therefore inevitable, and from 1986, Cameroon's economy declined into a deep economic crisis. The structural problems including crisis in the public finance and overgrowth of public expenditures seemed to have aggravated the economic situation.

In 2019, Cameroon’s budget deficit represented 2.6% of GDP, according to the Bank of Central African States (BEAC), (2020). This represents a slight rise (3 basis points) compared with the 2.3% recorded by the country in 2018. The institution adds that only Cameroon and Chad (-1.2% of GDP against 1.5% in 2018) recorded budget deficits, while the other four CEMAC countries ended the fiscal year with surpluses. Budget surpluses were recorded in Congo (6.0% of GDP, after 5.3% of GDP in 2018), Equatorial Guinea (1.1% of GDP, against 0.1% of in 2018), Central African Republic (2.9% of GDP, against 0.4% in 2018) and Gabon (2.4% of GDP, against -1.4% of GDP in 2018) (BEAC, 2020). Cameroon's goal was to reduce its budget deficit from 2.3% in 2018 to 2% in 2019. However, after the May 2019 budget revision, many economists had already predicted that they would not be able to reach that goal. For the 2020 Fiscal year, the country plans to reduce the budget deficit to 1.5%. However, considering the current economic situation as a result of Covid-19 crises, the target remains highly unattainable (BEAC, 2020).

##### Budget Deficit in Kenya

Budget deficit financing in Kenya comes from two major sources namely; external and domestic debt. Since the government is the largest borrower in the capital markets, debt Management influences general credit conditions in the economy (Senbet, 2017). If government decides to Increase the return on its securities, this has an influence on all other financial assets, tending to increase their yields and therefore affecting interest rates so that they may remain competitive (Wanjiru 2017). A potential harmful effect of financing the budget deficit through domestic borrowing is a reduction in private investment. This could lead to adverse effects in the economy such a slower productivity; lower standards of living and slow rate of economic growth. Budget deficit financing and private investment is when the government borrows from the private sector to finance the fiscal deficit; it sells securities to the private sector. In return, it receives money from individuals and firms. The money from the sale of government securities is deposited in government accounts and can be spent in the same way as tax receipts. Alternatively, the government can borrow from the Central Bank by selling securities to the bank (Richard, Kurayish & Enoch, 2020).

Globalization has made developing countries to lose a historically reliable source of income due to trade liberalization in the form of tariff income. In addition, these countries have also struggled to recover lost income despite the tax reform measures that they implemented to bridge these gaps (Velnampy& Jaffna, 2013). Situation like this leads to a budget deficit and poses challenges for the long-term growth of any economy due to the effects of rising inflation, devaluation of currencies, lower gross domestic product, fiscal adjustments and more (Kelikume, 2016). Like other developing countries, Kenya has a budget deficit due to limited resources due to low tax revenues, low salaries and low savings (Kosimbei, 2009). This is the Keynesian view of the budget deficit.

Theory further says that the budget deficit is positively linked to the actual growth of the economy. (Eminer, 2015).

Ricardian's theorem assumes that budget deficits are due to increased government spending that can be resolved immediately or in the future. Therefore, the tax cuts created by a budget deficit have no impact on spending and savings according to this proposition (Mangio, 2004). Neoclassical theory notes that the governments increased demand for loanable funds would distort the degree of private investment as an implication of the interest rate rising (Van & Sudhipongpracha, 2015). Decline in private investment will certainly slow economic growth. The breakdown of current spending and development spending for the 2019/2020 fiscal year was 64% and 36%, respectively (World Bank, 2019). This means that much more spending on recurring items such as wages, operating expenses and other daily expenses flows within various government agencies, leaving only 36% for development projects, including debt repayment (Odongo, Odhiambo & Ombok, 2019). Since the Kenya Revenue Authority (KRA) missed the Sh1.65 trillion target, the government is likely to continue borrowing as well as pursue new tax proposals so as to plug any budget deficits (Odongo et al., 2019). However, more trouble emerges when the Kenya finds itself with a net foreign borrowing standing at KSh 3 trillion as at June 2019 and domestic borrowings projected at KSh8 trillion. Also, while the devolved governance structure in Kenya is a good thing, the 47 counties may not be able to consistently meet the expenditure required to maintain these governance structures. Reports by the controller of budget revealed that the recurrent expenditure of the counties take the lion’s share of devolved funds at the expense of their development expenditure (Akinyi, Odunga & Opuodho, 2018).

However in view of the slowdown in global growth, the Government of Kenya has adopted a comprehensive fiscal consolidation policy package that includes fiscal,

monetary and financial policies (GOK, 2019). The budget deficit for Kenya for the 2020/21 fiscal year (July-June) was set at 4.9 % of gross domestic product (Budget Policy Statement, [BPC], 2020). The government expects the deficit to drop by the fiscal year 2022/23 to 3.5 per cent of GDP (BPC, 2020). Fiscal deficits, which peaked at 9.1 per cent of GDP in the financial year 2016/17, were driven by higher spending on infrastructure projects such as the Chinese debt-funded railway project. The fiscal gaps were preceded by the Kenya Revenue Authority (KRA)'s consistent failure to meet the government's lofty income collection targets every financial year (Wanjiru, 2017). Economic growth is estimated to have slowed to 5.6 percent in 2019, from 6.3 percent a year earlier and well below the government’s initial estimate of about 6%: The slowdown was due to lower-than-expected growth in the agriculture sector, which accounts for close to a third of Kenya’s annual output (BPC, 2020). Growth is expected to bounce to 6.1 % in 2020, before rising to 7% per annum in the medium term, driven by a focus on sectors with high potential like manufacturing (BPC, 2020). National Treasury data shows that ordinary income has decreased steadily as a share of GDP, moving from 18.1% in 2013/2014 to 15.7% in 2018/2019, forcing the government to turn to further borrowing to plug the budget deficit (Odongo, Odhiambo & Ombok, 2019).The government remains the largest buyer of goods and services and increased project spending has an impact on economic growth, which is projected this year to be 6%. This has the effect of putting money into private hands by demanding raw materials, which ultimately creates new jobs and sales for Kenya’s Corporate (Akinyi, Odunga & Opuodho, 2018). The World Bank recently approved a Sh107 billion ($1 billion) loan to help Kenya close its deficit and fight the financial shocks of the global corona-virus pandemic (World Bank, 2020). Kenya's budget deficit jumped from an original estimate of below 7 per cent to 8.2 per cent of GDP in the financial year until the end of March

2020. Mainly due to the drop in tax collection and the loss of VAT revenue and income tax cuts levied to reduce the effect of corona-virus on workers and companies (Akinyi, et al, 2018). Income, sales and sales tax cuts are expected to generate Sh43 billion in revenue in three months, the International Monetary Fund (IMF) warned after agreeing a Sh78.3 billion ($739 million) in emergency financing early this year to help Kenya respond to the economic shock caused by Covid-19 (IMF, 2020).

##### Budget Deficit in South Africa

Since 1985, South Africa's fiscal development has shown a significant budget deficit with stagnant economic growth. According to the Treasury (2014), South Africa experienced a high budget deficit, mainly due to high unemployment and weak economic growth. The first largest budget deficit recorded in South Africa was 6.6% in 1993, but GDP increased by only 1.2%. One of the main reasons cited was an increase in spending on preparing for the country's first democratic elections. Only a year after the democratic government, the budget deficit fell to 4.6% and GDP increased by 3.4% (Richard & Ogiji, 2016). This was a good sign that the new South African government is on the right track to deal with the mistakes of the past apartheid regime. The South African government remains financially enthusiastic and is working on prudent budget reforms through the implementation of the 1996 Growth, Employment and Redistribution Policy (GEAR). This political initiative was aimed, among other things, to reduce the overall budget deficit to 3%, save states in relation to GDP, and reduce state consumption. The policy helped the South African government reduce its budget deficit to 3.2% in 1998, the South African Reserve Bank (2013) reports. However, the budget deficit was still above the 3% expected by GEAR policy. In the same year of 1998, GDP growth grew by only 0.5 percent. During the same period, South Africa recorded initial budget surpluses of 0.3 percent and 0.7 percent, respectively. The budget

surpluses were mainly due to large savings form debt servicing cost and under-spending by government departments. The reasonable expansionary monetary policy implemented by the South Africa Reserve Bank during that time also assisted the fiscal authorities in realizing budget surpluses. The favourable economic conditions of that time assisted the government of South Africa in reducing the debt and also allowed expenditure redistribution. In the later stage of 2008 towards the beginning of 2009, the South African economy became hostile mainly due to the global economic meltdown. The magnitude of the global economic predicament on South African economy was enormous with budget deficits shifting from a surplus of 0.7 per cent to deficit of -4.6 per cent (Reinhart, Vincent & Kenneth, 2012). Since then, the South African economy has been struggling to fully recover and this has positioned the country under fiscal constraint environment. According to the State Treasury (2015), national financial constraints are affecting the speed and extent of government contributions to the National Development Program (NDP).

##### Theoretical Review

For every issues and concept in the field of academics, there exist various theoretical assumptions on which such knowledge are based. The theories postulate just how a particular concept evolve, thus, in this study various theories of deficit financing are discussed viz a viz the Keynesian theory, Neo-classical theory, Ricardian theory and Dual gap theory.

##### Keynesian Theory of Deficit Financing

The development of economic thought in the 20th century was greatly influenced by the ideas of John M. Keynes. These ideas led to the imposition of a policy of active state intervention in the economy (Ahmad, 2019). This intervention required the state to utilize various means of financing government spending, which resulted in specific

emphasis on deficit financing. Although Keynes himself did not advocate compulsory recipes for economic development and social welfare; his followers continued to study government intervention in the economy, thereby establishing Keynesian theory (Monogbe & Okah, 2018). This theory refutes the classical argument of limiting the use of deficit finance. Despite criticisms of Keynes's basic ideas over the last few decades, it can be argued that Keynesianism still provides government agencies with useful ideas and solutions. According to Keynes, in times of unemployment the task of the government is to borrow money and spend it in the economy (Okoro, 2013). It is of key significance to note that, First, the richer the community, the wider the gap between actual and potential production, and the more obvious and exorbitant shortcomings of the economic system. Second, poor communities tend to consume most of their production, so a very modest investment is sufficient to secure full employment. Third, wealthy communities need to discover many generous investment opportunities in order for the savings tendencies of rich members to match the employment of poor members. Therefore, propensity to consume, marginal efficiency of capital, and interest rate theory are crucial to Keynes (Owoye & Onofowora, 2017; Okoro, 2013).

The Keynesian economists propose a positive relationship between deficits financing and economic development. Abba Lerner (1948) is also a prominent proponent of the Keynesian concept of debt. According to him, loans taken by the government should not transfer the debt burden to future generations (Onuorah & Ogbonna, 2014). To implement the planned expenditure when there is a shortage of funds, the burden must be shouldered by the current generation.

In response to the arguments against debt financing of budget deficits, Lerner offers four mutually-derivative hypotheses: Public debt should not increase; If public debt increases, the increased interest is not to be paid by increasing the current level of

taxation; If the increased interest is paid by increasing the level of current taxation, these taxes are based only on the portion of benefits obtained from increased government spending and, therefore, are not considered a loss to the public, but simply a transfer from taxpayers to bondholders; High rates of income tax should not discourage investment, because the appropriate tax deductions for incurred losses will reduce investment capital at risk by the same proportion by which net investment income is reduced (Pechman, 2018).

##### Neoclassical Theory of Deficit Financing

The neoclassical economist proposes a negative relationship between fiscal deficits and economic development. The theory states that increased government spending stimulates aggregate demand, creating fierce competition between governments and private investors to demand credit, resulting in higher interest rates and the issuance of private bonds, private investment and private spending. And inflation raises levels, causing similar increases in current account deficits and ultimately slowing the pace of economic development through the movement of resources (Osuka & Achinihu, 2014). The Neoclassical school considers individuals planning their consumption over their entire cycle. By shifting taxes to future generations, fiscal deficits increase current consumption. Assuming full employment of resources, neoclassical schools argue that increased consumption means decreased savings. Interest rates need to be raised to create capital market equilibrium (Omoke & Ugwuanyi, 2018). Higher interest rate in turn results to a decline private investment, domestic production and an increase in the aggregate price level.

As the government sector expands, rising prices for these resources due to government over-demand will shrink the private sector, reducing private sector investment and consumption. Therefore, the expansion of the national sector has replaced the private

sector (Evans & Egwakhe, 2016). However, the excessive government demand for these resources is the productivity of the private sector, as resource migration is an important issue that needs to be addressed, especially in developing countries where resources can be scarce even in the private sector. Has a serious impact on (Brender & Drazen, 2018). The assumption that government borrowing reduces private investment plays an important role in neoclassical analysis.

##### Ricardian Theory of Deficit Financing

Baro's (1974) theory assumes that asset owners will fully discount future tax obligations embedded in the deficit. This implies that, a deficit financing with borrowing and a lump-sum cut in tax today will definitely be followed by a lump-sum tax increase in the future and will be fully offset by an increase in private saving, as taxpayers recognize that the tax is merely rescheduled, and not cancelled. Offsetting the rise in personal savings means that the deficit does not affect national savings, interest rates, exchange rates, future GDP, or future national income (Gale & Orszag, 2004).

Governments may either finance their deficit by taxing current taxpayers, or by borrowing. The taxes that were reduced in the previous year to repay the borrowed funds will eventually be raised higher than they should have been paid before. That is, personal savings accumulated during the increase in government spending will be used to offset the funds borrowed by Fund Future (Sorawon) & Adekunle, 2018). Therefore, Ricardo's equivalence suggests that government attempts to influence demand through fiscal policy will fail. Therefore, deficit finance does not overcrowd or crowd investors. From his point of view, there is no positive or negative relationship.

##### The Dual Gap theory of Deficit Financing

This theory is proposed on the condition that the state plays an important role in investment in achieving an appropriate level of economic development. However, such

investments cannot be made continuously without huge domestic savings. This means that a country needs investment and huge domestic savings to achieve a sustainable level of development (Ifeanyi & Umeh, 2019; Osuka & Achindu, 2014). However, in order to achieve comprehensive development, these domestic savings and investments are inadequate, and it is necessary to borrow funds from overseas. This means that the combination of domestic savings, investment, and foreign borrowing is a function of economic development, as expressed in this theory. Furthermore, if the domestic resources are to be supplemented from abroad, such as excess of import over export

(i.e. M > E), then; I > S and M > E

Hence, I – S = M – E

In national income accounting, an excess of investment over domestic saving is equivalent to excess surplus of import over export.

Income = consumption + import + savings Output = consumption + export + investment

Since Income = output, then Investment – Saving = Import – Export

Omoruyi (2005) found that when trying to close the gap between savings and investment levels, most economies relied on foreign borrowing to close this gap. As Chenery (1966) shows, this gap provides motivation for external debt. This is to make up for the country's shortage of savings and investment, as increased savings and investment lead to increased economic growth (Hunt, 2007). Dual-gap analysis provides a framework that shows that national development depends on investment, and that such investment requires insufficient domestic savings to ensure development takes place (Olanrewaju, Abubakar, & Abu, 2013).

Ajayi and Oke (2013) in their work asserted that, the basis of the dual gap theory, asserts that countries that requires saving and investment could import to achieve a particular rate of growth. According to Nwanne (2014), if the available domestic saving falls short of the level necessary to achieve the target rate of growth, a savings investment gap is said to exist. On a comparable note, if the most import requirement had to gain the increase goal is more than the most viable stage of export, then that is an export-import of foundation change gap. This take a look at adopts a small macroeconomic version framework to spotlight the dynamics of mounting authorities debt and its impact on monetary increase in Nigeria.

##### Empirical Review

The impact of public debt deficit finance on economic growth has been controversial over the last few decades among economists and policy makers in both developing and developed countries around the world. As already mentioned, the results of literature research on the impact of budget deficits on growth are not equally consistent. Although there have been some empirical studies focusing on the budget deficit problem and its impact on economic growth, literature reviews have included some negative, positive, or ineffective impacts on this relationship.

##### Deficit Financing and Economic Growth in Sub-Saharan Africa

Okah, Chukwu and Ananwude (2019) investigated the impact of deficit finance on Nigeria's economic growth from 1987 to 2017. Autoregressive vector estimation was employed to estimate the model. Analysis conducted has shown that deficit finance has a positive but insignificant impact on Nigeria's economic growth. Based on the findings, they recommended that government should strive to diversify its revenue base and also demonstrate a high level of transparency in both its monetary and fiscal operations among others.

Similarly, Nwanna and Umeh (2019) examined the effect of deficit financing on Nigeria economic growth using secondary data from 1981-2016. OLS estimates show that the deficit budget from external debt borrowing has had a significant negative impact on Nigeria's economic growth. Domestic debt also has a positive impact on Nigeria's economic growth, but debt repayment does not have a significant impact on Nigeria's economic growth.

Ifeanyi and Umeh (2019) examined the effect of deficit financing on Nigeria economic growth. The main objective of the study is to empirically examine the effect of deficit financing on Nigeria’s economic growth. The study used secondary data from CBN statistical bulletin on various issues as relevant for the period under study (1981-2016). Augmented Dickey Fuller (ADF) unit root test, Johansson cointegration test, and normality test were used for the analysis. According to a survey, the deficit of external debt borrowing has had a significant negative impact on Nigeria's economic growth. Domestic debt also has a positive impact on Nigeria's economic growth, but debt repayment does not have a significant impact on Nigeria's economic growth. Therefore, the study recommends that the government hire a monitoring team to ensure that the budget is properly and carefully implemented and to borrow to reduce corruption, connections and waste. The team does this by holding all the government-sponsored workshops accountable.

Bazza, Binta and Alhaji (2018) evaluated the impact of deficit financing on economic growth in Nigeria for the period spanning from 1981 to 2016 using the ARDL Technique. The result from the ARDL regression estimate showed that government deficit finance over the years had significantly impacted on the output growth of Nigeria.

Ali, Mandara and Ibrahim (2018) investigated the impact of deficit finance on Nigeria's economic growth during the period 1981-2016. Secondary data were used and obtained from the Central Bank of Nigeria's preliminary statistics, and Dickey Fuller and ARDL methods were used for regression analysis to determine the constant properties of time series variables. The results of the unit root test showed that the degree of integration of the variables was mixed. NS. The results of I (0) and (1), and ARDL regression estimates show that the government's deficit budget has had a significant impact on Nigeria's long-standing output growth. As the F statistic of model 56.27987 (0.000000) shows, the variables used in this study have also proven to be important for economic output growth**.** The study therefore recommends that deficit financing should be increased effectively, and that government should ensure an efficient public expenditure process and fiscal discipline as well as maintenance of macroeconomic stability so that Nigerian economy can develop.

Hussain and Haque (2017) studied the effect of deficit financing on economic growth in Bangladesh. Findings from the VECM for BBS data reveal that there is a positive and significant relationship between FD and GDPGR, supporting the Keynesian theory, while findings from the VECM for World Bank data indicate that the impact of Fiscal Deficit (FD) on GDPGR is mild but negative and significant at the 5% level.

Richard and Ogiji (2016) investigated the implications of deficit financing on economic stability in Nigeria between the periods of 1970-2013. The study adopted regression analysis. The study found that external sources of deficit financing (EXF), non-bank public deficit financing sources (NBPF) and exchange rates have important and positive effects on indicators of economic stability in gross domestic product (GDP). The Deficit Funding Instrument (WM) banking system, the Deficit Funding Instrument (BSF) and the interest rate (INTR) have a negative impact on Nigeria's economic stability**.**

##### External Debt and Economic Growth in Sub-Saharan Africa

Olusegun, Olufemi and Olubunm (2020) critically examined the impact of external debt on economic growth in Nigeria between 1981 and 2018. The study employs ARDLECM estimation technique. Augmented Dickey Fuller was also employed to test the variables. The findings of the study revealed that EDS, DDS, FDI and GOVE were stationary at first differencing while GDPGR was stationary at level form.

Elwasila (2018) investigated the effect of external debt on economic growth of Sudan from 1969 to 2015 and made use of Johansen co integration method and the Vector Error Correction Method (VECM) estimation technique. The study showed that external debt had had positive impact on economic growth of Sudan whereas exchange rate and foreign direct investment had adverse effects on the economy

Odubuasi, Uzoka and Anichebe (2018), analysed the effect of external debt on the economic growth of Nigeria from 1981 to 2017 using Granger Causality and Johansen Co-integration estimation technique. The study revealed that external debt stock and government capital expenditure have positive on Nigeria’s economic growth while external debt service had no significant impact on economic growth.

Inna and Viktoriia (2018) investigated the nexus between external debt and economic growth in emerging economies between 2006 and 2016 and made use of ADL model and correlation analysis. The study revealed that external debt had no impact on the economic growth of the countries that were examined.

Ndubuisi (2017) examined the impact of external debt on economic growth of Nigeria between 1985 and 2015 using Johansen Co-integration and error correction estimation technique. The Findings showed that debt service payment had an adverse and insignificant impact on economic growth while external debt stock had positive impact

on economic growth; also, the causality test revealed that there is unidirectional causality running from external debt to GDP.

Forgha, Mbella, and Ngangnchi (2017), investigated the impact of External Debt and Domestic Investment on Economic Growth in Cameroon between 1980 and 2015. The study made use of two Stage Least Squares estimation technique. The study revealed that domestic investment positively affects economic growth while external debt had negative affect economic growth.

Onakoya and Ogunade (2017) investigated the impact of external debt on economic growth in Nigeria between 1981 and 2014. The study used Autoregressive Bounds testing method Distributed Lag (ARDL) and Ordinary Least Squares technique. The study revealed that external debt had negative impact on economic growth.

Ekperiware and Oladeji (2017) analyzed the structural break relationship between external debt and economic growth between 1990 and 2015 on economic growth in Nigeria. The result revealed that the 2013 external debt relief caused a structural break economic growth relationship with external debt in Nigeria and that the external debt relief did make available resources for economic growth in Nigeria.

Ajayi and Oke (2016) examined the effect of the external debt on economic growth in Nigeria. The study employed OLS regression analysis and it was revealed that external debt burden had negative impact on the nation income and per capital income of the nation, also, huge external debt led to continuous industrial strike and poor educational system, increase in retrenchment of workers and devaluation of the nation currency.

Sulaiman and Azeez (2016) investigated the effect of external debt on the economic growth of Nigeria between 1980 and 2015 using Johansen Co-integration estimation technique, the study revealed that there is a long run relationship among the variables and external debt had positive impact on economic growth.

##### Domestic Debt and Economic Growth in Sub-Saharan Africa

Recently, Richard, Kurayish and Enoch (2020) investigated on the relationship of internal debt and economic growth sustainability in Uganda from 1980 to 2016. The result of the study indicates that internal debt had a notable adverse effect on the economic growth of Uganda, particularly in the short run.

Didia and Ayokunle (2020) analyzed the impact of domestic debts on the economic growth of Nigeria from 1980 to 2016. The study adopted Vector Error Correction Model (VECM). The result of the study showed that domestic debt had a more favourable effect on economic growth than the external debt.

Saungweme and Odhiambo (2020) studied the impact of domestic debts on Zimbabwe's economic growth from 1970 to 2017. ARDL approach was adopted in study for analysis. The study offers an empirical proof that domestic debt collectively had a significant adverse impact on the economic growth of Zimbabwe.

Ayuba and Khan (2019) evaluated the relationship between Domestic debt and economic growth in Nigeria for a period covering 1981 to 2013. Autoregressive Dispersed Slack methodology was adopted in the study. The result of the study showed that residential debts had an aggressive impact on the economy yet decidedly influenced the total government income inside the period secured by the examination.

Ari and Koc (2018) investigated domestic government borrowing on the sustainable economic growth of the United States, China, Germany and Japan from 2000 to 2015. The study provided evidence that the two categories of public loans harmed infrastructural development. The outcome disclosed that the harmful effect was because the government of the four countries used in the study, exceeded the tolerable borrowing limit the countries' economy cannot withstand.

Burhanudin, Muda, Nathan, and Arshad (2017) analyzed the effects of government internal debt on the economic growth of Malaysia from 1970 to 2015. The Autoregressive Distributed Lag approach was adopted in the study. The result indicated that government internal debt in Malaysia is helping to sustain economic growth.

Kueh, Liew, and Yong, (2017) investigated the impact of domestic debt on the financial development of Malaysia from 1980 to 2015. The actual outcome demonstrated that residential obligation was roughly 37% of GDP while external debt was just 4% of GDP. The discoveries additionally uncovered that household obligation aggregation underneath the limit level contributed distinctly to financial development which, when it surpassed, the economic growth was discouraged.

Haffiner, Aruna, and Adams (2017) examined the impact of internal debt on economic growth of Sierra Leone from 1970 to 2015. The study adopted the use of ARDL model. The result indicated that domestic debt exerted adverse effect on economic growth in the short and long terms.

Tawfiq and Shawawreh (2017) investigated the impact of domestic debt on the economic growth of Jordan from 2000 to 2015. Ordinary least-squares model was adopted in the study. The result of the findings reveals that public commitment negatively affected commercial development.

Ugwu (2017) examined the impact of domestic debt on Nigeria's financial development from 2000 to 2016. The Ordinary Least Square Model was applied in the study. The discoveries uncovered that social responsibility had a critical association with the Gross Domestic Product (GDP) of Nigeria.

##### Budget Deficit and Economic Growth in Sub-Saharan Africa

Rana and Wahid (2020) conducted a time-series analysis using ordinary least squares estimation, vector error correction model, and granger causality test. The findings suggested that the government budget deficit has statistically significant negative impact on economic growth in Bangladesh.

Aworinde (2020) examined the effects of budget deficits on the current account imbalance and inflation in African countries. He basically focused on the twin deficit issue. He used VAR, Threshold Co-integration and ARDL approach to find the results and concluded that positive government deficit shock increases the current account deficit in Botswana, Egypt, Ethiopia, Ghana, Morocco, South Africa and Tanzania. This result is consistent with the Keynesian absorption theory that increase in the fiscal deficits would induce domestic absorption.

Hassan and Akhter (2019) showed the relationship between budget deficit and economic growth in the case of Bangladesh. An augmented Dickey-Fuller (ADF) and Johansen Co-integration test had been used for time series diagnosis and according to the results of diagnostic the test, Vector Error Correction Model (VECM) had been used. Empirical result showed statistically significant negative effect of budget deficit over economic growth of Bangladesh i.e. GDP growth rate, which conformed to many other developing countries of the world.

Ondogo (2018) examined the effect of budget deficit financing mechanisms on economic growth in Kenya. The researchers captured budget deficit using internal and external-internal budget deficit financing ratio in relation to economic growth. The study used secondary time series data for the period 1970-2014 from Economic Survey published by Kenya National Bureau Statistics. The study was guided by neoclassical growth theory and adopted correlational research design. The models were estimated using Ordinary Least Squares method. The results indicated a positive and significant

effect of internal budget deficit financing on economic growth. Also, there was a negative and significant effect of external budget deficit financing on economic growth while the effect of external-internal budget deficit financing ratio on economic growth was negative and significant. Hence, the study recommends that policies that will promote consecutive borrowing in order to reduce the negative effect of external budget deficit financing on the economy should be adopted. The government should also find ways of enhancing its revenue generation capacity especially by broadening the tax base to reduce the deficit which is financed by internal borrowing.

Onwioduokit and Inam (2018) investigated the relationship between budget deficits and economic growth in Liberia. The study employed Classical Ordinary Least Squares Technique (OLS) and Co-integration test using Engle- Granger Two-Step procedure (EGTS); and a parsimonious Error Correction Model. It was evident from the analysis that there exists a long run relationship between Budget deficit and economic growth in Liberia. There also exists a positive and significant relationship between Budget deficit and economic growth in Liberia. Therefore, a 1.0 percent increase in deficits will result in an increase of approximately 0.42 percent in economic growth in Liberia.

Solawon and Adekunle (2018) did a study on the short run and long-run effect of deficit financing on the economic growth of Nigeria. The study made use of secondary data sourced from the Central Bank of Nigeria Statistical Bulletin from 1986 to 2016. A test for unit root and co-integration using the Augmented Dickey – Fuller (ADF) and Bound Test were used to test for Stationarity and long run relationship among variables (given as Gross Domestic Product, Budget Deficit, Money Supply and External Debt). The Auto Regressive Distributed Lag (ARDL) was employed to examine the relationships among the variables used. The result of the Auto Regressive Distributed Lag (ARDL) revealed that all the explanatory variables (budget deficit, money supply and external

debt) have positive effect on economic growth with budget deficit being insignificant. It was further revealed that the Nigerian government has been experiencing fiscal deficit in the recent years which resulted from insufficient government revenue to finance government rising expenditure. They recommended that, government budget deficit should be centered on capital expenditure rather than recurrent expenditure to ensure investment in infrastructural facilities that could improve economic growth through enhancement of both domestic and foreign investment while external debt should be closely monitored in order to ensure that external borrowings are not beyond the expected threshold which could result in debt overhang.

Nwakobi, Echekoba and Ananwude (2018) determined the effect of fiscal deficit on selected macroeconomic variables in Nigeria by specifically evaluating the effect of fiscal deficit on gross domestic product, money supply and inflation. The study employed various econometric techniques such as unit root test, Johansen co-integration, granger causality test in which variations in gross domestic product; money supply and inflation were regressed on fiscal deficit and exchange rate using time series data from 1981 to 2015. Secondary data casing the time frame were collected from Central Bank of Nigeria statistical bulletin. The result of the analysis revealed that fiscal deficit has no significant effect on gross domestic product, money supply and inflation in Nigeria. The finding also showed that there is a positive insignificant relationship between fiscal deficit and gross domestic product. This is in line with the Keynesian postulation of the existence of positive relationship between fiscal deficit and macroeconomic variables.

Ubi and Inyang (2018) descriptively appraised the implication of fiscal deficit on Nigeria’s economic development from 1980 to 2016. The study disclosed that Nigeria’s fiscal deficit has contributed positively to the growth of per capita income, economic

growth and stabilization of Balance of payments only but did not reduce unemployment and inflation rates.

Labonte (2018) studied the impact of budget deficit over the economy in USA focusing on the market confidence and emphasized over the impact of large but manageable budget deficit on economy.

Eminer (2018) studied the impact of budget deficit on economic growth in North Cyprus. The researcher selected Budget Deficit as dependent variables and Productive spending and Non-productive spending as independent variables for the study.

Ramu and Gayithri (2016) examined the long run and short run relationship between budget deficit and economic growth in India. The period of study was 1970 to 1971 and 2011 to 2012 using the vector error correction estimation method. The findings however showed that budget deficit inversely affects gross domestic product and the effective fiscal deficit enhances capital formation directly and indirectly encourages the private sector to invest more.

Arjomand, Emami and Salimi (2016) studied the effect of growth, efficiency and government budget deficit in MENA selected countries within the period 2000 to 2013, using the static panel models. The result of the estimated relations for the first model in which government budget deficit is the dependent variable indicate positive effect of economic growth and inflation rate variables as well as the negative effect of labour productivity and government budget deficit. Moreover, the second model in which economic growth is the dependent variable demonstrates the positive effect of labour productivity index and economic growth. In addition, negative correlation of government budget deficit with economic growth is also maintained.

Tung, (2018) examined the effect of fiscal deficit on economic growth in Vietnam, the country now is one of the most dynamically emerging countries, but its government has

been facing large fiscal deficits for many years by now. The study has applied the Error Correction model on the quarterly data of 2003-2016. The empirical results strongly indicate there is a cointegration relationship between fiscal deficit and economic growth in Vietnam, in which fiscal deficit had harmful effects on economic growth in both short and long run. In particular, the correlation analysis has confirmed that fiscal deficit can hurt not only the gross output but also private investments, foreign direct investments, and net exports. The results provide evidence for policymakers, and not only in Vietnam but also in other emerging countries which are in need of urgent solutions so that to reduce the fiscal deficit rate and have more sustainable growth in the future.

Brender and Drazen (2018) explained in his study developing countries vote for expansionary fiscal policy, however developed countries vote for low inflation. But high government spending or budget deficit does not always result with negative impact on the economy. If the budget expenditure is too high and if the government use it for productive purposes and not for political interest then the budget deficit could result with economic growth.

Ahmed (2017) investigated the relation between Budget Deficit and Gross Domestic Product of Pakistan in which GDP is taken as dependent variable and FDI and budget deficit as independent variables. The results followed the Ricardian approach who said that there is neutral relation

Momodu and Monogbe (2017) examined the influence of budget deficit on economic performance in Nigeria using time series data between the periods 1981 to 2015. Findings established that Budget deficit significantly stimulate economic performance. The output of the VAR estimate established that the lag value of federal government budget deficit has contributed to performance of the economy in the current year although the contributively quadrant is not been felt to a reasonable extent. These

empirical findings support the Keynesian postulation of significant relationship between budget deficit and economic performance.

Ramzan, Saleem, and Butt (2016) explored the impact of budget deficit on economic growth in Pakistan in which researchers used Time Series data for 30 years (1990 to 2014). The study was designed to find how the taxes are contributing toward the economic growth of Pakistan. The paper showed that there is a non-linear relationship between dependent variable GDP and independent variables inflation and investment and linear relationship exists between GDP, budget deficit and domestic credit.

Risti, Nicolaescu and Tagaduan (2016) analyzed the mutual impact between the budget deficit and the economic growth. They selected Real GDP growth rate as dependent variable and consolidated general budget account as an independent variable.

Gale and Orszag (2016) showed the economic effects of budget deficit like as paper showed that long-term budget deficits reduce national saving and impose substantial long-run costs on the economy, regardless of whether interest rates are affected and reduction in future income is the true cost of sustained budget deficits.

Osoro (2016) examined the effect of budget deficit on economic growth of Kenya from 1980 to 2014. The study adopted the Ordinary Least Squares (OLS) method of estimation. The result indicates that budget deficit has positive statistical significant impact on economic growth. The study recommends financing of development expenditures through public private partnerships or off the balance sheet to create fiscal space.

##### External Reserves and Economic Growth in Sub-Saharan Africa

Bacchetta, Kenza and Yannick (2019) evaluated the effect of external reserves management on macroeconomic stability of Nigeria from 1990–2017. Secondary data were sourced and analyzed using multiple regressions, granger casualty test, VAR

model and unit test. The study revealed a direct relationship between external reserves and explanatory variables and external reserves were observed to be inversely related to macroeconomic instability.

Aizenman and Lee (2018) examined the impact of foreign exchange reserve accumulation on economic growth from 1996-2016. Multiple Regressions and VAR model was adopted in the study. The results of the study indicates that increased external reserves reduces liquidity risk cost discovered that increase in external reserve lead to rise in both liquid and total debt while shortening debt maturity to the extent that interest rates of external reserves though are low an increase in external reserves will lead to a permanent decline in consumption and increase in investment and economic growth.

Egwakhe and Osabuohien (2018) evaluated the effect of change in external reserves position of Nigeria on domestic investment, inflation and exchange rate for the period 1996 - 2016. Both ordinary least square and vector error correction models were adopted in the study. The results show that changes in reserves influence only foreign direct investment and inflation rates.

Elhiraika and Ndikumana (2017) examined theeffect of external reserves and economic development in Nigeria between 1980 and 2008. Ordinary Least Square (OLS) estimation technique was adopted in the study. The result of the study discloses that there is statistical significant relationship in the management of Nigerian external reserve.

Gong (2017) evaluated the impact of foreign reserve accumulation and economic growth. The study adopted VAR model and Granger causality test. The result of the study reveals that foreign reserves accumulation is a consequence of a growth strategy induced by strong capital investment in a financially constrained economy.

Alasan and Shaib (2017) investigated the effect foreign exchange reserves accumulation and macroeconomic stability in Nigeria from 1990– 2015. The study adopted Unit root test and multiple regressions. The findings of the study reveal that exchange rate and GDP have positive and significant relationship with Foreign Exchange Reserve (FER) accumulation while inflation has negative and insignificant relationship with GDP. Aizenman and Rhee (2016) examined the effect of external reserves management on economic development in Nigeria. Multiple regressions, granger casualty test, VAR model and unit test were adopted in the study. The findings of the study reveal that large size of foreign reserves provides a form of self-insurance against the risk of rapid withdrawal of cross border investment which may lead to a deep recession.

Akinwunmi, Adeboye and Adekoya (2016) investigated the effect of external reserves management on Economic Growth of Nigeria. Time series data between 1990 and 2015 was collected from CBN statistical bulletin 2012 edition. The data was decomposed and regression analysis was applied to determine the impact external reserve accumulation has on Nigeria economy. Hypothesis was postulated and tested; the result showed that there is a significant relationship between Foreign Exchange Reserves (FER) accumulations.

Evans and Egwakhe (2016) evaluated the impact of external reserves on the Nigerian Economy. Time series data between 1970 and 2009 was collected from CBN statistical bulletin 2012 edition. Hypothesis was postulated and tested; the findings of the study indicate that there is a significant relationship between Foreign Exchange Reserves (FER) accumulations.

##### Broad Money Supply and Economic Growth in Sub-Saharan Africa

Jawaid, Quadri, and Ali (2019) applied co-integration and error correction model to examine money supply and economic growth in Pakistan from 1981-2017 and found the

existence of significant positive relationship between the variables both in the long and short run. The result specifically revealed that monetary policy is more effective than the fiscal policy in Pakistan. This finding confirms the Monetarists belief that monetary policy is a more effective economic policy than the fiscal policy.

Nouri and Samimi (2019) used Levine and Renelt growth model to investigate the impact of money supply on economic growth in Iran from 1994-2017. The result from the Ordinary Least Squares (OLS) method revealed that money supply exerted a significant positive influence on economic growth in Iran. This study validates the Monetarist postulation that money supply is the key driver of economic growth in a country.

Ogunmuyiwa and Ekone (2019) in the study of money supply and economy growth in Nigeria from 1990-2017 revealed that there is a negative relationship between money supply and gross domestic product. Causality test showed that money supply did not have the predictive power in explaining the growth of the real gross domestic product.

Havi and Enu (2018) examined the relative importance of money supply and fiscal policy on economic growth in Ghana from 1980-2016. The study utilized Ordinary Least Squares (OLS) method which revealed that money supply had a significant positive impact on the economy of Ghana.

Kamaan (2018) statistically assessed the effect of money supply on economic growth in Kenya and the study disclosed that monetary policy did not have a significant impact on economic growth in Kenya.

Osasohan (2018) studied the impact of money supply on economic growth in the United Kingdom (UK) from 1960-2016 using Vector Error Correction Model (VECM). The study found that money supply and rate of inflation were the major tools of UK monetary policy that enhances economic growth in the country.

Chipote and Palesa (2018) employed Error Correction Model and Johansen Co- integration to examine the impact of money supply on economic growth in South Africa for a period of 2000 to 2016. The findings revealed that money supply as a monetary policy tool had insignificant influence on economic growth in South Africa.

Onyeiwu (2017) assessed the impact of money supply on economic growth in Nigeria from 1990-2016 using Ordinary Least Squares Method (OLS). The findings revealed that money supply had a positive impact on GDP.

Senbet (2017) employed quarterly data from 1990 to 2016 to examine the relative impact of money supply and fiscal policies on the US real economic activity using Granger Causality tests and Vector Auto Regressive (VAR) models. The study found evidence that monetary policy influenced real output better than fiscal policy in the US economy. This study also substantiates the assertion of the Monetarists that monetary policy exerts better influences on economic growth than fiscal policy.

Inam and Ime (2017) studied the impact of money supply on Nigeria’s economic growth from 1980-2015 using Ordinary Least Squares (OLS) method and Granger Causality test. The study found an insignificant positive relationship between money supply and economic growth.

Mohamed and Aslam (2016) investigated the impact of money supply on Sri Lankan economy from 1980-2015. The study made use of gross domestic product (GDP) as the dependent variable while the independent variables were money supply, exchange rate, export earnings, import outflows and the consumer price index. The regression results indicated that money supply maintained significant positive influence on economic growth at 1% level of significance in Sri Lanka.

Njimanted, Akume, and Mukete (2016).analyze the effect of money supply on economic growth in the Central African Economic and Monetary Community (CEMAC). Vector

Auto-regression (VAR) method was adopted in the study. CEMAC was set up by a Treaty signed in 1972 by six states which include Cameroon, Chad, Equatorial Guinea, Gabon, The Central Africa and the Republic of Congo. The treaty was based on monetary co-operation arrangements in order to achieve price stability. The independent variables which were the monetary policy include money supply, interest and inflation rates. The study found that monetary policy tools affected the economic growth of the CEMAC community in diverse areas.

Prasert, Kanchana, Chukiat, and Monekeo (2016) investigated the relationship between money supply and economic growth of selected ASEAN Economic Cooperation (AEC) countries from 1995-2014. Pooled Mean Group Estimator (PMGE) was adopted in the study. The selected countries were Cambodia, Indonesia, Malaysia, Philippines, Singapore, Thailand and Vietnam. The results of the study revealed that money supply which comprises narrow money (M1) and demand deposit (DD) had positive relationship with economic growth measured by GDP.

##### Tabular Summary of Empirical Literature

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Author Year** | **Location of Study** | **Title of Study** | **Methodology** | **Findings** |
| Olusegun, Olufemi and Olubunm (2020) | Nigeria | impact of external debt on economic growth in Nigeria | ARDLECM  estimation technique | The findings of the study revealed that EDS, DDS, FDI  and GOVE were stationary at first differencing while GDPGR was stationary at level  form. |
| Saungweme and Odhiambo (2020) | Zimbabwe | impact of domestic debts on Zimbabwe's economic growth | ARDL approach | The study offers an empirical proof that domestic debt collectively had a significant adverse impact on the economic growth of Zimbabwe |
| Richard, Kurayish and Enoch (2020) | Uganda | Relationship of internal debt and economic growth sustainability in Uganda |  | The result of the study indicates that internal debt had a notable adverse effect on the economic growth of Uganda, particularly in the short run |
| Aworinde | African | budget | VAR, Threshold Co- | The result revealed |
| (2020) | countries | deficits on | integration and | positive |
|  |  | the current | ARDL approach | government deficit |
|  |  | account |  | shock increases the |
|  |  | imbalance |  | current account |
|  |  | and inflation |  | deficit in |
|  |  | in African |  | Botswana, Egypt, |
|  |  | countries |  | Ethiopia, Ghana, |
|  |  |  |  | Morocco, South |
|  |  |  |  | Africa and |
|  |  |  |  | Tanzania |

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| --- | --- | --- | --- | --- |
| Didia and Ayokunle (2020) | Nigeria | Impact of domestic debts on the economic growth of Nigeria | Vector Error Correction Model (VECM) | The result of the study showed that domestic debt had a more favorable effect on economic growth than the external debt |
| Rana and Wahid (2020) | Bangladesh |  | time-series analysis using ordinary least squares estimation, vector error correction model, and granger causality test | The findings show that government budget deficit has statistically significant negative impact on economic growth  in Bangladesh |
| Bacchetta, | Nigeria | Effect of | multiple regressions, | The study revealed |
| Kenza and |  | external | granger casualty test, | a direct relationship |
| Yannick (2019) |  | reserves | VAR model and unit | between external |
|  |  | management | test | reserves and |
|  |  | on |  | explanatory |
|  |  | macroecono |  | variables and |
|  |  | mic stability |  | external reserves |
|  |  | of Nigeria |  | were observed to |
|  |  |  |  | be inversely related |
|  |  |  |  | to macroeconomic |
|  |  |  |  | instability |
| Ondogo (2018) | Kenya | Effect of | Ordinary Least | The results |
|  |  | budget deficit | Squares method | indicated a positive |
|  |  | financing |  | and significant |
|  |  | mechanisms |  | effect of internal |
|  |  | on economic |  | budget deficit |
|  |  | growth in |  | financing on |
|  |  | Kenya |  | economic growth |
|  |  |  |  | while the effect of |
|  |  |  |  | external-internal |
|  |  |  |  | budget deficit |
|  |  |  |  | financing ratio on |
|  |  |  |  | economic growth |
|  |  |  |  | was negative and |
|  |  |  |  | significant |
| Jawaid, Quadri, | Pakistan | money | co-integration and | The result |
| and Ali (2019) |  | supply and | error correction | specifically |
|  |  | economic | model | revealed that |
|  |  | growth |  | monetary policy is |
|  |  |  |  | more effective than |
|  |  |  |  | the fiscal policy in |
|  |  |  |  | Pakistan |

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| --- | --- | --- | --- | --- |
| Nouri and Samimi (2019) | Iran | impact of money supply on economic growth in Iran | Ordinary Least Squares (OLS) | The result revealed that money supply exerted a significant positive influence on economic growth in Iran |
| Ayuba and | Nigeria | relationship | Autoregressive | The result show |
| Khan (2019) |  | between | Dispersed Slack | that residential |
|  |  | Domestic | methodology | debts had an |
|  |  | debt and |  | aggressive impact |
|  |  | economic |  | on the economy yet |
|  |  | growth in |  | decidedly |
|  |  | Nigeria |  | influenced the total |
|  |  |  |  | government |
|  |  |  |  | income inside the |
|  |  |  |  | period secured by |
|  |  |  |  | the examination |
| Ari and Koc | United | domestic |  | The outcome |
| (2018) | States, | government | disclosed that the |
|  | China, | borrowing on | harmful effect was |
|  | Germany | the | because the |
|  | and Japan | sustainable | government of the |
|  |  | economic | four countries used |
|  |  | growth | in the study, |
|  |  |  | exceeded the |
|  |  |  | tolerable borrowing |
|  |  |  | limit the countries' |
|  |  |  | economy cannot |
|  |  |  | withstand |
| Burhanudin, | Malaysia | effects of | Autoregressive | The result indicated |
| Muda, Nathan, |  | government | Distributed Lag | that government |
| and Arshad |  | internal debt | approach | internal debt in |
| (2017) |  | on the |  | Malaysia is helping |
|  |  | economic |  | to sustain economic |
|  |  | growth of |  | growth |
|  |  | Malaysia |  |  |
| Onwioduokit | Liberia | relationship | Classical Ordinary | It was evident from |
| and Inam |  | between | Least Squares | the analysis that |
| (2018) |  | budget | Technique (OLS) | there exists a long |
|  |  | deficits and | and Co-integration | run relationship |
|  |  | economic | test using Engle- | between Budget |
|  |  | growth in | Granger Two-Step | deficit and |
|  |  | Liberia | procedure (EGTS); | economic growth |
|  |  |  | and a parsimonious | in Liberia. |
|  |  |  | Error Correction |  |
|  |  |  | Model |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Solawon and Adekunle (2018) | Nigeria | short run and long-run effect of deficit financing on the economic growth of Nigeria | Auto Regressive Distributed Lag (ARDL) | The result revealed that all the explanatory variables (budget deficit, money supply and external debt) have positive effect on economic growth with budget deficit being insignificant |
| Momodu and Monogbe (2017) | Nigeria | influence of budget deficit on economic performance in Nigeria | VAR estimate | The findings revealed that the lag value of federal government budget deficit has contributed to performance of the economy in the current year although the contributively quadrant is not  been felt to a reasonable extent |
| Ramu and Gayithri (2016) | India | long run and short run relationship between budget deficit and economic growth in India | vector error correction estimation method | The findings showed that that budget deficit inversely affects gross domestic product and the effective fiscal deficit enhances capital formation directly and indirectly encourages the private sector to invest more. |
| Ramzan, Saleem, and Butt (2016) | Pakistan | budget deficit on economic growth in Pakistan | Ordinary Least Square technique | The paper showed that there is a non- linear relationship between dependent variable GDP and independent variables inflation and investment and linear relationship  exists between |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  |  |  | GDP, budget deficit and domestic credit |
| Elhiraika and Ndikumana (2017) | Nigeria | effect of external reserves and economic development in Nigeria | Ordinary Least Square (OLS) estimation technique | The result of the study discloses that there is statistical significant relationship in the management of Nigerian external reserve |
| Gong (2017) |  | impact of foreign reserve accumulation and economic growth | VAR model and Granger causality test | The result of the study reveals that foreign reserves accumulation is a consequence of a growth strategy induced by strong capital investment in a financially  constrained economy |
| Alasan and Shaib (2017). | Nigeria | effect foreign exchange reserves accumulation and macroecono mic stability in Nigeria | Unit root test and multiple regressions | The findings of the study reveal that exchange rate and GDP have positive and significant relationship with Foreign Exchange Reserve (FER) accumulation while inflation has negative and insignificant relationship with  GDP |
| Chipote and Palesa (2018) | South Africa | impact of money supply on economic growth in South Africa | Error Correction Model and Johansen Co-integration | The findings revealed that money supply as a monetary policy tool had insignificant influence on  economic growth in South Africa |
| Onyeiwu (2017) | Nigeria | impact of money supply on economic  growth in | Ordinary Least Squares Method (OLS) | The findings revealed that money supply had a positive impact  on GDP |

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| --- | --- | --- | --- | --- |
|  |  | Nigeria |  |  |
| Senbet (2017) | USA | relative impact of money supply and fiscal policies on the US real economic activity | Granger Causality tests and Vector Auto Regressive (VAR) models | The study found evidence that monetary policy influenced real output better than fiscal policy in the US economy |
| Mohamed and Aslam (2016) | Sri Lanka | impact of money supply on Sri Lankan economy |  | The regression results indicated that money supply maintained significant positive influence on economic growth at 1% level of significance in Sri Lanka. |
| Evans and Egwakhe (2016) | Nigeria | impact of external reserves on the Nigerian Economy |  | The findings of the study indicate that there is a significant relationship between Foreign Exchange Reserves (FER)  accumulations |

* 1. **Theoretical Framework**

Theoretically, when government initiates a project and her revenue is not sufficient enough in sponsoring the project, there are three major ways of financing such a project and they are taxes, borrowing and monetization. Currently, the most common method of deficit finance is borrowing, which is usually done by issuing government bonds in the open market. It is of key significance to note that deficit financing in an economic has its implication either positive or negative has argued by various school of thoughts. For the purpose of this study, the theoretical frameworks that were considered relevant include:

Keynesian economic growth theoryand Neo-classical school of thought. However, this work is anchored on the Keynesian view of budget deficits.

##### Keynesian Economic Growth Theory

Keynesian Economic Theory was developed by British Economist John Maynard Keynes (1936) and was used by Ali (2014); Bakare, Adesanya and Bolarinwa, (2014); Muhammad, Sofia, Syed and Abbas, (2014); Okelo, Momanyi, Lucas and Alia, (2013); Okoro, (2013); Ojong and Hycenth (2013) in their studies.

Keynesian theory believes that public spending can make a positive contribution to economic growth by increasing government consumption through employment, profitability and investment. In other words, the federal government can reverse the recession by borrowing money from the private sector and returning it to the private sector through various expenditures. The theory states that active government intervention in the market through deficit finance is the only way to ensure growth and stability through efficient resource allocation, market regulation, economic stabilization

and harmonization of social conflicts. Keynes states that in the short run, economic growth through economic stability is strongly influenced by total spending in the economy. This theory considers the economy to be inherently volatile and requires active government intervention through spending to achieve economic stability. Parkim (1990) believes that Keynesians place little emphasis on monetary policy and very much on fiscal policy. Bowden (1982) in Ojong and Hycenth (2013) found that Keynesian economics helps to understand what determines the level of spending, but what determines the level of employment, production and income in the economy. He says he believes. Keho (2010), states that the budget deficit has a positive impact on macroeconomic activity thereby stimulating savings and capital formation.

Deficit financing whether through domestic resources or foreign borrowings involves the absorption of real resources by the public sector that otherwise would be available to the private sector (Okelo, Momanyi, Lucas & Alia, 2013). This absorption would improve overall efficiency (output growth) if the social return (benefit) from public expenditure exceeds its private opportunity cost. Public spending can replace production in the private sector (replacement effect), but it can also improve productivity in the private sector (positive externalities or impact on public goods). The study of public spending development models, primarily Rustow (1971), has to go through different stages before the countries of the world develop; and the ratio of these different stages to the sum of government spending. Investment in the economy is large because most of its activities are focused on capital formation. Capital formation is adjacent to roads, home phones, education, health care, etc. in preparation for the start of the interim phase.

Keynesian theory stimulates the economy, reduces unemployment and makes household feel wealthier using government spending (Usher, 1998).

The desired aggregate demand relationship in the goods market in the Keynesian framework is expressed as follows:

Y= C + I+G+ (X-M) … … … … … … … (1) The behavioral equation is written as;

Where Y = output, C = Consumption, = Disposable income, T = Tax revenue, I = Investment, 𝟃𝟃 = exogenous investments, I = interest G = exogenous government expenditure (G\*), X = exports, s= exogenous exports, e=exchange M= Imports, m= exogenous imports and b, 𝜎𝜎, 𝜙𝜙 and 𝞬𝞬 are coefficients.

From a different perspective, Okpanachi and Abimiku (2007) suggest that fiscal deficits stimulate economic activity in the short term, making households feel richer and thus increasing overall spending on private and public consumption. This means that

Keynesian theory increases the demand for money and increases the interest rate, which reduces investment. Keynesian economists believe that private sector decisions often lead to inefficient macroeconomic consequences that require strong public sector policy responses, such as the monetary policy measures of the Nigerian central bank and the fiscal policy of the Federal Treasury to stabilize output to the economy.

##### Neoclassical School of Thought

The neoclassical economist proposes a negative relationship between fiscal deficits and economic development. The Neoclassical school considers individuals planning their consumption over their entire cycle. By shifting taxes to future generations, fiscal deficits increase current consumption. By assuming full employment of resources the neoclassical school argues that increased sconsumption implies a decrease in savings (Ayuba & Khan, 2019).

Higher interest rate in turn results to a decline private investment, domestic production and an increase in the aggregate price level. When the public sector expands, the price of these resources rises due to excessive demand from the government, which causes the private sector to contract, reducing investment and consumption by the private sector. Thus, expansion of the public sector pushes the private sector out (Aworinde, 2020). However, resource concentration is an important issue to consider, especially in developing countries where even the private sector lacks resources, so excessive government demand for these resources will have a serious impact on the productivity of the private sector. The assumption that government borrowing reduces private investment plays a key role in the neoclassical analysis (Ayadi & Ayadi, 2015). **Implications of the Reviewed Theories for the Sub-Sahara African Economy**

The theoretical postulations reviewed havethrown a shocker in the Sub-Saharan perspective as none of this theoretical exertion seems to be yielding positive result.

Considering the fact that Sub-Sahara Africa is faced with persistence high level of unemployment coupled with the huge quantum of debt the governments of the region accommodate yearly, can one emphatically says that deficit financing has really stimulated economic growth and development in Sub-Saharan Africa as earlier stated by Keynes or reverse is the case?

Despite high governmental strives through borrowing and generated revenue in ensuring economic development, Osaku and Achinihu (2014) reported that borrowed funds in Sub-Saharan Africa is centred towards current consumption which lead to downsizing of economic development hence increases debt servicing cost.

The Ricardian equivalence theorem emphasis that increases in the deficit financed by fiscal spending will be matched by future increase in taxes and so this will leave interest rates and private investment unchanged. As a result, when you try to pay off your loan, the tax cut from the previous year will eventually increase by more than you had to pay before, meaning your personal savings accumulated over the period of your loan growth. The state budget will be used to pay off future loans. The choice is therefore between tax now and tax later. At this juncture, one wonders why empirical evidence and theoretical underpinning justifies the fact that deficit financing stimulates economic growth especially when an economy is facing persistence unemployment like in the Sub-Sahara African case. But in the practical experience, the reverse is the case in the Sub-Saharan Africa.

Monogbe, Dornubari, and Emah (2016) reported that mismanagement and misappropriation of borrowed funds is a major impediment in the Sub-Saharan African economy and hence, debars development. Long-term financing of the deficit has an overall negative impact on the economy and pushes out private investment (Isah, 2012). However, Onuorah and Ogbonna (2014) argued that the combination of domestic and

foreign debt led to the failure of deficit financing to stimulate economic development. Consequently, Ndekwu (2003) argued that the use of deficit financing for fiscal policy often increases risk to the economy.

##### Statement of Research Gap

With the divergent estimation techniques and results from different studies on the assessment of the impact of deficits financing on economic growth in view, the pertinent question still remains whether the persistent deficits have effect on Sub-Sahara Africa’s economic growth for the period 1986 to 2020. Notwithstanding these various approaches that have been adopted by various researchers; those studies served as inputs to this study. However, this study extended its scope beyond those of earlier studies by modifying the available models and extending the periods captured to 2020 (i.e. the most recent data available). This constituted a gap in existing body of knowledge which this study was designed to fill.

Secondly, there are conflicting views on the relationship between fiscal deficits and economic growth. The Keynesian economist argued that there was a positive relationship between the two series, the neoclassical economist argued the opposite, and the Ricardo Equivalence hypothesis argued that there was a neutral relationship between the countrys’ budget deficit and economic growth In theory, a fiscal deficit occurs when government spending exceeds revenues, resulting in negative government savings that can slow the country's growth and development initiatives. This study also tried to share more light on this construct by disputing previous suppositions of authors that these theories does not give a true picture of the Sub-Sahara African economic setting. This also constituted a gap in existing body of knowledge which this study was design to fill. Based on the empirical studies reviewed above, fiscal policy and economic growth nexus are of three strands: positive, negative and non-linear relationship. For example,

Akinmulegun, (2014) reported negative result; while others revealed that deficit financing has a positive relationship with economic growth and thereby canvas support for the Keynesian school (Okah, Chukwu, & Ananwude 2019; Nwanna & Umeh 2019; Onwioduokit & Inam 2018; Solawon & Adekunle 2018; Adesuyi & Falowo, 2014) while Ifeanyi and Umeh (2019) found that deficit financing has no significant effect on economic growth. The contradictory findings from these studies suggest that empirical research, on the average, has had little success in establishing a strong and statistically significant connection between deficit financing and economic growth. Thus, findings are inconclusive as to the exact relationships that exist between deficit financing and economic growth. Sequel to this identified gap, this study set out to contribute to the line of research by investigating the causality flow between deficit financing and economic growth in Sub-Saharan African using diverse variables to capture various aspect of governments deficit and to offer new evidence to enrich the debate around the literature. This study will fill the gap in existing literature by revealing the relationship that exists between deficit financing and economic growth.

Again, the researcher discovered that the major reasons for the conflicting result may be traced to various estimation techniques and variables that have been used by these different scholars. Hence, this research used five (5) independent variables to capture the various sources of deficit financing and one (1) dependent variable to capture economic growth. However, previous studies only used some of the variables in their studies, while some picked just three (3) variables to proxy deficit financing. This also constituted a literature gap.

This study also tried to lend scholarly submissions on the various empirical questions on deficit financing; for instance, can we conveniently say that, the huge quantum of loans borrowed by the governments to ensure economic growth in Sub-Saharan Africa has

stimulated Sub-Sahara African economic growth from 1981 till date? Better still, to what extent has deficit financing affected economic growth of Sub-Saharan Africa? Hence, the need for the study.

Lastly, this study included money supply which is a major strategy of financing budget deficit in the model, which is lacking in previous research work.

#### CHAPTER THREE METHODOLOGY

##### 3.1. Introduction

This section discusses the methodology employed to achieve the objectives of the research. Thus, the section addresses the methodology to be employed in the study. Specifically, the chapter examinesbriefly research design, population and sample size of the study, sources of data, data analysis techniques, and model specifications. A-priori expectations, methods of conducting preliminary tests, and others are also discussed in the chapter.

##### Research Design

This study utilized the longitudinal research design approach. The choice for this design is predicated on the fact that it involves repeated observations of the same variables over a period of time. In other words, longitudinal studies are a type of correlational research in which researchers observe and collect data on a number of variables without trying to influence those variables. While they are most commonly used in medicine, economics, and finance, longitudinal studies can also be found in the other social or management sciences. For the present study, data were collected on the variables which covered a timeframe of 35 years, that is, 1986 to 2020.

##### Population of the Study

The population of a research study comprises the totality of units or members having certain defined characteristics in common. In other words, members or units of a population are always alike in some significant aspects. Hence, Creswell (2005) posits that a population is a group of individuals or countries who comprise the same characteristics. Evidently, many Sub-Sahara African countries are experiencing the debt overhang that impede on economic growth.

Accordingly, the population of the current research study covers the entire 53 countries of the Sub-Sahara African countries.

##### Sample Size of the Study

The sample size comprisedCameroon, Kenya, Nigeria, and South Africa. Thesecountries were selected based onthe fact that each of them represents their respective regions in the Sub-Saharan Africa. Again, the countries were chosen based on their income group and availability of secondary data. The variables of the study includereal gross domestic product (which served as the dependent variable), and domestic debt, external debt, external reserves, broad money supply and deficit budget (which represented the independent or explanatory variables).

##### Method of Data Collection

Secondary data sets which spanned from 1986 to 2020 (35 years) were obtained from the International Financial Statistics (IFS), Government Finance Statistics (GFS) and the Balance of Payment Statistics (BOPS) of the International Monetary Fund as well as the World Bank Development Indicators and the African Development Bank Indicators, CBN Statistical Bulletin (2020), Central bank of Kenya (CBK) Statistical Bulletin (2020), Bank of Central African States (BEAC) Report (2020) and the Central Bank of South Africa (CBSA) Report(2020).

##### Data Analysis Techniques

The study adopted both the Fully Modified Ordinary Least Square (FMOLS) and Panel Data Regression Methodology. While the Pooled OLS covered for the individual country data, the panel data regression covered the four selected countries. The essence of the two techniques is to compare their results. The various techniques adopted are discussed below:

##### Fully Modified Ordinary Least Square (FMOLS) Estimation Technique

The study adopted the Fully Modified Ordinary Least Square (FMOLS) estimation technique. This technique is better than Ordinary Least Square (OLS) due to a number of reasons. First, OLS estimates are super-consistent, but the t-statistic obtained without stationary are only approximately normal. Even though, OLS is super-consistent, in the presence of a large finite sample biases the convergence of OLS can be low in finite samples. Secondly, OLS estimates may suffer from Heteroskedasticity and autocorrelation since the omitted dynamics are captured by the residual so that inference using the normal tables will not be valid - even asymptotically. Therefore, “t” statistics for the estimates OLS estimates are useless. Comparably, the FMOLS takes cares of endogeneity by adding the leads and lags. In addition, white heteroskedastic standard errors are used. FMOLS does the same using a nonparametric approach (Arize, John & Ghosh, 2015) and (Arize, Thomas, & Slottje, 2000). In doing this, certain pretests including descriptive statistics, Philip-Perron unit root test, Johansen Julius (JJ) test for co-integration and Vector Error Correction Model (VECM) estimates were employed to test whether or not there exist a long run relationship among all the variables of the study, and determine whether the time series data set is useful for policy formulation. The generalized form of the Fully Modified OLS based on the OLS framework is given by;

𝑌𝑡 = 𝛽0 + 𝛽1𝑋1 + 𝛽2𝑋2 + ⋯ + 𝛽𝑛𝑋𝑛 + 𝜀𝑡 … … … … … … (2)

##### Panel Data Regression Methodology

The study also adopted the panel data methodology. To decide whether the Random Effect Model or the Fixed Effect Model is most appropriate for the study, we employed the Hausman Test. According to Hosna (2009) the Hausman test is a very general test and can be used if two models could be used for the same equation. Again, the null

hypothesis states that the random effect model is preferred while the alternative hypothesis is that only the fixed effect model is consistent. If the null hypothesis is rejected then the random effects model cannot be used.

Furthermore, to ensure that the model is reliable, we will subject the model to both Joint Significant and Breusch-Pagan/Cook-Weisberg Test. The Joint Significant is designed specifically to test the sensitivity of each variable on each other. Meanwhile, the Breusch-Pagan / Cook-Weisberg will be used to test the null hypothesis that the error variances are all equal versus the alternative that the error variances are a multiplicative function of one or more variables. The alternative hypothesis states that the error variances increase (or decrease), as the predicted value of Y increases that is, the higher the predicted value of Y, the larger the error variances. Higher chi-square would simply indicate the presence of heteroscedasticity. With respect to the result obtained from the heteroscedasticity test conducted in this study, the chi-square value is large and the p- value is small, signifying the presence of heteroscedasticity. This is therefore an outright violation of the assumption number four of classical linear regression model which states that there must be constant variance, that is, the disturbances reflecting in the population regression function are homoscedasticity. Therefore, owing to the presence of heteroscedasticity, the study decided to conduct Fixed and Random effects model which is capable of taking care of the individual differences in units. This test would make whatever inferences drawn from the study to be reliable and valid.

##### Fixed Effect Model

A fixed effect model is more plausible when the entities of the sample effectively constitute the entire population. In a fixed effect model, the individual-specific effects are correlated with the independent variables. The fixed effect estimator is used to refer

to an [estimator](https://en.wikipedia.org/wiki/Estimator) for the [coefficients](https://en.wikipedia.org/wiki/Coefficient) in the regression model. The generalized form of the fixed effect model is given by;

𝑌𝑖𝑡 = 𝛼0 + 𝛽𝑥𝑖𝑡 + 𝜇𝑖𝑡 + 𝑣𝑖𝑡 … … … … … … (3)

Where

Yit = dependent variable α0 = intercept

βxit = vector of explanatory variable μit = individual specific effect

vit = error term

##### Random Effect Model

The random effect model is more appropriate when the entities in the sample can be thought of as having been randomly selected from the population. In a [random](https://en.wikipedia.org/wiki/Random_effects_model) [effects](https://en.wikipedia.org/wiki/Random_effects_model) model, the individual-specific effects are uncorrelated with the independent variables. In [econometrics](https://en.wikipedia.org/wiki/Econometrics), random effects models are used in [panel analysis](https://en.wikipedia.org/wiki/Panel_analysis) of [panel](https://en.wikipedia.org/wiki/Panel_data) [data](https://en.wikipedia.org/wiki/Panel_data) when one assumes no [fixed effects](https://en.wikipedia.org/wiki/Fixed_effects_estimator). To decide whether the Random Effect Model or the Fixed Effect Model is most appropriate for the study, the Hausman Test was employed.The generalized form of the fixed effect model is given by;

𝑌𝑖𝑡 = 𝛼 + 𝛽𝑥𝑖𝑡 + 𝜖𝑖 + 𝜀𝑖𝑡 … … … … … … (4)

Where

ϵi = cross sectional error term

εit = individual observational error term

##### Model Specification

The estimation of the relationships between the independent variables (budget deficit, money supply, domestic debt, foreign exchange reserve and external debt) and the dependent variable (real gross domestic product) is modeled using multiple regression econometric models. In a bid to test the hypotheses made in this study, this study

specified five mathematical models to capture the impact of deficit financing on economic growth in Sub-Sahara African countries. The models in this study surpass previous scholars models because it captured macroeconomic variables that measures the financial capacity of the economy (money supply) and the implications of external resources (external debt).

Following the works of Okah, Chukwu and Ananwude (2019) &Nwanna and Umeh (2019) as a measure in analyzing influence of fiscal deficit on the performance of the Nigeria economy and it was modified to suit the purpose of this research work. In those works, it specified that GDP is an indicator of economic growth and it significantly influenced by the fiscal policy indicator (Federal Government domestic debt and Federal Government external debt).

We hereby formulate the research model which reveals the nexus between deficit financing and economic performance.

The modified version is presented, below:

RGDP = f (FGDD, FGXD, FGBD, EXR, BRMS) … … … (5)

In econometrics, equation (1) above is insufficient resulting from absence of error term. Hence, we express the above equation in a functional relationship using linear regression

|  |  |  |
| --- | --- | --- |
| model by introducing constant and error term, hence we have: |  | |
| **Model 1-Nigeria** |
| RGDP = β0+ β1FGDD+ β2FGXD+ β3 FGBD+ β4EXR+ β5BRMS+ɛit…  **Model 2-Kenya** | … | (6) |
| RGDP = β0+ β1FGDD+ β2FGXD+ β3 FGBD+ β4EXR+ β5BRMS+ɛit…  **Model 3-South Africa** | … | (7) |
| RGDP = β0+ β1FGDD+ β2FGXD+ β3 FGBD+ β4EXR+ β5BRMS+ɛit … | … | (8) |

##### Model 4- Cameroon

RGDP = β0+ β1FGDD+ β2FGXD+ β3 FGBD+ β4EXR+ β5BRMS+ɛit … … (9)

##### Model 5- Nigeria, South Africa, Cameroon and Kenya (Panel Data Regression Methodology)

RGDP = ɥ+ β1FGDD+ β2FGXD+ β3 FGBD+ β4EXR+ β5BRMS+ɥit … … (10)

|  |  |  |
| --- | --- | --- |
| Where: |  | |
| RGDP | = | Real Gross Domestic Product |
| FGXD | = | External Debt |
| FGDD | = | Domestic Debt |
| FGBD | = | Budget Deficit |
| EXR | = | External Reserves |
| BRMS | = | Broad Money Supply |
| β0 | = | Constant Value |
| β1-β5 | = | Parameter Estimate |
| ɛit | = | Error Term |

##### Note: All variables used under research were later normalized. Apriori Expectation

Judging by the literature underpinning, we expect a direct and positive flow among the employed variables and its dependent counterpart. Therefore mathematically states as:

A priori expectation β1, β2, β3, β4, β5 > 0 for equation 1‘

The Apriori expectation assumes that there exist a positive relationship between the dependent variable and the independent variables.

##### 3.8. Measurement of the Variables

The variables under investigation are group dependent and independent variable. The independent variable in the study is deficit financing measured by federal government

domestic debt, external debt, budget deficit, foreign exchange reserve, broad money supply while the dependent variable in the study is economic growth measured by real gross domestic product.

##### Real Gross Domestic Product (Dependent Variable)

Real Gross Domestic Product (RGDP) is employed as dependent variable in this study to capture economic growth. By this, we mean, the monetary worth of all production output and service outlet produced in a geographical confine over a particular time frame adjusted for inflation. It is measured in millions of Naira.

##### Domestic Debt (Independent Variable)

Federal Government Domestic/ national Debt (FDD) this is the quantum of fund raised locally or domestically by the government of a country from her indigenes. Holistically, local borrowing comprises of dual stages that is banking borrowing which include sales of government financial instrument like bonds, Treasury bill commercial papers and non-banking borrowing.

##### External Debt (Independent Variable)

Federal Government External Debt (FEXD) is a combination of multilateral and bilateral debt which is simply captured using the total quantum of public debt borrowed by Nigeria government from abroad over the years as obtained from the CBN statistical bulletin 2019 issues.

##### Budget Deficit (Independent Variable)

This variable is operationalized using the different between total government expenditure and total revenue over the years as obtained from CBN statistical bulletin 2019 issues. Here, it must be noted that the difference between the total government expenditure and total revenue could be surplus or deficit, for the scope of this study, we employed the deficit side.

##### External Reserves (Independent Variable)

This variable is operationalized using the cash and other reserve assets held by a central bank of Nigeria as obtained from CBN statistical bulletin 2019 issues.

##### Broad Money Supply (Independent Variable)

This is a measure of money supply that includes cash and checking deposits (1) as well as near money. Hence, it is a broader money classification than narrow money supply (M1) because it include asset that are highly liquid.

#### CHAPTER FOUR

**DATA PRESENTATION AND ANALYSIS OF RESULTS**

##### 4.1. Introduction

This chapter presents the study’s data and analyzes/interpretsthe empirical results thus obtained.Secondary data spanning from 1986 to 2020 were sourced from the CBN Statistical Bulletin, CBK Statistical Bulletin, CBSA Statistical Bulletin, BEAC Statistical Bulletin and the World Bank Global Development Index.The data analysis techniques specified in chapter three were deployed to conduct our estimation exercises. Further, this section entails the initial analysis of the population with the aid of descriptive statistics. The chapter ends with the test of research hypotheses formulated in chapter one of the thesis.

##### Data Presentation

The data sets utilized for the study are contained in Appendix I.

##### Data Analysis

Data for the study was analyzed using descriptive statistics, Philip-Peron unit root test, Johansen Julius (JJ) test for co-integration and Vector Error Correction Model.

##### Descriptive Statistics

The descriptive statistics account for the values of mean, minimum, maximum, standard deviation, skewedness, Kurtosis, Jarque-Bera test alongside its ρ-value. The resultsof the descriptive statistics are presented Table 1 below:

##### Table 1(a): Descriptive Statistics Results for Model 1 - Nigeria

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **RGDP** | **FGBD** | **FGDD** | **FGXD** | **EXR** | **BRMS** |
| Mean | 38404.46 | 7023.573 | 3544.393 | 2163.241 | 21.15770 | 836432.1 |
| Median | 31709.45 | 172.6000 | 1329.680 | 716.8700 | 10.65000 | 195292.1 |
| Maximum | 74694.00 | 107735.3 | 16023.89 | 12706.00 | 53.60000 | 3601488. |
| Minimum | 15237.99 | 3.380000 | 28.44000 | 41.45000 | 0.930000 | 2380.640 |
| Std. Dev. | 20262.25 | 19897.61 | 4497.421 | 2690.933 | 18.64761 | 1121051. |
| Skewness | 0.440692 | 4.062102 | 1.289876 | 2.128475 | 0.318944 | 1.194413 |
| Kurtosis | 1.603331 | 20.23236 | 3.454302 | 8.062852 | 1.453266 | 3.088077 |
| Jarque-Bera | 3.977639 | 529.3121 | 10.00637 | 63.80805 | 4.082291 | 8.333283 |
| Probability | 0.136857 | 0.000000 | 0.006717 | 0.000000 | 0.129880 | 0.015504 |
| Sum | 1344156. | 245825.1 | 124053.8 | 75713.44 | 740.5196 | 29275124 |
| Sum Sq. Dev. | 1.40E+10 | 1.35E+10 | 6.88E+08 | 2.46E+08 | 11822.93 | 4.27E+13 |
| **Observations** | **35** | **35** | **35** | **35** | **35** | **35** |

***Source: Researcher’s Computations using Econometric Views Version 9.0 (2021)***

The descriptive results in Table 1a above showedthat the data of the study covered 35 observations for all the variables, that is, a timeframe of 35 years – 1986 to 2020. Further, the result evidenced that real gross domestic product, budget deficit, domestic debt, external debt, external reserves, and broad money supply reported maximum values of 74694.00, 107735.3, 16023.89, 12706.00, 53.60000, and 3601488 billion.

Meanwhile, they reported minimum values of 15237.99, 3.380000, 28.44000,

41.45000, 0.930000, and 2380.640 respectively.

In terms of degree if volatility, all the study variables except real gross domestic product and broad money supply were highly volatile. This is because only real gross domestic product and broad money supply reported a low standard deviation values. Again, both of their Jarque Bera p-values are lower than 5% level.

##### Table 1b: Descriptive Statistics Results for Model 2 - Kenya

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **RGDP** | **FGBD** | **FGDD** | **FGXD** | **EXR** | **BRMS** |
| Mean | 2106532. | -62176.71 | 1.04E+08 | 71697932 | 2542.035 | 1056029. |
| Median | 1020220. | 207360.0 | 931.1830 | 973.0450 | 1274.563 | 441657.0 |
| Maximum | 8904980. | 401280.0 | 5.09E+08 | 3.79E+08 | 8196.865 | 4414885. |
| Minimum | 95503.38 | -6193064. | 0.004000 | 1.114000 | 79.54926 | 35693.90 |
| Std. Dev. | 2465665. | 1153405. | 1.50E+08 | 1.09E+08 | 2679.030 | 1231808. |
| Skewness | 1.393512 | -4.700759 | 1.257410 | 1.522833 | 1.032160 | 1.279573 |
| Kurtosis | 3.869448 | 24.64457 | 3.383851 | 4.121047 | 2.572223 | 3.479612 |
| Jarque-Bera | 12.43002 | 812.1110 | 9.437842 | 15.36037 | 6.481430 | 9.886419 |
| Probability | 0.001999 | 0.000000 | 0.008925 | 0.000462 | 0.039136 | 0.007132 |
| Sum | 73728621 | -2176185. | 3.64E+09 | 2.51E+09 | 88971.21 | 36961002 |
| Sum Sq. Dev. | 2.07E+14 | 4.52E+13 | 7.63E+17 | 4.05E+17 | 2.44E+08 | 5.16E+13 |
| Observations | 35 | 35 | 35 | 35 | 35 | 35 |

***Source: Research’s Computations using Econometric Views Version 9.0 (2021)***

The descriptive results in Table 1b above reported 35 observations for all the variables, that is, the study covered a timeframe of 35 years, 1986 to 2020.are missing. Further, the results show that real gross domestic product, budget deficit, domestic debt, external debt, external reserves, and broad money supply reported maximum values of 8904980, 401280.0, 5.09 x108, 3.79x 108, 8196.865, and 4414885, respectively. Meanwhile,

theTable reported minimum values of 95503.38, -6193064, 0.004000, 1.114000,

79.54926, and 35693.90, respectively.

Additionally, the results in the Table show mean scores of 2106532, -62176.71, 1.04E+08, 71697932, 2542.035 1056029for RGDP, FGBD, FGDD, FGXD, EXR, and

BRMS, respectively.The value of Standard Deviation of for Real Gross Domestic Product is 2465665; since the mean score for the variable is lower than its standard deviation, it shows that there exists a wide variation from the mean. In addition, the result also shows a mean score of 1.04 x 108 and standard deviation of 1.50 x 108 for domestic debt, it indicates that there exists a wide variation since the standard deviation is greater than the mean score. Furthermore the mean score and the standard deviation for external debt, are 7169732 and 1.09 x 108 respectively, hence there exist a low volatility since the standard deviation is lower than the mean score. The mean score and

standard deviation for budget deficit are 62176.71 and 1153405 respectively which indicates that there is a low volatility, since the mean score is greater than the standard deviation. Also, the result shows a mean score of 2542.035 and standard deviation of 2679.030 for external reserves. Since the mean score is lower than the standard deviation, it indicates that there exists a wide variation. Lastly the mean score and standard deviation for broad money supply are 1056029 and 1231808 respectively which indicates that there exists a wide variation, since the mean score is lower than the standard deviation.

##### Table 1c: Descriptive Statistics for Model 3 –South Africa.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **RGDP** | **FGBD** | **FGDD** | **FGXD** | **EXR** | **BRMS** |
| Mean | 1634398. | 39562.22 | 1191.864 | 65760.45 | 22788.91 | 12563100 |
| Median | 1046140. | 35000.00 | 12.50000 | 37138.45 | 8154.090 | 709151.0 |
| Maximum | 4873900. | 224720.0 | 27081.38 | 185357.0 | 55055.89 | 4.00E+08 |
| Minimum | 351.4325 | -79910.00 | 0.000000 | 0.000000 | 2194.850 | 26049.93 |
| Std. Dev. | 1484453. | 81606.58 | 4576.363 | 62980.30 | 20850.79 | 67424035 |
| Skewness | 0.807871 | 0.657485 | 5.391851 | 0.656666 | 0.392313 | 5.657025 |
| Kurtosis | 2.346138 | 2.768885 | 31.01561 | 1.950468 | 1.381829 | 33.01162 |
| Jarque-Bera | 4.430647 | 2.599566 | 1314.196 | 4.121769 | 4.716418 | 1500.195 |
| Probability | 0.109118 | 0.272591 | 0.000000 | 0.127341 | 0.094589 | 0.000000 |
| Sum | 57203935 | 1384678. | 41715.23 | 2301616. | 797612.0 | 4.40E+08 |
| Sum Sq. Dev. | 7.49E+13 | 2.26E+11 | 7.12E+08 | 1.35E+11 | 1.48E+10 | 1.55E+17 |
| Observations | 35 | 35 | 35 | 35 | 35 | 35 |

***Source: Researcher’s Computations using Econometric Views Version 9.0 (2021)***

The descriptive results in Table 1c above reported 35 observation for all the variables. This means that the study covered a timeframe of 35 years, 1986 to 2020. Further, the results show that real gross domestic product, budget deficit, domestic debt, external debt, external reserves, and broad money supply recorded maximum values of 4873900, 224720.0, 27081.38, 185357.0, 55055.89, 4.x108, respectively. Meanwhile, they reported minimum values of 351.4325,

-79910.00, 0.000000, 0.000000, 2194.850, and 26049.93, respectively.

Furthermore, the results show mean score of 1634398 and standard deviation of 1484453 for real gross domestic product.Since the mean score is greater than the

standard deviation,these statistical results indicate that there exists a low volatility. In addition, the results show a mean score of 1191.864 and standard deviation of 4576.363 for domestic debt. Since the mean score is lower than the standard deviation, it indicates that there exists a wide variation since the standard deviation is greater than the mean score.

Again, the mean score and the standard deviation for external debt are 65760.45 and 62980.30 respectively. This suggests low volatility since its standard deviation value is lower than the mean score. This was further reaffirmed by the Jarque-Bera probability value of 0.127341.

Additionally, South Africa reported budget deficit average and standard deviation value of 39562.22 and 81606.58 respectively. This indicates that there is a wide variation, since her mean score is lower than her standard deviation. Also, the result shows a mean score of 22788.91 and standard deviation of 20850.79 for external reserves. Since the mean score is greater than the standard deviation, it indicates that there exists a low volatility. Lastly the mean score and standard deviation for broad money supply are 12563700 and 67424035 respectively which indicates that there exists a wide variation, since the mean score is lower than the standard deviation.

##### Table 1d: Descriptive Statistics Results for Model 4 - Cameroon

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **RGDP** | **FGBD** | **FGDD** | **FGXD** | **EXR** | **BRMS** |
| Mean | 20102.98 | -604173.1 | 94867.99 | 7545.451 | 1491.896 | 518538.0 |
| Median | 15498.18 | -125070.0 | 224.3940 | 7700.089 | 652.1352 | 30576.10 |
| Maximum | 39029.58 | 3740290. | 1684910. | 11493.28 | 3851.532 | 4751920. |
| Minimum | 9643.953 | -5837800. | 0.000000 | 2835.554 | 9.555391 | 5830.340 |
| Std. Dev. | 10275.26 | 2782240. | 389885.3 | 3080.208 | 1554.817 | 1046958. |
| Skewness | 0.586988 | -0.263879 | 3.817990 | -0.191757 | 0.356967 | 3.178486 |
| Kurtosis | 1.803620 | 2.017768 | 15.58324 | 1.494732 | 1.298822 | 12.61240 |
| Jarque-Bera | 4.097253 | 1.813160 | 315.9424 | 3.518836 | 4.963741 | 193.6801 |
| Probability | 0.128912 | 0.403903 | 0.000000 | 0.172145 | 0.083587 | 0.000000 |
| Sum | 703604.4 | -21146059 | 3320380. | 264090.8 | 52216.36 | 18148830 |
| Sum Sq. Dev. | 3.59E+09 | 2.63E+14 | 5.17E+12 | 3.23E+08 | 82193512 | 3.73E+13 |
| Observations | 35 | 35 | 35 | 35 | 35 | 35 |

***Source: Researcher’s Computations using Econometric Views Version 9.0 (2021)***

The descriptive result in table 4.1d above reported a 35 observation for all the variables. This means that the study covered a time frame of 35 years (1986-2020) and that none of the study variables are missing. Further, the result shows that real gross domestic product, budget deficit, domestic debt, external debt, external reserves, and broad money supply reported maximum values of 39029.58, 3740290.0, 1684910.0, 11493.28, 3851.532, and 4751920. Meanwhile, they reported minimum values of 9643.953, - 5837800, 0.000000, 2835.554, 9.555391, and 5830.340respectively.

Again, the result shows mean score of 20102.98 and standard deviation of 10275.26 for real gross domestic product. This indicates that low volatility since the mean score is greater than the standard deviation. In addition, the result also shows a mean score of 94867.99 and standard deviation of 389885.3 for domestic debt. This indicates that low volatility since her standard deviation value is lower than her mean score. More so, the mean score and the standard deviation for external debt are 7545.451 and 3080.208 respectively, this indicates low volatility since it standard deviation value is lower than its mean score.

Again, the mean score and standard deviation for budget deficit are -604173.1 and 2782240 respectively. This indicates that there is a wide variation since its mean score is lower than its standard deviation value. Meanwhile, the result shows a mean score of 1491.896 and standard deviation of 1554.817 for external reserves. Since the mean score is lower than the standard deviation, it indicates that there exists a wide variation. This was further buttressed by the P-value of the Jacque Bera test. Lastly, the mean score and standard deviation for federal government broad money are 518538.0 and 1046958 respectively which indicates that there exists a low volatility since its mean score is greater than its standard deviation value.

In view of the above that some of the variables exhibited high standard deviation value comparably, we logged all the study variables so as to ensure that our results are not spurious.

##### Unit Root Test

To determine whether the study variables are stationary or not, we first subjected the model to country level and cross-country level data analysis techniques using Philip- Perron test. They are therefore presented in Tables 2a to 2e below:

##### Table 4.2a: Summary of PP Unit Root Test-Nigeria (Model 1)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **AT LEVELS** | | | | | |
| **Target Variables** | **ADJ.T.**  **Statistics** | **PP Test Critical Value @ 5%** | **P-value** | **Order of Integration** | **Decision** |
| Real Gross Domestic product | -0.371414 | -2.951125 | 0.9031 | 1(0) | Non- Stationary |
| Domestic Debt. | -2.384389 | -2.951125 | 0.1535 | 1(0) | Non- Stationary |
| External Debt. | 1.366690 | -2.951125 | 0.9985 | 1(0) | Non- Stationary |
| Budget Deficit. | -1.181297 | -2.951125 | 0.6711 | 1(0) | Non- Stationary |
| External Reserves | -0.948469 | -2.957110 | 0.7592 | 1(0) | Non- Stationary |
| Broad Money Supply | -1.283936 | -2.951125 | 0.6256 | 1(0) | Non- Stationary |
| **AT FIRST DIFFERENCE** | | | | | |
| **Target Variables** | **ADJ.T.**  **Statistics** | **PP Test Critical Value @ 5%** | **P-value** | **Order of Integration** | **Decision** |
| Real Gross Domestic Product | -5.941341 | -2.954021 | 0.0000 | 1(1) | Stationary |
| Domestic Debt. | -4.246729 | -2.954021 | 0.0021 | 1(1) | Stationary |
| External Debt. | -4.241790 | -2.954021 | 0.0022 | 1(1) | Stationary |
| Budget Deficit. | -9.118954 | -2.954021 | 0.0000 | 1(1) | Stationary |
| External Reserves | -6.493316 | -2.963972 | 0.0000 | 1(1) | Stationary |
| Broad Money Supply | -6.167689 | -2.954021 | 0.0000 | 1(1) | Stationary |

***Source: Researcher’s Compilation using Econometric Views Output 9.0 (2021)***

The Philip-Perron test in table 4.3 above clearly revealed that all the study variables did not attain stationarity at their natural level but when subjected further they became

stationary at their first differencing. This is because at first differencing, their Adj. t- statistic values (-5.941341, -4.246729, -4.241790, -9.118954, -6.493316, and -6.167689)

respectively were higher than their PP critical values at 5% significant level (-2.954021,

-2.954021, -2.954021, -2.963972, and -2.954021). Again, all their p-values (0.0000,

0.0021, 0.0022, 0.0000, 0.0000, and 0.0000) respectively were lower than 5% significant level. Hence, we rejected the null hypothesis which supports the presence of unit root and accepted the alternative hypothesis which states that there is no unit root in the series.

##### Table 2b: PP Unit Root Test Results for Model 2 - Kenya

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **AT LEVELS** | | | | | | | | |
| **Target Variables** | | **ADJ.T.**  **Statistics** | **PP Test Critical Value @ 5%** | **P-value** | | **Order of Integration** | **Decision** | |
| Real Gross Domestic product | | - 1.662042 | -2.951125 | 0.4409 | | 1(0) | Non- Stationary | |
| Domestic Debt. | | - 1.458542 | -2.951125 | 0.5421 | | 1(0) | Non- Stationary | |
| External Debt. | | - 1.060606 | -2.951125 | 0.7197 | | 1(0) | Non- Stationary | |
| Budget Deficit. | | - 0.365593 | -2.951125 | 0.9041 | | 1(0) | Non- Stationary | |
| External Reserves | | - 1.245506 | -2.951125 | 0.6430 | | 1(0) | Non- Stationary | |
| Broad Money Supply | | - 1.114762 | -2.951125 | 0.6986 | | 1(0) | Non- Stationary | |
| **AT FIRST DIFFERENCE** | | | | | | | | |
| **Target Variables** | **ADJ.T.**  **Statistics** | | **PP Test Critical Value @ 5%** | | **P-value** | **Order of Integration** | | **Decision** |
| Real Gross Domestic Product | -5.474709 | | -2.954021 | | 0.0001 | 1(1) | | Stationary |
| Domestic Debt. | -7.096184 | | -2.954021 | | 0.0000 | 1(1) | | Stationary |
| External Debt. | -6.159177 | | -2.954021 | | 0.0000 | 1(1) | | Stationary |
| Budget Deficit. | -5.797549 | | -2.954021 | | 0.0000 | 1(1) | | Stationary |
| External Reserves | -5.853191 | | -2.954021 | | 0.0000 | 1(1) | | Stationary |
| Broad Money Supply | -5.696724 | | -2.954021 | | 0.0000 | 1(1) | | Stationary |

***Source: Researcher’s Compilation from Econometric Views Output 9.0 (2021).***

The unit root test in table 4.2b above reported that all the study variables sourced from Kenya only became stationarity at their first differencing. In view of this, we rejected the null hypothesis which supports the presence of unit root and accepted the alternative hypothesis which states that there is no unit root in the series.

##### Table 2c: PP Unit Root Test Results for model 3 -South Africa

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **AT LEVELS** | | | | | | |
| **Target Variables** | **ADJ.T.**  **Statistics** | | **PP Test Critical**  **Value @ 5%** | **P-value** | **Order of Integration** | **Decision** |
| Real Gross Domestic product | -1.694707 | | -2.951125 | 0.4248 | 1(0) | Non- Stationary |
| Domestic Debt. | -2.139848 | | -3.548490 | 0.5062 | 1(0) | Non- Stationary |
| External Debt. | 1.444994 | | -2.951125 | 0.9988 | 1(0) | Non- Stationary |
| Budget Deficit. | 0.177866 | | -2.951125 | 0.9670 | 1(0) | Non- Stationary |
| External Reserves | 0.177866 | | -2.951125 | 0.9670 | 1(0) | Non- Stationary |
| Broad Money Supply | 0.801604 | | -2.954021 | 0.9926 | 1(0) | Non- Stationary |
| **AT FIRST DIFFERENCE** | | | | | | |
| **Target Variables** | | **ADJ.T.**  **Statistics** | **PP Test Critical Value @ 5%** | **P-value** | **Order of Integration** | **Decision** |
| Real Gross Domestic Product | | -4.349755 | -2.976263 | 0.0021 | 1(1) | Stationary |
| Domestic Debt. | | -5.207022 | -3.552973 | 0.0009 | 1(1) | Stationary |
| External Debt. | | -5.393791 | -2.954021 | 0.0001 | 1(1) | Stationary |
| Budget Deficit. | | -3.745562 | -2.954021 | 0.0078 | 1(1) | Stationary |
| External Reserves | | -3.745562 | -2.954021 | 0.0078 | 1(1) | Stationary |
| Broad Money Supply | | -17.78046 | -2.954021 | 0.0001 | 1(1) | Stationary |

***Source: Researcher’s Computations using Econometric Views Output 9.0 (2021)***

Just like models 1 and 2 above, model 3 (Deficit Financing and the growth of the South African economy) reported that none of the study variables attained stationarity at their natural level but became stationary at first differencing. In view of this, we rejected the null hypothesis which supports the presence of unit root and accepted the alternative hypothesis which states that there is no unit root in the series.

##### Table 2d: Unit Root Test Results for Model 4 -Cameroon

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **AT LEVELS** | | | | | |
| **Target Variables** | **ADF Test Statistics** | **MacKinnon Critical Value @ 5%** | **P-value** | **Order of Integration** | **Decision** |
| Real Gross Domestic product | -1.505599 | -3.548490 | 0.8079 | 1(0) | Non- Stationary |
| Domestic Debt. | -1.619674 | -3.548490 | 0.7639 | 1(0) | Non- Stationary |
| External Debt. | -0.316660 | -2.951125 | 0.9121 | 1(0) | Non- Stationary |
| Budget Deficit. | -2.051239 | -3.548490 | 0.5533 | 1(0) | Non- Stationary |
| External Reserves | -0.727021 | -2.951125 | 0.8265 | 1(0) | Non- Stationary |
| Broad Money Supply | 0.032869 | -2.951125 | 0.6986 | 1(0) | Non- Stationary |
| **AT FIRST DIFFERENCE** | | | | | |
| **Target Variables** | **ADF Test Statistics** | **MacKinnon Critical Value @ 5%** | **P-value** | **Order of Integration** | **Decision** |
| Real Gross Domestic Product | -6.785404 | -3.552973 | 0.0000 | 1(1) | Stationary |
| Domestic Debt. | -3.098373 | -2.954021 | 0.0364 | 1(1) | Stationary |
| External Debt. | -6.289718 | -2.954021 | 0.0000 | 1(1) | Stationary |
| Budget Deficit. | -5.069365 | -3.552973 | 0.0013 | 1(1) | Stationary |
| External Reserves | -4.686193 | -2.954021 | 0.0007 | 1(1) | Stationary |
| Broad Money Supply | -5.696724 | -2.954021 | 0.0001 | 1(1) | Stationary |

***Source: Researcher’s Computations using Econometric Views Output 9.0 (2021)***

The unit root test in table 4.2d above reported that all the study variables sourced from Cameroon only became stationarity at their first differencing. In view of this, we rejected the null hypothesis which supports the presence of unit root and accepted the alternative hypothesis which states that there is no unit root in the series.

##### Table 2e: Panel Unit Root Test Results for Model 5

|  |  |  |  |
| --- | --- | --- | --- |
| **AT LEVEL (1(0)** | | | |
| **Variable** | **Chi-square** | **P-value** | **Decision** |
| RGDP | 13.2733 | 0.1028 | Non-stationary |
| FGBD | 13.2733 | 0.1028 | Non-stationary |
| FGDD | 8.55375 | 0.3813 | Non-stationary |
| FGXD | 7.41607 | 0.4925 | Non-stationary |
| EXR | 3.81529 | 0.8734 | Non-stationary |
| BRMS | 10.7039 | 0.2190 | Non-stationary |
| **AT FIRST DIFFERENCE (1(1)** | | | |
| **Variable** | **Chi-square** | **P-value** | **Decision** |
| RGDP | 57.5387 | 0.0000 | Stationary |
| FGBD | 80.1378 | 0.0000 | Stationary |
| FGDD | 73.1099 | 0.0000 | Stationary |
| FGXD | 69.4640 | 0.0000 | Stationary |
| EXR | 81.8158 | 0.0000 | Stationary |
| BRMS | 52.9285 | 0.0000 | Stationary |

***Source: Researcher’s Computations using Econometric Views version 9.0 (2021)***

The panel unit root in table 4.2e above reaffirmed the PP unit root test specified in table

4.2a to table 4.2d above. Hence, we conclude that all the study variables are integrated at first difference. This justifies the need to test for long run relationship.

##### Cointegration Test

Having established that all the study variables attained stationarity at their first differencing, we moved on to test for long run relationship using Johanson Cointegration test (for the country level data) and Kao Cointegration test (for the panel level data).The null hypotheses for the two tests is that there is no cointegration in the series, and the alternative hypotheses is that there is cointegration in the series. Both results are therefore presented below:

##### Table 3a: Johansen Co integration Result-Nigeria (Model 1)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Unrestricted Cointegration Rank Test (Trace) | | | | |
| Hypothesize d |  | Trace | 0.05 |  |
| No. of CE(s) | Eigenvalue | Statistic | Critical Value | Prob.\*\* |
| None \* | 0.926611 | 206.1164 | 103.8473 | 0.0000 |
| At most 1 \* | 0.760325 | 119.9209 | 76.97277 | 0.0000 |
| At most 2 \* | 0.706194 | 72.78132 | 54.07904 | 0.0005 |
| At most 3 | 0.393458 | 32.36171 | 35.19275 | 0.0979 |
| At most 4 | 0.306911 | 15.86233 | 20.26184 | 0.1809 |
| At most 5 | 0.107814 | 3.764650 | 9.164546 | 0.4483 |
| Trace test indicates 3 cointegrating eqn(s) at the 0.05 level | | | | |
| \* denotes rejection of the hypothesis at the 0.05 level | | | | |
| \*\*MacKinnon-Haug-Michelis (1999) p-values | | | | |
| Unrestricted Cointegration Rank Test (Maximum Eigenvalue) | | | | |
| Hypothesize d |  | Max-Eigen | 0.05 |  |
| No. of CE(s) | Eigenvalue | Statistic | Critical Value | Prob.\*\* |
| None \* | 0.926611 | 86.19555 | 40.95680 | 0.0000 |
| At most 1 \* | 0.760325 | 47.13956 | 34.80587 | 0.0011 |
| At most 2 \* | 0.706194 | 40.41961 | 28.58808 | 0.0010 |
| At most 3 | 0.393458 | 16.49939 | 22.29962 | 0.2642 |
| At most 4 | 0.306911 | 12.09768 | 15.89210 | 0.1804 |
| At most 5 | 0.107814 | 3.764650 | 9.164546 | 0.4483 |
| Max-eigenvalue test indicates 3 cointegrating eqn(s) at the 0.05 level | | | | |
| \* denotes rejection of the hypothesis at the 0.05 level | | | | |
| \*\*MacKinnon-Haug-Michelis (1999) p-values  Source: Researcher’s Computations using E-Views9.0 | | | | |

The results contained in Table 3a above show that both the trace test values and the Max- eigen values show 3 co-integrating equations. Hence, the null hypothesis (H0) is rejected in favor of the alternative hypotheses. This implies that a long-run equilibrium relationship exists among the variables. As a result, we conclude that there exists a long run relationship between deficits financing with that of economic growth in Nigeria over the study period.

##### Table 3b: Johansen Co integration Results for Model 2 -Kenya

Unrestricted Cointegration Rank Test (Trace)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Hypothesize d |  | Trace | 0.05 |  |
| No. of CE(s) | Eigenvalue | Statistic | Critical Value | Prob.\*\* |
| None \* | 0.860616 | 133.2266 | 83.93712 | 0.0000 |
| At most 1 \* | 0.634800 | 68.19942 | 60.06141 | 0.0088 |
| At most 2 | 0.383743 | 34.95821 | 40.17493 | 0.1519 |
| At most 3 | 0.340789 | 18.98322 | 24.27596 | 0.2012 |
| At most 4 | 0.081301 | 5.231754 | 12.32090 | 0.5355 |
| At most 5 | 0.071088 | 2.433471 | 4.129906 | 0.1403 |

Trace test indicates 2 cointegrating eqn(s) at the 0.05 level

\* denotes rejection of the hypothesis at the 0.05 level

\*\*MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Hypothesize d |  | Max-Eigen | 0.05 |  |
| No. of CE(s) | Eigenvalue | Statistic | Critical Value | Prob.\*\* |
| None \* | 0.860616 | 65.02715 | 36.63019 | 0.0000 |
| At most 1 \* | 0.634800 | 33.24120 | 30.43961 | 0.0218 |
| At most 2 | 0.383743 | 15.97500 | 24.15921 | 0.4237 |
| At most 3 | 0.340789 | 13.75146 | 17.79730 | 0.1834 |
| At most 4 | 0.081301 | 2.798283 | 11.22480 | 0.8183 |
| At most 5 | 0.071088 | 2.433471 | 4.129906 | 0.1403 |

Max-eigenvalue test indicates 2 cointegrating eqn(s) at the 0.05 level

\* denotes rejection of the hypothesis at the 0.05 level

\*\*MacKinnon-Haug-Michelis (1999) p-values

***Source: Researcher’s Computations using E-Views9.0 (2021)***

[[

Just like Models 1, model 2 established that both the Trace test and Max-eigenvalue test indicates 2 co-integrating equations at the 0.05 level. Hence, the null hypothesis which states that there is no long run relationship among the series is rejected while the alternative hypothesis in supports the existence of long run relationship among the study variables is accepted instead. On this premise, we conclude that, deficit financing has a long run effect on economic growth of Kenya just like Nigeria reported earlier.

##### Table 3c: Johansen Co integration Result-South Africa (Model 3)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Unrestricted Cointegration Rank Test (Trace) | | | | |
| Hypothesize d |  | Trace | 0.05 |  |
| No. of CE(s) | Eigenvalue | Statistic | Critical Value | Prob.\*\* |
| None \* | 0.878523 | 167.4091 | 95.75366 | 0.0000 |
| At most 1 \* | 0.806967 | 97.84421 | 69.81889 | 0.0001 |
| At most 2 | 0.454197 | 43.56271 | 47.85613 | 0.1195 |
| At most 3 | 0.355317 | 23.58129 | 29.79707 | 0.2187 |
| At most 4 | 0.148980 | 9.094392 | 15.49471 | 0.3567 |
| At most 5 | 0.107982 | 3.770859 | 3.841466 | 0.0521 |
| Trace test indicates 2 cointegrating eqn(s) at the 0.05 level | | | | |
| \* denotes rejection of the hypothesis at the 0.05 level | | | | |
| \*\*MacKinnon-Haug-Michelis (1999) p-values | | | | |
| Unrestricted Cointegration Rank Test (Maximum Eigenvalue) | | | | |
| Hypothesize d |  | Max-Eigen | 0.05 |  |
| No. of CE(s) | Eigenvalue | Statistic | Critical Value | Prob.\*\* |
| None \* | 0.878523 | 69.56490 | 40.07757 | 0.0000 |
| At most 1 \* | 0.806967 | 54.28150 | 33.87687 | 0.0001 |
| At most 2 | 0.454197 | 19.98143 | 27.58434 | 0.3424 |
| At most 3 | 0.355317 | 14.48689 | 21.13162 | 0.3264 |
| At most 4 | 0.148980 | 5.323533 | 14.26460 | 0.7006 |
| At most 5 | 0.107982 | 3.770859 | 3.841466 | 0.0521 |
| Max-eigenvalue test indicates 2 cointegrating eqn(s) at the 0.05 level | | | | |
| \* denotes rejection of the hypothesis at the 0.05 level | | | | |
| \*\*MacKinnon-Haug-Michelis (1999) p-values  ***Source: Researcher’s Computations using E-Views 9.0 (2021)*** | | | | |

Just like Models 1 and 2, Model 3 above established that both the Trace test and Max- eigenvalue test indicates 2 co-integrating equations at the 0.05 level. Hence, the null hypothesis which states that there is no long run relationship among the series is rejected while the alternative hypothesis in supports of the existence of a long run relationship among the study variables is accepted instead. On this premise, we conclude that, deficit financing has a long run effect on economic growth of South Africa just like Nigeria and Kenya reported earlier.

##### Table 3d: Johansen Co integration Results for Model 4 -Cameroon

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Unrestricted Cointegration Rank Test (Trace) | | | | |
| Hypothesize d |  | Trace | 0.05 |  |
| No. of CE(s) | Eigenvalue | Statistic | Critical Value | Prob.\*\* |
| None \* | 0.878059 | 150.2610 | 95.75366 | 0.0000 |
| At most 1 \* | 0.689935 | 82.92600 | 69.81889 | 0.0032 |
| At most 2 | 0.520665 | 45.45488 | 47.85613 | 0.0826 |
| At most 3 | 0.329523 | 21.92347 | 29.79707 | 0.3028 |
| At most 4 | 0.246495 | 9.130979 | 15.49471 | 0.3534 |
| At most 5 | 0.002320 | 0.074337 | 3.841466 | 0.7851 |
| Trace test indicates 2 cointegrating eqn(s) at the 0.05 level | | | | |
| \* denotes rejection of the hypothesis at the 0.05 level | | | | |
| \*\*MacKinnon-Haug-Michelis (1999) p-values | | | | |
| Unrestricted Cointegration Rank Test (Maximum Eigenvalue) | | | | |
| Hypothesize d |  | Max-Eigen | 0.05 |  |
| No. of CE(s) | Eigenvalue | Statistic | Critical Value | Prob.\*\* |
| None \* | 0.878059 | 67.33500 | 40.07757 | 0.0000 |
| At most 1 \* | 0.689935 | 37.47112 | 33.87687 | 0.0178 |
| At most 2 | 0.520665 | 23.53141 | 27.58434 | 0.1519 |
| At most 3 | 0.329523 | 12.79249 | 21.13162 | 0.4715 |
| At most 4 | 0.246495 | 9.056641 | 14.26460 | 0.2815 |
| At most 5 | 0.002320 | 0.074337 | 3.841466 | 0.7851 |
| Max-eigenvalue test indicates 2 cointegrating eqn(s) at the 0.05 level | | | | |
| \* denotes rejection of the hypothesis at the 0.05 level | | | | |
| \*\*MacKinnon-Haug-Michelis (1999) p-values.  ***Source: Researcher’s Computations using E-Views 9.0 (2021)*** | | | | |

Table 3d above reaffirmed that there existsa long run relationship between deficit financing proxies and economic growth. This is because both the trace test and the Max- eigen testresults appear with 2 co-integrating equations at the 0.05 level. Hence, the null hypothesis which states that there is no long run relationship among the series is rejected while the alternative hypothesis in supports the existence of long run relationship among the study variables is accepted instead. On this premise, we conclude that, deficit financing has a long run effect on economic growth of Cameroon just like Nigeria, South

Africa, and Kenya reported earlier.

##### Table 3e: Kao Co-integration Results for Model 5 - Selected Sub-Sahara African Countries

|  |  |  |
| --- | --- | --- |
| Newey-West automatic bandwidth selection and Bartlett kernel | | |
|  | t-Statistic | Prob. |
| ADF | -2.863084 | 0.0021 |
| Residual variance | 0.083775 |  |
| HAC variance | 0.059530 |  |

***Source: Researcher’s Computations using E-views 9.0 (2021)***

To further revalidate the Johansen co-integration test results in Tables 3a to 3d above, the Kao (1999) co-integration test as presented in Table 3e above supports the alternative hypothesis which reaffirmed the existence of co-integration since its ρ-value estimated at 0.0021 is less than 5% level ofsignificance. Hence, we conclude that from all indications that deficit financing has a long run effect on economic growth of the Sub-Sahara African countries.

##### 4.3.4 Vector Error Correction Model (VECM) Estimates

This section accounted for VECM estimates for both country and cross country level VECM results. While the country level covered VECM results for Nigeria, Kenya, South Africa and Cameroon, the Cross country VECM result account for panel VECM results for the four selected SSA Countries. Each of them is briefly discussed below:

##### Table 4a: VECM Estimates for Model 1 -Nigeria

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Dependent Variable: D(LOG(RGDP))** | | | | |
|  | **Coefficient** | **Std. Error** | **t-Statistic** | **Prob.** |
| **ECT(-1)** | **-0.207774** | **0.076536** | **-2.714732** | **0.0124** |
| RGDP(-1) | 0.423974 | 0.166235 | 2.550456 | 0.0179 |
| FGDD(-1) | 0.090104 | 0.153934 | 0.585344 | 0.5640 |
| FGXD(-1) | 0.004680 | 0.034990 | 0.133743 | 0.8948 |
| FGBD(-1) | -6.57E-15 | 4.59E-15 | -1.428940 | 0.1665 |
| EXR(-1) | -0.045230 | 0.043158 | -1.048025 | 0.3055 |
| BRMS(-1) | -0.107855 | 0.143134 | -0.753524 | 0.4588 |
| C | 0.099991 | 0.054774 | 1.825510 | 0.0809 |
| R-squared | 0.574825 | Mean dependent var | | 0.176416 |
| Adjusted R-squared | 0.445424 | S.D. dependent var | | 0.116314 |
| S.E. of regression | 0.086619 | Akaike info criterion | | -1.836954 |
| Sum squared resid | 0.172567 | Schwarz criterion | | -1.466892 |
| Log likelihood | 36.47278 | Hannan-Quinn criter. | | -1.716323 |
| F-statistic | 4.442197 | Durbin-Watson stat | | 2.186939 |
| Prob(F-statistic) | 0.002983 |  | |  |

***Source: Researcher’s Computations using Econometric Views version 9.0 (2021)***

The results from the ECM equation in Table 4a above suggests that budget deficit (FGBD), external reserves (EXR) and broad money supply (BRMS) negatively affected the economic growth (GDP) in Nigeria. A unit change in FGBD will lead to an innovation in RGDP by the magnitude of its coefficient (-6.57E-15). Similarly, a unit change in EXR will lead to a change in RGDP by -0.04. Similar pattern was found with BRMS as a unit change in BRMS will impact on RGDP by -0.10. In contrast, domestic debt (FGDD), and external debt (FGXD) are observed to be positively insignificant indicating that a unit change in these variables will lead to changes in RGDP by the value of their coefficients 0.09 and 0.004 respectively. However, all the variables are insignificant since their probability values are greater than 0.05 at 5% level.

Given the coefficient of determination as 0.574825 which is 57.48% supported by low value of adjusted R**2**as 44.54% it presumes that the independent variables jointly accounted for 44.54% variation in the dependent variable, while the remaining are caused by the error term. The F Probability statistic (0.002983) also confirms the

significant of this model. Again, the Durbin Watson Statistics (2.186939) clearly revealed that the model is not serially correlated since it value is within the accepted region of acceptance.

Lastly, the VECM estimate in table 4.4a above reported a negative error correction term value of -0.207774 and it was also found to be statistically significant at 5% level. This suggests that the previous years would be corrected in the following year at an adjustment rate of 11.17%. Hence, there is convergence of the study variables (budget deficit (FGBD), domestic debt (FGDD), external debt (FGXD), external reserves (EXR), broad money supply (BRMS), and real gross domestic product (RGDP)) to long run relationship equilibrium relationship. On this premise, we conclude that the coefficients are significantly differently from zero signposting that deficit financing on the overall has high statistical significant effect on economic growth of Nigeria on the short run.

##### Table 4b: VECM Estimates for Model 2 -Kenya

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Coefficient | Std. Error | t-Statistic | Prob. |
| **ECT(-1)** | **-0.103872** | **0.040032** | **-2.594661** | **0.0183** |
| RGDP(-1) | 14.41028 | 5.034312 | 2.862412 | 0.0104 |
| FGDD(-1) | 0.087726 | 0.565445 | 0.155145 | 0.8784 |
| FGXD(-1) | 2.249878 | 0.991839 | 2.268390 | 0.0358 |
| FGBD(-1) | -0.037224 | 0.046750 | -0.796231 | 0.4363 |
| EXR(-1) | -3.312891 | 1.964511 | -1.686369 | 0.1090 |
| BRMS(-1) | 0.129677 | 0.436673 | 0.296967 | 0.7699 |
| C | 1.920687 | 0.840630 | 2.284819 | 0.0347 |
| R-squared | 0.899754 | Mean dependent var | | -0.005971 |
| Adjusted R-squared | 0.783756 | S.D. dependent var | | 0.357035 |
| S.E. of regression | 0.363012 | Akaike info criterion | | 1.110872 |
| Sum squared resid | 2.371993 | Schwarz criterion | | 1.752131 |
| Log likelihood | -3.773947 | Hannan-Quinn criter. | | 1.323431 |
| F-statistic | 0.922133 | Durbin-Watson stat | | 2.110473 |
| Prob(F-statistic) | 0.550397 | | |  |
| ***Source: Researcher’s Computations using E-Views 9.0 (2021).*** | | | |  |

The VECM estimates in Table 4b above suggest that past values of budget deficit (FGBD) and external reserves (EXR) with coefficients of -0.037 and -3.31

respectively,negatively affected the economic growth (GDP) in Kenya, while past values of domestic debt (FGDD), external debt (FGXD) and broad money supply (BRMS) with coefficients of 0.08, 2.24, and 0.12 respectively positively affected the economic growth (RGDP). However, past values of RGDP with that of external debt (FGXD) have statistical significant effect on economic growth proxy (RGDP) in Kenya since their probability values were less than 0.05 at 5% level, except which has probability values lower than 0.05 at 5% level.

Given the coefficient of determination as 0.899754 which is 89.97% supported by high value of adjusted R**2**as 78.37% it presumes that the independent variables incorporated into this model have been able to determine the economic growth (RGDP) to 78.37% that is there is a significant relationship between dependent variables and independent variables. The F Probability statistic (0.550397) also confirms the significant of this model. Again, the Durbin Watson Statistics (2.110473) clearly revealed that the model is not serially correlated since it value is within the accepted region of acceptance.

Lastly, ECT (-1) has negative coefficient value of -0.1038720with a probability value (0.0183<0.05). This suggests that the previous years would be corrected in the following year at an adjustment rate of 10%. Hence, there is convergence of the study variables (budget deficit (FGBD), domestic debt (FGDD), external debt (FGXD), external reserves (EXR), Broad money supply (BRMS), and real gross domestic product (RGDP) to long run relationship equilibrium relationship. On this premise, we conclude that the coefficients are significantly differently from zero signposting that deficit financing on the overall has high statistical significant effect on economic growth of Kenya on the short run.

##### Table 4c: VECM Estimates for Model 3 - South Africa

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Dependent Variable: D(RGDP) | | | | |
|  | Coefficient | Std. Error | t-Statistic | Prob. |
| **ECT(-1)** | **-0.740783** | **0.173284** | **-4.274972** | **0.0002** |
| RGDP(-1) | 2.517608 | 0.602869 | 4.176048 | 0.0003 |
| FGDD(-1) | -0.009899 | 0.008493 | -1.165485 | 0.2548 |
| FGXD(-1) | -0.001379 | 0.005891 | -0.234027 | 0.8169 |
| FGBD(-1) | 0.001232 | 0.002390 | 0.515434 | 0.6108 |
| EXR(-1) | -0.053991 | 0.084647 | -0.637839 | 0.5294 |
| BRMS(-1) | -0.909146 | 0.269036 | -3.379274 | 0.0024 |
| C | -0.086843 | 0.045492 | -1.908943 | 0.0678 |
| R-squared | 0.996608 | Mean dependent var | | -0.080075 |
| Adjusted R-squared | 0.995658 | S.D. dependent var | | 0.729341 |
| S.E. of regression | 0.048059 | Akaike info criterion | | -3.025562 |
| Sum squared resid | 0.057741 | Schwarz criterion | | -2.662773 |
| Log likelihood | 57.92178 | Hannan-Quinn criter. | | -2.903495 |
| F-statistic | 1049.276 | Durbin-Watson stat | | 1.546731 |
| Prob(F-statistic) | 0.000000 |  | |  |

***Source: Research’s Computations using Econometric Views version 9.0 (2021)***

The VECM estimates in Table 4c above suggest that past values of domestic debt (FGDD), external debt (FGXD), external reserves (EXR) and broad money supply (BRMS) exerted negative impacts on South Africa’s economic growth (RGDP) during the period covered by the study. A unit change in FGDD will lead to change in RGDP by -0.009. Also, a unit change in FGXDwill lead to change in RGDP by -0.013. Similarly, a unit change in EXR and BRMS will lead to changes in RGDP by the value of their coefficients -0.0539 and -0.9091 respectively.

With avalue of the coefficient of determination, R2, 996608, all the independent variables were able to explain over 99.6% of the systematic variations in the dependent variable, economic growth (RGDP).This empirical resultsshows that the model of the study has a high explanatory power. Similarly, with the value of the adjusted R**2**, 99.56%, it is presumed that all the independent variables in the study’s model were able to explain approximately 99.6% of the systematic variations in economic growth in Cameroon, Kenya, Nigeria and South Africa, respectively.What these empirical findings

portend is that there is a high measure of goodness-of-fit among the variables contained in the model of the study.

The value of the F-statistic, 1049.276[0.00000], shows that the model of the study passed the test of overall significance at the traditional 1% level. However, the value of Durbin Watson-statistic, 1.546731, is less than 2. The implication for this statistical finding is that there exist strong elements of serial correlation.

The value of ECT(-1) has a negative coefficient value of -0.740783and this accords with theory. This suggests that the previous years’disequilibrium would be corrected in the following year at an adjustment speed of 74%. Hence, there is convergence of the study’s variables (i.e. budget deficit (FGBD), domestic debt (FGDD), external debt (FGXD), external reserves (EXR), broad money supply (BRMS), and real gross domestic product (RGDP) to long run relationship equilibrium relationship. On this premise, we conclude that the coefficients are significantly differently from zero signposting that deficit financing on the overall has high statistical significant effect on economic growth in South Africa on the short run.

##### Table 4d: VECM Estimates for Model 4 - Cameroon

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Coefficient | Std. Error | t-Statistic | Prob. |
| **ECM(-1)** | **-0.100891** | **0.045538** | **-2.215506** | **0.0407** |
| RGDP(-1) | -0.372495 | 0.365134 | -1.020160 | 0.3220 |
| FGDD(-1) | -0.026368 | 0.012966 | -2.033586 | 0.0579 |
| FGXD(-1) | -0.020111 | 0.013546 | -1.484636 | 0.1559 |
| FGBD(-1) | 0.020785 | 0.016342 | 1.271815 | 0.2206 |
| EXR(-1) | -0.432156 | 0.341034 | -1.267196 | 0.2222 |
| BRMS(-1) | -0.047897 | 0.115193 | -0.415796 | 0.6828 |
| C | -0.005420 | 0.026806 | -0.202195 | 0.8422 |
| R-squared | 0.725195 | Mean dependent var | | 0.003710 |
| Adjusted R-squared | 0.515049 | S.D. dependent var | | 0.188672 |
| S.E. of regression | 0.131388 | Akaike info criterion | | -0.918869 |
| Sum squared resid | 0.293469 | Schwarz criterion | | -0.271261 |
| Log likelihood | 28.24246 | Hannan-Quinn criter. | | -0.707765 |
| F-statistic | 0.137948 | Durbin-Watson stat | | 2.089772 |
| Prob(F-statistic) | 0.712777 |  | |  |

***Source:Researcher’s Computations using Econometric Views version 9.0 (2021)***

The VECM estimates in Table 4d above suggests that past values of all the study variables except budget deficit (FGBD) with a coefficient value of 0.020 negatively affected the economic growth (RGDP) of Cameroon. However, all the study variables are statistically insignificant. This was reaffirmed by the f-statistics with a probability value of 0.71277.

With a coefficient of determination value of 0.725195 presumed that the model has a high explanatory power. Meanwhile, by high value of adjusted R**2** as 51.50% it presumes that the independent variables incorporated into this model have been able to determine the economic growth (RGDP) to 51.50% that is there is a significant relationship between dependent variables and independent variables. Again, the Durbin Watson Statistics with a value of 2.089772 clearly revealed that the model is not serially correlated since it value is within the accepted region of acceptance.

Lastly, ECT (-1) has negative coefficient value of -0.100891with a probability value (0.0407<0.05). This suggests that the previous years would be corrected in the following year at an adjustment rate of 10%. Hence, there is convergence of the study variables (budget deficit (FGBD), domestic debt (FGDD), external debt (FGXD), external reserves (EXR), broad money supply (BRMS), and real gross domestic product (RGDP) to long run relationship equilibrium relationship. On this premise, we conclude that the coefficients are significantly differently from zero signposting that deficit financing on the overall has high statistical significant effect on economic growth of Cameroon on the short run.

##### Table 4.3e: Panel VECM Results for Model 5 -Selected SSA Countries

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Dependent Variable: D(RGDP) | | | | |
| Method: Panel Least Squares | | | | |
| Date: 09/09/21 Time: 06:49 | | | | |
| Sample (adjusted): 1989 2020 | | | | |
| Periods included: 32 | | | | |
| Cross-sections included: 4 | | | | |
| **Study Variables** | **Coefficient** | **Std. Error** | **t-Statistic** | **Prob.** |
| **ECT(-1)** | **-0.111697** | **0.046722** | **-2.390696** | **0.0185** |
| D(RGDP(-1)) | -0.279367 | 0.252294 | -1.107309 | 0.2705 |
| D(FGDD(-1)) | 0.087950 | 0.038970 | 2.256859 | 0.0259 |
| D(FGXD(-1)) | -0.033102 | 0.054463 | -0.607794 | 0.5445 |
| D(FGBD(-1)) | 0.036123 | 0.027784 | 1.300124 | 0.1962 |
| D(EXR(-1)) | -0.124080 | 0.195127 | -0.635893 | 0.5261 |
| D(BRMS(-1)) | -0.471838 | 0.137405 | -3.433923 | 0.0008 |
| C | -0.014279 | 0.052817 | -0.270344 | 0.7874 |
| R-squared | 0.169149 | Mean dependent var | | 0.000983 |
| Adjusted R-squared | 0.074402 | S.D. dependent var | | 0.412873 |
| S.E. of regression | 0.397217 | Akaike info criterion | | 1.094248 |
| Sum squared resid | 17.98704 | Schwarz criterion | | 1.406189 |
| Log likelihood | -56.03189 | Hannan-Quinn criter. | | 1.220991 |
| F-statistic | 1.785281 | Durbin-Watson stat | | 1.580064 |
| Prob(F-statistic) | 0.053568 |  |  |  |

***Source:Researcher’s Computations using Econometric Views version 9.0 (2021)***

On a cross country level, the error correction term denoted by ECT(-1) reported a negative coefficient value of -0.111697 and this negativity sign is in tandem with theory. This empirical finding suggests that the previous year’s disequilibrium would be corrected in the following year at an adjustment speed of 11.17%. Hence, there is convergence of the study’s variables (budget deficit - FGBD [0.036123], domestic debt - FGDD [0.087950], external debt – FGXD [-0.0033103], external reserves – EXR [- 0.124080], broad money supply – BRMS [-0.471838], and real gross domestic product – RGDP [-0.279367]) to long run relationship equilibrium relationship. However, the F- statistics test (1.785281) revealed that the coefficients are statistically insignificant at 5% critical level. This implies that the coefficients are not significantly differently from

zero. Hence, we conclude that there is no influence of exogenous variables (deficit financing) on the endogenous variable (economic growth).

##### 4.4. Regression Result-Hypotheses Testing

To test the magnitude of the relationship among the study variables on a country level, the fully modified ordinary least square (FMOLS) was adopted. Meanwhile, testing the magnitude of the relationship among the study variables on a country level, the panel data methodology was adopted using the Hausman test as a basis for choosing between the Random and Fixed effect model. The decision rule here is that, if the probability value associated with the Chi-square statistics of the Hausman test is higher than 5%, we are to accept the null hypothesis which states that the random effect model is preferred model. Meanwhile, if the probability value associated with the Chi-square statistics of the Hausman test is lower than 5%, we are to reject the null hypothesis and accept the alternate hypothesis is that the model is fixed effects model. Both the country level (Nigeria, South Africa, Kenya, and Cameroon) and cross country level (Sub-Saharan African Countries) regression results are presented in Table 5(a) below:

##### Table 5a: Fully Modified Least Squares (FMOLS) Results for Model 1 – Nigeria

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Method: Fully Modified Least Squares (FMOLS) | | | | | | |
| Date: 09/08/21 Time: 15:17 | | | | | |  |
| Sample (adjusted): 1987 2020 | | | | | |  |
| Included observations: 32 after adjustments | | | | | | |
| No cointegrating equation deterministics | | | | | | |
| Long-run covariance estimate (Bartlett kernel, Newey-West fixed | | | | | | |
| bandwidth = 4.0000) | | | | | |  |
| **Variable** | **Coefficient** | **Std. Error** | | **t-Statistic** | | **Prob.** |
| FGDD | 2.304615 | 0.673418 | | 3.422263 | | 0.002 |
| FGXD | 1.218523 | 0.505779 | | 2.409203 | | 0.0231 |
| FGBD | -0.405758 | 0.643078 | | -0.630962 | | 0.5334 |
| EXR | 3.366955 | 0.943624 | | 3.56811 | | 0.0014 |
| BRMS | -3.221187 | 0.897873 | | -3.587575 | | 0.0013 |
| R-squared | 0.592752 | Mean dependent var | | | | 11.64157 |
| Adjusted R-squared | 0.532418 | S.D. dependent var | | | | 3.238620 |
| S.E. of regression | 2.214566 | Sum squared resid | | | | 132.4162 |
| Long-run variance | 5.955276 |  | |  | |  |
| **Wald Test:** | | | | | | |
| **Test Statistic** | **Value** | | **Df** | | **Probability** | |
| F-statistic | 196.6771 | | (4, 27) | | 0.0000 | |
| Chi-square | 786.7083 | | 4 | | 0.0000 | |

***Source:Researcher’s Computations using Econometric Views version 9.0 (2021)***

The empirical results of the Fully Modified Least Squares (FMOLS) in Table 5a above reported an R-squared value of 0.5927. This implies that all the study variables jointly accounted for at least 59.27% changes in gross domestic product of Nigeria. The R- square value stated above was further re-enforced by the adjusted r-square value of 0.532418. Furthermore, the F-statistics of the Wald test estimated at 196.6771 is statistically significant implying all that the study variables considered in this study are not equal to zero. Meanwhile, on individual bases, all the deficit financing proxies - FGDD (2.304615), FGXD (1.218523), EXR (3.366955) exerted positive effect on economic growth while BRMS (-3.221187) and FGBD (-0.405758) exerted negativeeffect on economic growth. However, all the study variables passed the test of statistical significant.

##### Table 5b: Fully Modified Least Squares Estimation Results for Model 2 -Kenya

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Dependent Variable: RGDP | | | | |
| Date: 09/08/21 Time: 18:41 | | | | |
| Sample (adjusted): 1987 2020 | | | | |
| Included observations: 34 after adjustments | | | | |
| Cointegrating equation deterministics: C @TREND | | | | |
| Long-run covariance estimate (Bartlett kernel, Newey-West fixed | | | | |
| bandwidth = 4.0000) | | | |  |
| **Variable** | **Coefficient** | **Std. Error** | **t-Statistic** | **Prob.** |
| FGDD | 0.068118 | 0.043787 | 1.555668 | 0.1314 |
| FGXD | 0.072880 | 0.024571 | 2.966140 | 0.0062 |
| FGBD | 0.047870 | 0.016659 | 2.873530 | 0.0078 |
| EXR | 1.392975 | 0.499446 | 2.789043 | 0.0096 |
| BRMS | 1.052637 | 0.118957 | 8.848883 | 0.0000 |
| C | -13.82704 | 4.722955 | -2.927624 | 0.0069 |
| @TREND | -0.124856 | 0.027793 | -4.492292 | 0.0001 |
| R-squared | 0.778547 | Mean dependent var | | 11.94088 |
| Adjusted R-squared | 0.729335 | S.D. dependent var | | 0.747386 |
| S.E. of regression | 0.388831 | Sum squared resid | | 4.082119 |
| Long-run variance | 0.126566 |  |  |  |
| **Wald Test:** | | | | |
| **Test Statistic** | **Value** | | **df** | **Probability** |
| F-statistic | 23.10333 | | (4, 27) | 0.0000 |
| Chi-square | 92.41331 | | 4 | 0.0000 |

***Source:Researcher’s Computations using Econometric Views version 9.0 (2021)***

The Fully Modified Least Squares (FMOLS) in table 4.5b above reported R-squared value of 0.778547. This implies the all the study variables jointly accounted for at least 77.85% changes in gross domestic product of Kenya. The r-squared value stated above was further re-enforced by the adjusted r-square value of 0.729335. Furthermore, the F- statistics of the Wald test estimated at 23.10333 is statistically significant implying all that the study variables considered in this study are not equal to zero. Meanwhile, on individual bases, all the deficit financing proxies – FGDD (0.0681), FGXD (0.0728), FGBD (0.0478), EXR (1.3929) and BRMS(1.0526) exerted positive significant effect on economic growth in Kenya.

##### Table 5c: Fully Modified Least Squares (FMOLS) Results for Model 3 -South Africa

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Dependent Variable: RGDP | | | | | | |
| Date: 09/09/21 Time: 01:54 | | | | | | |
| Sample (adjusted): 1987 2020 | | | | | | |
| Included observations: 34 after adjustments | | | | | | |
| Cointegrating equation deterministics: C @TREND | | | | | | |
| Long-run covariance estimate (Bartlett kernel, Newey-West fixed | | | | | | |
| bandwidth = 4.0000) | | | | | |  |
| **Variable** | **Coefficient** | **Std. Error** | | **t-Statistic** | | **Prob.** |
| FGDD | -0.003265 | 0.003732 | | -0.874848 | | 0.3894 |
| FGXD | -0.008868 | 0.004868 | | -1.821606 | | 0.0796 |
| FGBD | 0.171096 | 0.004429 | | 38.62767 | | 0.0000 |
| EXR | 0.054525 | 0.042833 | | 1.272942 | | 0.2139 |
| BRMS | 0.978269 | 0.096346 | | 10.15376 | | 0.0000 |
| C | -1.525601 | 1.015913 | | -1.501704 | | 0.1448 |
| @TREND | -0.004573 | 0.006370 | | -0.717926 | | 0.4790 |
| R-squared | 0.996541 | Mean dependent var | | | | 12.01050 |
| Adjusted R-squared | 0.995772 | S.D. dependent var | | | | 0.591289 |
| S.E. of regression | 0.038446 | Sum squared resid | | | | 0.039908 |
| Long-run variance | 0.001351 |  | |  | |  |
| **Wald Test:** | | | | | | |
| **Test Statistic** | **Value** | | **Df** | | **Probability** | |
| F-statistic | 867.5724 | | (4, 27) | | 0.0000 | |
| Chi-square | 3470.290 | | 4 | | 0.0000 | |

***Source:Researcher’s Computations using Econometric Views version 9.0 (2021).***

Table 5c above reported R-squared and adjusted R-squared values of 99.6% and 99.57% respectively. This implies the all the study variables jointly accounted for at least 99.67% changes in gross domestic product of South Africa. Furthermore, the F-statistics of the Wald test estimated at 867.5724 is statistically significant implying all that the study variables considered in this study are not equal to zero. Meanwhile, on individual bases, domestic debt (FGBD- 0.1710), external reserves (EXR – 0.0545), and Broad money supply (BRMS – 0.9782) exerted positive effect on economic growth in South Africa. However, domestic debt (FGDD [-0.0032]) and external debt (FGXD [-0.0088]) both exerted negative effect on economic growth of South Africa. More so, in terms of

statistical significant, only budget deficit (FGBD) and Broad money supply (BRMS) passed the test of statistical significant very well.

##### Table 5d: Fully Modified Least Squares (FMOLS) Estimates for Model 4 - Cameroon

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Dependent Variable: GDP | | | | | | |
| Date: 09/09/21 Time: 03:53 | | | | | | |
| Sample (adjusted): 1987 2020 | | | | | | |
| Included observations: 34 after adjustments | | | | | | |
| Cointegrating equation deterministics: C | | | | | | |
| Long-run covariance estimate (Bartlett kernel, Newey-West fixed | | | | | | |
| bandwidth = 4.0000) | | | | | |  |
| **Variable** | **Coefficient** | **Std. Error** | | **t-Statistic** | | **Prob.** |
| FGDD | -0.007921 | 0.006595 | | -1.201132 | | 0.2398 |
| FGXD | 0.053950 | 0.079096 | | 0.682084 | | 0.5008 |
| FGBD | -0.023671 | 0.006348 | | -3.728991 | | 0.0009 |
| EXR | 0.076051 | 0.040861 | | 1.861216 | | 0.0732 |
| BRMS | 0.065731 | 0.017394 | | 3.778945 | | 0.0008 |
| C | 8.547993 | 0.966866 | | 8.840926 | | 0.0000 |
| R-squared | 0.819531 | Mean dependent var | | | | 10.25580 |
| Adjusted R-squared | 0.787304 | S.D. dependent var | | | | 0.217842 |
| S.E. of regression | 0.100467 | Sum squared resid | | | | 0.282619 |
| Long-run variance | 0.006353 |  | |  | |  |
| Wald Test: | | | | | | |
| Test Statistic | Value | | Df | | Probability | |
| **F-statistic** | **20.40664** | | **(4, 28)** | | **0.0000** | |
| Chi-square | 81.62655 | | 4 | | 0.0000 | |

***Source:Researcher’s Computations using Econometric Views version 9.0 (2021)***

Table 5d above reported a R-squared and adjusted R-squared values of 81.95% and 78.73% respectively. This implies the all the study variables jointly accounted for at least 81.95% changes in gross domestic product of Cameroon. Furthermore, the F- statistics of the Wald test estimated at 20.40664 is statistically significant implying all that the study variables considered in this study are not equal to zero. Meanwhile, on individual bases, external debt (FGXD – 0.0539), external reserves (EXR – 0.0760), and Broad money supply (BRMS – 0.0657) exerted positive effect on economic growth in Cameroon. However, budget deficit (FGBD [-0.0236]) and domestic debt (FGDD [- 0.0079]) both exerted negative effect on economic growth of Cameroon. More so, in

terms of statistical significant, only budget deficit (FGBD) and Broad money supply (BRMS) passed the test of statistical significant very well.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Table 5e: Correlated Random Effects - Hausman Test** | | | | |
| Equation: Untitled |  |  |  |  |
| Test period random effects | | | | |
| Test Summary |  | Chi-Sq. Statistic | Chi-Sq. d.f. | Prob. |
| **Period random** |  | **2.355263** | **5** | **0.7981** |
| \*\* WARNING: estimated period random effects variance is zero. | | | | |
| **Period random effects test comparisons:** | | | | |
| Variable | Fixed | Random | Var(Diff.) | Prob. |
| FGDD | -0.175142 | -0.170877 | 0.000219 | 0.7732 |
| FGXD | 0.259302 | 0.246228 | 0.000269 | 0.4258 |
| FGBD | 0.121628 | 0.130254 | 0.000294 | 0.6149 |
| EXR | 0.863037 | 0.857008 | 0.002465 | 0.9033 |
| BRMS | 0.155031 | 0.162126 | 0.001891 | 0.8704 |

***Source: Researcher’s Computations using Econometric Views version 9.0 (2021)***

The Hausman test in Table 5e above reported a chi-square value of 2.355263 and a p- value of 0.7981. Since its p-value is greater than 5% significant level, we conclude that the null hypothesis which states that the random effect model is preferred is accepted. Hence, it was used to test the research hypotheses formulated earlier. The Random effect model is therefore presented in table 4.5f below:

##### Table 5f: Random Effect Model-Model 5

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Swamy and Arora estimator of component variances | | | | |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| C | -0.256808 | 0.272565 | -0.942192 | 0.3478 |
| FGDD | -0.170877 | 0.029545 | -5.783655 | 0.0000 |
| FGXD | 0.246228 | 0.042046 | 5.856137 | 0.0000 |
| FGBD | 0.130254 | 0.018709 | 6.962311 | 0.0000 |
| EXR | 0.857008 | 0.096390 | 8.891092 | 0.0000 |
| BRMS | 0.162126 | 0.093578 | 1.732515 | 0.0855 |
| Effects Specification | | | | |
|  |  |  | S.D. | Rho |
| Period random |  |  | 0.000000 | 0.0000 |
| Idiosyncratic random |  |  | 0.736275 | 1.0000 |
| Weighted Statistics | | | | |
| R-squared | 0.967085 | Mean dependent var | | 7.799541 |
| Adjusted R-squared | 0.965857 | S.D. dependent var | | 3.590984 |
| S.E. of regression | 0.663538 | Sum squared resid | | 58.99780 |
| F-statistic | 787.4179 | Durbin-Watson stat | | 1.549077 |
| Prob(F-statistic) | 0.000000 |  |  |  |
| Unweighted Statistics | | | | |
| R-squared | 0.967085 | Mean dependent var | | 7.799541 |
| Sum squared resid | 58.99780 | Durbin-Watson stat | | 1.549077 |

***Source: Researcher’s Computations using Econometric Views version 9.0 (2021)***

As shown in Table 5f above indicated that, R-squared (coefficient of determination, which refers to a goodness of fit measure for linear regression models and indicates the percentage of the variance in the dependent variable that the independent variables explain collectively) of the variables was 96.71%. As a measure of the overall fitness of the model, the R-squared indicated that, the model was capable of explaining about 96.59% of the systematic variation in the value of dependent variable which could be traced to the independent variables and that about 3.41% of the variations in economic growth proxy (GDP) of the sampled Sub-Sahara African countries were accounted for by other factors. This result was complimented by the adjusted R-squared (having

considered the degree of freedom) of 96.59%, which was the proportion of total variance that could be explained by the model.

Additionally, the Durbin Watson statistics value of 1.549077 reported positive serial- auto correlation. This is because a Durbin-Watson value between 0 and 2 indicates positive autocorrelation. This further suggests that the model reaffirmed the OLS assumption of the presence of no-serial-auto correlation in the data series.

Similarly, findings from the Fishers ratio (that is, the F-statistic) which is a proof of the validity of the estimated model presented a p-value of (0.000000) that is less than 0.05. This therefore provides enough evidence to reject the null hypothesis which states that: deficit financing on the overall does not have no significant effect on economic growth in Sub-Sahara African countries.

Sequel to the above exposition, the hypotheses formulated in the earlier chapter of this study are therefore tested below:

##### Test of Hypothesis One:

**Ho**1: External Debt has no significant effect on Real Gross Domestic Products (GDP) in Sub-Sahara African Countries.

The random effect model in Table 5f above revealed that external debt denoted by FGXD reported a positive coefficient value of 0.246228 and a p-value of 0.0000. This implies that FGXD has a positive significant effect on economic growth in Sub-Sahara African Countries. Hence, we reject the null hypothesis one and accepted the alternative hypothesis which states that:

**Ho1:** External Debt has significant effect on Real Gross Domestic Product (RGDP) in Sub-Sahara African Countries.

##### Test of Hypothesis Two:

**Ho2:** Domestic Debt has no significant effect on Real Gross Domestic Product (RGDP) in Sub-Saharan Countries.

The Random effect model in table 5f above revealed that domestic debt denoted by FGDD reported a negative coefficient value of -0.170877 and a p-value of 0.0000. This implies that FGDD has a negative significant effect on economic growth in Sub-Sahara African Countries. Hence, we reject the null hypothesis two and accepted the alternative hypothesis which states that:

**Ho2:** Domestic Debt has significant effect on Real Gross Domestic Product (RGDP) in Sub-Sahara African Countries.

The above result supports the findings gotten from Nigeria in terms of statistical significance in that it reported that federal government domestic debt has a significant effect on economic growth in Nigeria.

##### Test of Hypothesis Three:

**Ho3:** Budget Deficit has no significant impact on Real Gross Domestic Product (RGDP) in Sub-Sahara African Countries.

The random effect model in table 4.5f above revealed that budget deficit denoted by FGBD reported a positive coefficient value of 0.130254 and a p-value of 0.0000. This implies that FGBD has a positive significant effect on economic growth in Sub-Sahara African Countries.

On country level, budget deficit has a negative insignificant effect on economic growth in Nigeria. This is because it has a negative coefficient value of -0.405758 and a p-value (0.5334) that is higher than 5%. Meanwhile, budget deficit has a positive significant effect on economic growth in Kenya and South Africa. This is because they exerted positive coefficient values of 0.047870 and 0.171096 respectively and probability values

(0.0078 and 0.000 respectively). However, budget deficit has a negative significant effect on economic growth in Cameroon. This is because it has a negative coefficient value of -0.023671 and a p-value (0.0009) that is lower than 5%. Hence, we reject the null hypothesis three and accepted the alternative hypothesis which states that:

**Ho3:** Budget Deficit has significant effect on Real Gross Domestic Product (RGDP) in Sub-Sahara African Countries.

##### Test of Hypothesis Four:

**Ho4:** External Reserves have no significant impact on Real Gross Domestic Products (RGDP) in Sub-Sahara African Countries.

The Random effect model in table 4.5f above revealed that external reserves denoted by EXR reported a positive coefficient value of 0.857008 and a p-value of 0.0000. This implies that EXR has a positive significant effect on economic growth in Sub-Sahara African Countries.

On country level, external reserves have a positive effect on economic growth in the four selected Sub-Sahara African countries. This is because they reported a positive coefficient value (3.366955, 1.392975, 0.054525, and 0.076051). However, only model 1 and 2 passed the test of statistical significant since their p-values (0.0014 and 0.0096) are less 5% level.

In the light of the above, we reject the null hypothesis four and accept the alternative hypothesis which states that:

**Ho4:** External Reserve has significant effect on Real Gross Domestic Product (RGDP) in Sub-Sahara African Countries.

##### Test of Hypothesis Five:

**Ho5**: Broad Money Supply has no significant impact on Real Gross Domestic Product (RGDP) in Sub-Saharan Countries.

The Random effect model in table 4.5f above revealed that broad money supply denoted by BRMS reported a positive coefficient value of 0.162126 and a p-value of 0.0855. This implies that BRMS has a positive insignificant effect on economic growth in Sub- Sahara African Countries.

Although, broad money supply passed the test of statistical significant effect on economic growth in selected Sub-Sahara African individual countries but on a panel base was found to be statistical insignificant. In the light of the above, there is no enough evidence to reject the null hypothesis five. Hence, null hypothesis five is retained.

#### CHAPTER FIVE

**DISCUSSION OF RESULTS AND POLICY IMPLICATIONS**

##### Introduction

This chapter covers both the discussions of the regression results and the policy implications of each of the findings. Specifically, thechaptershows whether or not deficit financing affects economic growth in Sub-Sahara African countries.

##### Discussion of Results

* + 1. **External Debt and Real Gross Domestic Product (RGDP)**

On a cross country level, the Random effect model revealed that external debt denoted by FGXD had a positive coefficient of 0.246228 suggesting that a unit percent rise in external debt will increase the growth of Sub-Sahara African Countries by 24.62%. In terms of statistical significance, it passed the test of significance very well. This is because its p-value estimated at 0.000 is less than 5%. The same positive significant result was also replicated in Nigeria and Kenya. However, in the case of the two other Sub-Sahara African countries (South Africa and Cameroon), its effect on economic growth are mixed. The implication of the positive significant result is that external borrowings and by extension foreign debt is not a bad macroeconomic policy per say and that if an economy must grow, bridge her savings-investment gaps, foreign exchange gaps such economy must opt for external borrowings and by extension external debt. This study does not however advocate for seeking for foreign loans for the purposes of servicing previous loans collected. This further revealed that if countries of the world use borrowed loans for developmental purposes, the end result is improved economic growth.

Furthermore, the above findings laid claim that foreign borrowings do not all the time dampen economic growth. This is because at low levels of debt, additional foreign

borrowings could stimulate growth to the extent the additional capital financed by this new borrowing enhances the country’s productive capacity. By extension, as a country’s access to loan drop, how propensity to save will drop and as a result, the growth process will be truncated.

The Keynesian school of thought believes that active government intervention in the market place through deficit financing was the only method for ensuring growth and stability by ensuring efficiency in resources allocation, regulation of markets, stabilization of the economy and harmonization of social conflicts. This is the stand of this study.

To further validate theories as well as the result is in tandem with the findings of Solawon and Adekunle (2018); Sulimand & Azeez (2012) who reported that external debt is positively and significantly related to economic growth. However, the result contradicts the findings of Nwanna and Umeh (2019), Ifeanyi and Umeh (2019) who reported that external debt is negative and significantly related to economic growth.

##### Domestic Debt and Real Gross Domestic Product (RGDP)

The Random effect result revealed that domestic debt had negative significant effect on economic growth of Sub-Sahara African Countries. This is because it reported a negative coefficient value (-0.170877) and an estimated p-value (0.000) lesser than 5% level. This implies that a unit rise in domestic debt will decrease economic growth of Sub-Sahara African countries by 17.88%. This implies that domestic debt debars economic growth of Sub-Sahara African Countries. The justification for this is that as the stock of public (domestic) debt increases, investors may be worried that the government will finance its debt service obligations using distortionary economic policies like inflation rate. This is the position of this study. Hence, this finding is therefore critical to the Sub-Sahara African economy.

To further validate theories as well as the result is in tandem with the findings of Nwanna and Umeh (2019), Ifeanyi and Umeh (2019) but contradicts the findings of Solawon and Adekunle (2018); Sulimand & Azeez (2012).

##### Budget Deficit and Real Gross Domestic Product (GDP)

The result or of the random effect model revealed that budget deficit denoted by FGBD reported a positive coefficient value of 0.130254 and a p-value of 0.0000. This implies that FGBD has a positive significant effect on economic growth in Sub-Sahara African Countries. On country level, budget deficit also has a positive significant effect on economic growth in Kenya and South Africa. This is because they exerted positive coefficient values of 0.047870 and 0.171096 respectively and probability values (0.0078 and 0.000 respectively). However, budget deficit has a negative significant effect on economic growth in Nigeria. This is because it has a negative coefficient value of - 0.023671 and a p-value (0.0009) that is lower than 5%. Meanwhile, budget deficit has a negative insignificant effect on economic growth in Cameroon. This is because it has a negative coefficient value of -0.405758 and a p-value (0.5334) that is higher than 5%. Meanwhile,

The policy implication of the panel data result is that further increase in budget deficit in supplementing governments expenditure will only increase the Sub-Sahara African economy if it is efficiently used, otherwise it would negatively affect her economies on the long-run. The result is in tandem with the apriori expectation of the study and the Ricardian equivalence theorem and Keynesian theory of positive relationship between budget deficit and economic growth.

Following the Keynesian theory, an increase in government spending stimulates aggregate demand which leads to employment of idle resources and thus increase output. As such for the Sub-Sahara African Countries to reap the benefits of having a

budget deficit that stimulates the economy, the optimal level of 13.03% budget deficit has to be maintained, beyond this level, the benefits start increasing at a reducing rate and eventually become detrimental to real gross domestic product hence neoclassical theory will hold. Thus, the federal governments in Sub-Saharan Africa should not be worried about the existence of budget deficit but the levels should be their main concern, since beyond 13.13% of RGDP, it becomes unsustainable to the growth of the economy. To further validate theories as well, the result is in tandem with the findings of Tung (2018), Pelagidis and Desli (2014); Osuka and Achinhu (2014); Adeusi and Falowo (2013) but contradicts the findings of Iya et’al (2014) and Nwanne (2014).

##### External Reserves and Real Gross Domestic Product (GDP)

The Random effect model in table 5f above revealed that external reserves denoted by EXR reported a positive coefficient value of 0.857008 and a p-value of 0.0000. This implies that EXR has a positive significant effect on economic growth in Sub-Sahara African Countries. On country level, external reserves have a positive effect on economic growth in the four selected Sub-Sahara African countries. This is because they reported a positive coefficient value (3.366955, 1.392975, 0.054525, and 0.076051). However, only model 1 and 2 passed the test of statistical significant since their p-values (0.0014 and 0.0096) are less 5% level.

The policy implication of the above result is that if the federal governments should make more effort to increase external reserves in supplementing government expenditure; the Nigerian, Kenyan, South African, and Cameroonian economy will improve significantly. Both the Random effect and the Fully Modified OLS results are in tandem with the apriori expectation of the study and the dual-growth theory of positive relationship between external reserves and economic growth.

To further validate theories as well, the result is in tandem with the findings of Tung (2014) but contradicts the findings of Hussain and Haque (2017).

##### 5.2.5. Broad Money Supply and Real Gross Domestic Product (GDP)

The Random effect model in table 5f above revealed that broad money supply denoted by BRMS reported a positive coefficient value of 0.162126 and a p-value of 0.0855. This implies that BRMS has a positive insignificant effect on economic growth in Sub- Sahara African Countries. The implication of the positive result is that a unit rise in broad money supply will increase the economic growth of Sub-Sahara African countries by 16.12%. This result is in line with the apriori expectation of the study and the dual- growth theory. Meanwhile, the implication of the negative result is that broad money supply is not instrumental to economic growth of Sub-Sahara African countries. However, at country level, broad money supply passed the test of statistical significance.

To further validate theories as well as the result is in tandem with the findings of Solawon and Adekunle (2015) but contradicts the findings of Monogbe et’al (2015).

#### CHAPTER SIX

**SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS**

##### 6.1 Summary of Findings

The study carried out an in-depth empirical verification of the impact of deficit financing on economic growth in Sub-Saharan Africa using annual time series data spanning the period from 1986 to 2020. In doing this, both the statistical and econometrics strategies were employed to conduct the verification which was preceded by preliminary tests including the stationarity and co-integration tests. The empirical findings thus obtained included the following:

1. The random effect model results revealed that external debt had a positive significant effect on economic growth in Sub-Sahara African Countries. The same positive significant result was also replicated in Nigeria and Kenya. However, in the case of the two other Sub-Sahara African countries (South Africa and Cameroon), its effect on economic growth are mixed.
2. The results of the random effect model revealed that domestic debt had a negative significant effect on economic growth in Sub-Sahara African Countries. However, on country level, it effect on economic growth are mixed.
3. The Random effect model revealed that budget deficit had a positive significant effect on economic growth in Sub-Sahara African Countries. However, on country level, only result from Kenya and South Africa reported same. Meanwhile, results from Nigeria and Cameroon are mixed.
4. External reserves had a positive significant effect on economic growth in Sub-Sahara African Countries at cross country level. However, at individual country level, though all reported positive effect but only Nigeria and Kenya passed the test of statistical significance
5. Broad money supply had a positive insignificant effect on economic growth in Sub- Sahara African Countries both at individual country level and cross country level.

**6.2. Conclusion**

This study was concerned with the impact of deficit financing on economic growth in Sub-Sahara African countries from 1986–2020. Various Sub-Sahara African Countries considered include Nigeria, Kenya, South Africa, and Cameroon. The independent variable in the study is deficit financing measured by external debt, domestic debt, budget deficit, external reserves and broad money supply while the dependent variable in the study is economic growth measured by real gross domestic product. This study adopted both the FMOLS and Panel data estimation technique. For initial check of the series, the study employed four panel unit root test and the results show that all series are integrated of order one after the first difference. Both the Kao (1999) and Johansen cointegration tests were applied to check for cointegration. Both results revealed that there exists a long run co-integrating relationship between deficit financing on economic growth both on individual and cross-country level. To test the magnitude of the long relationship among variables on a country level, the fully modified ordinary least square (FMOLS) was adopted. Results both at country and cross-country level clearly revealed that deficit financing is instrumental to Sub-Sahara African Countries. Hence, we conclude that deficit financing is and still remains the surest way for countries in Sub- Saharan Africa to achieve outstanding economic performance provided loans borrowed are not used to service previous loans borrowed.

##### Recommendations

In line with the major findings of the study, the following recommends were made:

* + 1. The federal governments should maintain optimum level of foreign debt as it is one of the mechanisms for economic growth.
    2. Policy makers should encourage state owned enterprises to borrow through government guarantees to execute projects with expected revenue streams e.g. Standard Gauge Railways (SGR) project. This is expected to create fiscal space and reduce the fiscal deficits to sustainable levels.
    3. To maintain the budget deficit at sustainable levels, the study recommends exploring other options of financing expenditure especially the development expenditure like public private partnership which will create fiscal space off the government balance sheet.
    4. The federal governments in Sub-Sahara African countries should ensure that all efforts towards reducing her external reserves should be abhorred.
    5. Fiscal authorities should use various contractionary policies to reduce too much money in circulation which have prompted the broadly money supply to be insignificant to the growth of Sub-Sahara African countries on the overall.

##### Contributions to knowledge

The study has been able to contribute to knowledge in no little measure, and the contributions are believed to be significant. Some of the contributions of the study to knowledge are enumerated below:

* + 1. To the best of our knowledge, this study seems to be the one of the first of its kind to examine the subject matter both at a country level and cross country level in Sub-Sahara African Countries.
    2. The study extended its scope beyond those of earlier studies by modifying models of what were used earlier through the inclusion of budget deficit which was not captured by most scholars in previous studies.
    3. It filled knowledge gap by extending the period captured to the year 2020 (i.e. the most recent available data at the time of the analysis).
    4. It also helps existing investors to realize that Sub-Saharan Africa is fit despite the fact that she is faced with issue of deficit financing.
    5. The study also widens our horizon on the efficacy of deficit financing in improving the state of the Sub-Saharan African economy.

##### Suggestions for Further Studies

1. Future studies can look at the threshold of foreign debts on economic growth in Africa
2. Future studies can be centered on the effect of dual gap analysis on economic growth in Africa.
3. Future researchers may decide to widen both their geographical and time scope.
4. Future researchers may use other econometric model and tools other than the ones used in this study.

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**APPENDIX 1-RAW DATA**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **YEAR** | **RGDP** | **FGDD** | **FGXD** | **EXR** | **FGBD** | **BRMS** |
| 1986 | 15,237.99 | 28.44 | 41.45 | 1.35 | 8255.3 | 2380.64 |
| 1987 | 15,263.93 | 36.79 | 100.79 | 1.5 | 5889.7 | 2757.358 |
| 1988 | 16,215.37 | 47.03 | 133.96 | 0.93 | 12160.9 | 3835.68 |
| 1989 | 17,294.68 | 47.05 | 240.39 | 2.04 | 15134.7 | 4590.288 |
| 1990 | 19,305.63 | 84.09 | 298.61 | 4.13 | 35755.2 | 4742.329 |
| 1991 | 19,199.06 | 116.2 | 328.45 | 4.68 | 39532.5 | 7540.118 |
| 1992 | 19,620.19 | 177.96 | 544.26 | 1.2 | 107735.3 | 11111.23 |
| 1993 | 19,927.99 | 273.84 | 633.14 | 1.64 | 70 | 16533.87 |
| 1994 | 19,979.12 | 407.58 | 648.81 | 1.65 | 3.38 | 23029.26 |
| 1995 | 20,353.20 | 477.73 | 716.87 | 1.71 | 46.95 | 28909.11 |
| 1996 | 21,177.92 | 419.98 | 617.32 | 4.33 | 81.19 | 34585.4 |
| 1997 | 21,789.10 | 501.75 | 595.93 | 7.78 | 30.04 | 41328.01 |
| 1998 | 22,332.87 | 560.83 | 633.02 | 7.3 | 102.57 | 48814.58 |
| 1999 | 22,449.41 | 794.81 | 2,577.37 | 5.65 | 11.25 | 62895.22 |
| 2000 | 23,688.28 | 898.25 | 3,097.38 | 10.1 | 27.56 | 87845.73 |
| 2001 | 25,267.54 | 1,016.97 | 3,176.29 | 10.65 | 133.39 | 126932.2 |
| 2002 | 28,957.71 | 1,166.00 | 3,932.88 | 7.57 | 285.1 | 150596.4 |
| 2003 | 31,709.45 | 1,329.68 | 4,478.33 | 7.42 | 103.78 | 195292.1 |
| 2004 | 35,020.55 | 1,370.33 | 4,890.27 | 17.26 | 221.05 | 213181.9 |
| 2005 | 37,474.95 | 1,525.91 | 2,695.07 | 28.63 | 301.4 | 263791.3 |
| 2006 | 39,995.50 | 1,753.26 | 451.46 | 42.74 | 202.72 | 379790.9 |
| 2007 | 42,922.41 | 2,169.64 | 438.89 | 51.91 | 172.6 | 512740.1 |
| 2008 | 46,012.52 | 2,320.31 | 523.25 | 53.6 | 161.41 | 864342.9 |
| 2009 | 49,856.10 | 3,228.03 | 590.44 | 45.51 | 101.4 | 968750.7 |
| 2010 | 54,612.26 | 4,551.82 | 689.84 | 35.88 | 117.24 | 1110146 |
| 2011 | 57,511.04 | 5,622.84 | 896.85 | 36.26 | 47.38 | 1262832 |
| 2012 | 59,929.89 | 6,537.54 | 1,026.90 | 47.55 | 255.73 | 1550341 |
| 2013 | 63,218.72 | 7,118.98 | 1,387.33 | 46.25 | 102.34 | 1874307 |
| 2014 | 67,152.79 | 7,904.03 | 1,631.52 | 37.5 | 293.51 | 2041561 |
| 2015 | 69,023.93 | 8,837.00 | 2,111.53 | 29.01 | 1064.6 | 2088552 |
| 2016 | 67,931.24 | 11,058.20 | 3,478.92 | 28.02 | 1109 | 2425900 |
| 2017 | 67,931.24 | 12,578.80 | 5,787.51 | 40.5 | 193.55 | 2860447 |
| 2018 | 68,490.98 | 12,774.40 | 7,759.20 | 42.84 | 20.01 | 2977443 |
| 2019 | 74,694.00 | 10,293.80 | 5,853.21 | 38.7 | 78.3 | 3425790 |
| 2020 | 62608.65 | 16023.89 | 12,706 | 36.73 | 16,024 | 3601488 |

Nigeria- Data Presentation

SOURCE: CBN Statistical Bulletin (2020); WORLD BANK DEVELOPMENT DATA BANK (2020)

##### Kenya Data (N’BILLION)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **Kenya Data**  **(N’BILLION)** |  |  |  |  |  |
| **Year** | **FGBD** | **RGDP** | **EXR** | **FGXD** | **FGDD** | **BRMS** |
| 1986 | 206110 | 117460 | 444.495 | 931.183 | 931.183 | 35693.9 |
| 1987 | 214910 | 131156 | 294.402 | 1128.299 | 1128.299 | 39666.7 |
| 1988 | 226520 | 148284 | 296.454 | 973.045 | 973.045 | 42855.6 |
| 1989 | 220570 | 170404 | 316.625 | 889.011 | 889.011 | 48392.9 |
| 1990 | 237210 | 196434 | 236.115 | 871.482 | 871.482 | 58099.2 |
| 1991 | 241860 | 224230 | 145.138 | 783.086 | 783.086 | 69470.8 |
| 1992 | 217980 | 264472 | 79.5493 | 656.246 | 656.246 | 96579.3 |
| 1993 | 220450 | 333611 | 436.745 | 566.289 | 566.289 | 123654 |
| 1994 | 182120 | 400658 | 588.142 | 501.277 | 501.277 | 152314 |
| 1995 | 71120 | 465251 | 384.263 | 435.115 | 435.115 | 196486 |
| 1996 | 74650 | 687998 | 775.927 | 312.445 | 312.445 | 246246 |
| 1997 | 78830 | 770313 | 811.093 | 213.218 | 213.218 | 295975 |
| 1998 | 85930 | 850808 | 783.051 | 154.375 | 154.375 | 304650 |
| 1999 | 66160 | 906928 | 791.59 | 90.768 | 90.768 | 324415 |
| 2000 | 60540 | 967837 | 897.866 | 47.399 | 47.399 | 340337 |
| 2001 | 110850 | 1020220 | 1064.99 | 23.458 | 23.458 | 359533 |
| 2002 | 93140 | 1035370 | 1068.14 | 12.834 | 12.834 | 395087 |
| 2003 | 60780 | 1131780 | 1482.12 | 5.876 | 5.876 | 441657 |
| 2004 | 120620 | 1274330 | 1519.54 | 1.114 | 1.114 | 501156 |
| 2005 | 150470 | 1415730 | 1799.09 | 49055044.5 | 0.004 | 550812 |
| 2006 | 169780 | 1862040 | 2416.07 | 48375799.2 | 81883209 | 644295 |
| 2007 | 180440 | 2151350 | 3355.42 | 51051535.5 | 82551602 | 775880 |
| 2008 | 207360 | 2483060 | 2878.95 | 53087822.8 | 1.03E+08 | 896520 |
| 2009 | 244400 | 2863690 | 3849.5 | 66294423.5 | 1.18E+08 | 1044060 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 2010 | 269210 | 3169340 | 4320.86 | 70422734.8 | 1.41E+08 | 1277530 |
| 2011 | 250170 | 3725920 | 4265.146 | 90167264 | 1.60E+08 | 1522210 |
| 2012 | 287520 | 4261370 | 5711.832 | 100781400.5 | 1.87E+08 | 1741290 |
| 2013 | 223520 | 4745090 | 6598.882 | 120145678.8 | 2.09E+08 | 2007330 |
| 2014 | 259840 | 5402650 | 7911.258 | 150733935 | 2.62E+08 | 2336390 |
| 2015 | 283270 | 6284180 | 7548.44 | 196192099.6 | 3.23E+08 | 2666700 |
| 2016 | 346730 | 7022960 | 7600.553 | 221433928.8 | 3.74E+08 | 2764510 |
| 2017 | 304670 | 8144370 | 7353.449 | 279840553.2 | 4.46E+08 | 3010940 |
| 2018 | 401280 | 8904980 | 8196.865 | 321825977.2 | 5.09E+08 | 3337830 |
| 2019 | -6193064 | 98843.36 | 1474.091 | 310682296 | 2.94E+08 | 3897552 |
| 2020 | -2352131 | 95503.38 | 1274.563 | 379328524 | 3.49E+08 | 4414885 |

**SOURCE: Central Bank of Kenya (2020); World Bank Development Data Bank (2020)**

**South Africa-Data Presentation**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **YEA R** | **FGBD** | **RGDP** | **EXR** | **FGXD** | **FGDD** | **BRMS** |
| 1986 | 213,660,000,0  00.00 | 150,500,000,  000 | $2,254,162,  000 | $0.00 | $0.00 | 76,161,950,0  00 |
| 1987 | 224,720,000,0  00.00 | 154,289,000,  000 | $3,462,963,  000 | $0.00 | $0.00 | 91,031,250,0  00 |
| 1988 | 190,080,000,0  00.00 | 180,339,000,  000 | $2,203,671,  000 | $0.00 | $0.00 | 115,624,000,  000 |
| 1989 | 169,850,000,0  00.00 | 216,381,000,  000 | $2,194,854,  000 | $0.00 | $0.00 | 139,407,000,  000 |
| 1990 | 154,580,000,0  00.00 | 259,726,000,  000 | $2,582,983,  000 | $0.00 | $0.00 | 155,933,000,  000 |
| 1991 | 136,660,000,0  00.00 | 298,971,000,  000 | $3,186,552,  000 | $344,183,000.0  0 | $0.00 | 182,615,000,  000 |
| 1992 | 113,310,000,0  00.00 | 342,245,000,  000 | $3,207,729,  000 | $595,623,800.0  0 | $0.00 | 187,840,000,  000 |
| 1993 | 101,610,000,0  00.00 | 383,723,000,  000 | $2,879,215,  000 | $6,654,735,000  .00 | $0.00 | 199,692,000,  000 |
| 1994 | 71,040,000,00  0.00 | 438,884,000,  000 | $3,294,868,  000 | $21,671,000,00  0.00 | $0.00 | 236,268,000,  000 |
| 1995 | 35,800,000,00  0.00 | 496,233,000,  000 | $4,463,557,  000 | $25,358,000,00  0.00 | $0.00 | 274,145,000,  000 |
| 1996 | 63,910,000,00  0.00 | 563,870,000,  000 | $2,341,015,  000 | $26,050,000,00  0.00 | $0.00 | 313,290,000,  000 |
| 1997 | 50,370,000,00  0.00 | 634,611,000,  000 | $5,957,313,  000 | $30,071,800,00  0.00 | $0.00 | 369,097,000,  000 |
| 1998 | 29,620,000,00  0.00 | 703,117,000,  000 | $5,508,053,  000 | $24,778,640,00  0.00 | $0.00 | 419,490,000,  000 |
| 1999 | 43,700,000,00  0.00 | 761,658,000,  000 | $7,496,680,  000 | $24,536,860,00  0.00 | $0.00 | 465,244,000,  000 |
| 2000 | 35,000,000,00  0.00 | 834,753,000,  000 | $7,702,061,  000 | $25,435,200,00  0.00 | $710,000.00 | 498,812,000,  000 |
| 2001 | 38,380,000,00  0.00 | 946,324,000,  000 | $7,626,857,  000 | $24,603,880,00  0.00 | $3,372,000.0  0 | 599,522,000,  000 |
| 2002 | 44,070,000,00  0.00 | 1,046,140,00  0,000 | $7,816,785,  000 | $33,719,580,00  0.00 | $7,357,000.0  0 | 709,151,000,  000 |
| 2003 | 35,520,000,00  0.00 | 1,217,270,00  0,000 | $8,154,089,  000 | $37,138,450,00  0.00 | $12,498,000.  00 | 803,827,000,  000 |
| 2004 | - 14,390,000,00  0.00 | 1,325,770,00  0,000 | $14,886,240  ,000 | $43,181,220,00  0.00 | $15,633,000.  00 | 909,555,000,  000 |
| 2005 | - 23,750,000,00  0.00 | 1,476,620,00  0,000 | $20,624,460  ,000 | $44,736,850,00  0.00 | $22,594,000.  00 | 1,097,810,00  0,000 |
| 2006 | - 66,610,000,00  0.00 | 1,639,250,00  0,000 | $25,593,360  ,000 | $59,381,330,00  0.00 | $30,854,000.  00 | 1,346,170,00  0,000 |
| 2007 | - 76,440,000,00  0.00 | 1,839,400,00  0,000 | $32,919,400  ,000 | $72,596,570,00  0.00 | $29,010,000.  00 | 1,668,320,00  0,000 |
| 2008 | - 79,910,000,00  0.00 | 2,109,500,00  0,000 | $34,070,370  ,000 | $69,960,360,00  0.00 | $26,501,000.  00 | 1,914,200,00  0,000 |
| 2009 | - 4,710,000,000  .00 | 2,369,060,00  0,000 | $39,602,640  ,000 | $79,017,430,00  0.00 | $26,168,000.  00 | 1,947,910,00  0,000 |
| 2010 | 34,040,000,00  0.00 | 2,507,680,00  0,000 | $43,819,540  ,000 | $108,392,000,0  00.00 | $20,673,000.  00 | 2,082,980,00  0,000 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 2011 | 32,320,000,00  0.00 | 2,748,010,00  0,000 | $48,748,260  ,000 | $116,929,000,0  00.00 | $383,733,000  .00 | 2,256,730,00  0,000 |
| 2012 | - 40,440,000,00  0.00 | 3,023,660,00  0,000 | $50,688,080  ,000 | $144,959,000,0  00.00 | $583,108,000  .00 | 2,373,440,00  0,000 |
| 2013 | - 71,530,000,00  0.00 | 3,253,850,00  0,000 | $49,708,180  ,000 | $139,790,000,0  00.00 | $1,077,011,0  00.00 | 2,513,870,00  0,000 |
| 2014 | - 44,020,000,00  0.00 | 3,539,980,00  0,000 | $49,121,570  ,000 | $141,599,000,0  00.00 | $1,336,687,0  00.00 | 2,696,860,00  0,000 |
| 2015 | - 43,410,000,00  0.00 | 3,805,350,00  0,000 | $45,887,070  ,000 | $138,078,000,0  00.00 | $1,966,737,0  00.00 | 2,975,280,00  0,000 |
| 2016 | 13,500,000,00  0.00 | 4,049,880,00  0,000 | $47,180,130  ,000 | $146,041,000,0  00.00 | $1,784,791,0  00.00 | 3,156,160,00  0,000 |
| 2017 | 39,950,000,00  0.00 | 4,359,060,00  0,000 | $50,722,890  ,000 | $180,497,000,0  00.00 | $2,342,769,0  00.00 | 3,358,960,00  0,000 |
| 2018 | 11,580,000,00  0.00 | 4,653,580,00  0,000 | $51,642,040  ,000 | $179,306,000,0  00.00 | $2,686,253,0  00.00 | 3,547,050,00  0,000 |
| 2019 | - 16,712,249,78  0.00 | 4,873,900,00  0,000 | 55,055,893,  657 | 170,836,000,00  0.00 | $2,277,401,0  00.00 | 4.00E+14 |
| 2020 | - 16,670,000,00  0.00 | 351,432,453.  35 | 55,008,491,  996 | 185,357,000,00  0.00 | 27081384855 | 26049930604 |

**SOURCE: Central Bank of South Africa (2020); WORLD BANK DEVELOPMENT DATA BANK (2020)**

**Cameroon- (N’Million)**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 1986 | FGBD | RGDP | EXR | FOXD | FGDD | BRMS |
| 1987 | 37402900000  00 | 106211600  00 | 70742510 | 413722600  0 | 401432000 | 83976000000  0 |
| 1988 | 34876000000  00 | 123024700  00 | 78283060 | 458851300  0 | 545004000 | 68585000000  0 |
| 1989 | 32103500000  00 | 124932900  00 | 18815450  0 | 481272500  0 | 508344000 | 69985100000  0 |
| 1990 | 29390800000  00 | 111400600  00 | 91892960 | 536458800  0 | 572238000 | 71701100000  0 |
| 1991 | 29236800000  00 | 111515800  00 | 37075060 | 656250500  0 | 651315000 | 71192300000  0 |
| 1992 | 30461300000  00 | 124343700  00 | 53628540 | 676722400  0 | 723513000 | 72245000000  0 |
| 1993 | 23744500000  00 | 113963100  00 | 30352650 | 751493200  0 | 723305000 | 60165300000  0 |
| 1994 | 15306900000  00 | 154981800  00 | 14152080 | 774530700  0 | 706919000 | 54613000000  0 |
| 1995 | 13402700000  00 | 106001600  00 | 13740920 | 935851600  0 | 694531000 | 69107800000  0 |
| 1996 | 10487600000  00 | 964395300  0 | 15372100 | 109534200  00 | 639066000 | 64854500000  0 |
| 1997 | 75437000000  0 | 105133900  00 | 13833210 | 110745300  00 | 520168000 | 5830340000 |
| 1998 | 62713000000  0 | 108335000  00 | 9555391 | 107514600  00 | 410156000 | 6913480000 |
| 1999 | 35676000000  0 | 106128500  00 | 9911701 | 113179800  00 | 349556000 | 7450910000 |
| 2000 | 44634000000  0 | 111983800  00 | 13121980 | 107653800  00 | 276123000 | 8441650000 |
| 2001 | 56001000000  0 | 100839400  00 | 22021940  0 | 105612800  00 | 218028000 | 10056900000 |
| 2002 | 13424000000  0 | 103713300  00 | 34011540  0 | 974884500  0 | 178649000 | 10195100000 |
| 2003 | - 46130000000 | 115793400  00 | 63993030  0 | 102859000  00 | 141674000 | 12353800000 |
| 2004 | - 47381000000  0 | 145488500  00 | 65213520  0 | 114081500  00 | 145294000 | 12594400000 |
| 2005 | - 12507000000  0 | 174309300  00 | 84243020  0 | 108557800  00 | 117000000 | 13532700000 |
| 2006 | - 16778000000  0 | 179440800  00 | 96474550  0 | 770008900  0 | 83623000 | 14297900000 |
| 2007 | - 34023000000  0 | 193560500  00 | 17352630  00 | 341855700  0 | 45841000 | 15460000000 |
| 2008 | - 48400000000  0 | 223652700  00 | 29317460  00 | 308555200  0 | 40464000 | 17759200000 |
| 2009 | - 14837000000  00 | 264097800  00 | 31128610  00 | 283555400  0 | 35024000 | 20236800000 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 2010 | - 20021000000  00 | 260179300  00 | 36755220  00 | 323732200  0 | 29584000 | 21902600000 |
| 2011 | - 22669000000  00 | 261438200  00 | 36426430  00 | 319073700  0 | 24123000 | 24926900000 |
| 2012 | - 26047000000  00 | 293370100  00 | 31987180  00 | 309490300  0 | 18671000 | 27452100000 |
| 2013 | - 29497000000  00 | 291044400  00 | 33807030  00 | 388829900  0 | 13337000 | 27435900000 |
| 2014 | - 34390000000  00 | 323481500  00 | 34720000  00 | 517221300  0 | 8002000 | 30576100000 |
| 2015 | - 41257000000  00 | 349429500  00 | 31682170  00 | 575784100  0 | 2667000 | 34625300000 |
| 2016 | - 47387000000  00 | 309162200  00 | 35362550  00 | 728199700  0 | 0 | 37673400000 |
| 2017 | - 51083000000  00 | 326215400  00 | 22257090  00 | 823994400  0 | 0 | 39557400000 |
| 2018 | - 53495000000  00 | 349227800  00 | 31967910  00 | 104769900  00 | 224394000 | 41706300000  00 |
| 2019 | - 58378000000  00 | 386752100  00 | 34593300  00 | 114932800  00 | 251561000 | 47519200000  00 |
| 2020 | - 40364112678  43 | 390155890  00 | 33296740  00 | 102754570  00 | 16261700000  00 | 95530600000  0 |

**SOURCE: Central Bank of Cameroon (2020); World Bank Development Data Bank (2020)**

# APPENDIX II: PANEL FORM (LOGGED)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **YEARS** | **CROSSID** | **FGBD** | **RGDP** | **EXR** | **FGXD** | **FGDD** | **BRMS** |
| 1986 | 1 | 11.3141 | 11.06989 | 8.647867 | 8.969035 | 8.969035 | 10.55259 |
| 1987 | 1 | 11.33226 | 11.11779 | 8.46894 | 9.052424 | 9.052424 | 10.59843 |
| 1988 | 1 | 11.35511 | 11.17109 | 8.471957 | 8.988133 | 8.988133 | 10.63201 |
| 1989 | 1 | 11.34355 | 11.23148 | 8.500545 | 8.948907 | 8.948907 | 10.68478 |
| 1990 | 1 | 11.37513 | 11.29322 | 8.373124 | 8.940258 | 8.940258 | 10.76417 |
| 1991 | 1 | 11.38356 | 11.35069 | 8.161782 | 8.893809 | 8.893809 | 10.8418 |
| 1992 | 1 | 11.33842 | 11.42238 | 7.900636 | 8.817067 | 8.817067 | 10.98488 |
| 1993 | 1 | 11.34331 | 11.52324 | 8.640228 | 8.753038 | 8.753038 | 11.09221 |
| 1994 | 1 | 11.26036 | 11.60277 | 8.769482 | 8.700078 | 8.700078 | 11.18274 |
| 1995 | 1 | 10.85199 | 11.66769 | 8.584629 | 8.638604 | 8.638604 | 11.29333 |
| 1996 | 1 | 10.87303 | 11.83759 | 8.889821 | 8.494774 | 8.494774 | 11.39137 |
| 1997 | 1 | 10.89669 | 11.88667 | 8.90907 | 8.328824 | 8.328824 | 11.47126 |
| 1998 | 1 | 10.93414 | 11.92983 | 8.89379 | 8.188577 | 8.188577 | 11.4838 |
| 1999 | 1 | 10.8206 | 11.95757 | 8.8985 | 7.957933 | 7.957933 | 11.5111 |
| 2000 | 1 | 10.78204 | 11.9858 | 8.953211 | 7.675769 | 7.675769 | 11.53191 |
| 2001 | 1 | 11.04474 | 12.00869 | 9.027345 | 7.370291 | 7.370291 | 11.55574 |
| 2002 | 1 | 10.96914 | 12.0151 | 9.028629 | 7.108362 | 7.108362 | 11.59669 |
| 2003 | 1 | 10.78376 | 12.05376 | 9.170882 | 6.769082 | 6.769082 | 11.64509 |
| 2004 | 1 | 11.08142 | 12.10528 | 9.181712 | 6.046885 | 6.046885 | 11.69997 |
| 2005 | 1 | 11.17745 | 12.15098 | 9.255052 | 13.69068 | 3.60206 | 11.741 |
| 2006 | 1 | 11.22989 | 12.26999 | 9.38311 | 13.68463 | 13.91319 | 11.80908 |
| 2007 | 1 | 11.25633 | 12.33271 | 9.525747 | 13.70801 | 13.91673 | 11.88979 |
| 2008 | 1 | 11.31672 | 12.39499 | 9.459234 | 13.72499 | 14.01271 | 11.95256 |
| 2009 | 1 | 11.3881 | 12.45693 | 9.585404 | 13.82148 | 14.07071 | 12.01873 |
| 2010 | 1 | 11.43009 | 12.50097 | 9.63557 | 13.84771 | 14.14838 | 12.10637 |
| 2011 | 1 | 11.39824 | 12.57123 | 9.629934 | 13.95505 | 14.2052 | 12.18247 |
| 2012 | 1 | 11.45867 | 12.62955 | 9.756775 | 14.00338 | 14.27182 | 12.24087 |
| 2013 | 1 | 11.34932 | 12.67624 | 9.81947 | 14.07971 | 14.3193 | 12.30262 |
| 2014 | 1 | 11.41471 | 12.73261 | 9.898246 | 14.17821 | 14.4189 | 12.36855 |
| 2015 | 1 | 11.4522 | 12.79825 | 9.877857 | 14.29268 | 14.5096 | 12.42597 |
| 2016 | 1 | 11.53999 | 12.84652 | 9.880845 | 14.34524 | 14.57245 | 12.44162 |
| 2017 | 1 | 11.48383 | 12.91086 | 9.866491 | 14.44691 | 14.64975 | 12.4787 |
| 2018 | 1 | 11.60345 | 12.94963 | 9.913648 | 14.50762 | 14.70676 | 12.52346 |
| 2019 | 1 | 0 | 10.99495 | 9.168524 | 14.49232 | 14.46866 | 12.59079 |
| 2020 | 1 | 0 | 10.98002 | 9.105361 | 14.57902 | 14.54264 | 12.64492 |
| 1986 | 2 | 2.296935 | 1.45393 | 1.617525 | 0.130334 | 3.916733 | 3.376694 |
| 1987 | 2 | 2.388599 | 1.56573 | 2.003417 | 0.176091 | 3.770093 | 3.440493 |
| 1988 | 2 | 2.499158 | 1.672375 | 2.126975 | -0.03152 | 4.084966 | 3.583842 |
| 1989 | 2 | 2.617902 | 1.67256 | 2.380916 | 0.30963 | 4.179974 | 3.66184 |
| 1990 | 2 | 2.694292 | 1.924744 | 2.475104 | 0.61595 | 4.553339 | 3.675992 |
| 1991 | 2 | 2.770896 | 2.065206 | 2.516469 | 0.670246 | 4.596954 | 3.877378 |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 1992 | 2 | 2.957142 | 2.250322 | 2.735806 | 0.079181 | 5.032358 | 4.045762 |
| 1993 | 2 | 3.099396 | 2.437497 | 2.8015 | 0.214844 | 1.845098 | 4.218375 |
| 1994 | 2 | 3.247677 | 2.610213 | 2.812118 | 0.217484 | 0.528917 | 4.36228 |
| 1995 | 2 | 3.491395 | 2.679183 | 2.85544 | 0.232996 | 1.671636 | 4.461035 |
| 1996 | 2 | 3.611305 | 2.623229 | 2.79051 | 0.636488 | 1.909503 | 4.538893 |
| 1997 | 2 | 3.645295 | 2.700487 | 2.775195 | 0.89098 | 1.4777 | 4.616244 |
| 1998 | 2 | 3.681708 | 2.748831 | 2.801417 | 0.863323 | 2.01102 | 4.68855 |
| 1999 | 2 | 3.738967 | 2.900263 | 3.411177 | 0.752048 | 1.051153 | 4.798618 |
| 2000 | 2 | 3.848974 | 2.953397 | 3.490994 | 1.004321 | 1.440279 | 4.943721 |
| 2001 | 2 | 3.915637 | 3.007308 | 3.50192 | 1.02735 | 2.125123 | 5.103572 |
| 2002 | 2 | 4.060753 | 3.066699 | 3.594711 | 0.879096 | 2.454997 | 5.177815 |
| 2003 | 2 | 4.132163 | 3.123747 | 3.651116 | 0.870404 | 2.016114 | 5.290685 |
| 2004 | 2 | 4.258255 | 3.136825 | 3.689333 | 1.237041 | 2.344491 | 5.32875 |
| 2005 | 2 | 4.364023 | 3.183529 | 3.43057 | 1.456821 | 2.479143 | 5.42126 |
| 2006 | 2 | 4.482519 | 3.243846 | 2.654619 | 1.630835 | 2.306897 | 5.579545 |
| 2007 | 2 | 4.540028 | 3.336388 | 2.642356 | 1.715251 | 2.237041 | 5.709897 |
| 2008 | 2 | 4.601563 | 3.365546 | 2.718709 | 1.729165 | 2.20793 | 5.936686 |
| 2009 | 2 | 4.638104 | 3.508938 | 2.771176 | 1.658107 | 2.006038 | 5.986212 |
| 2010 | 2 | 4.744053 | 3.658185 | 2.838748 | 1.554852 | 2.069076 | 6.04538 |
| 2011 | 2 | 4.804231 | 3.749956 | 2.95272 | 1.559428 | 1.675595 | 6.101346 |
| 2012 | 2 | 4.860934 | 3.815414 | 3.011528 | 1.677151 | 2.407782 | 6.190427 |
| 2013 | 2 | 4.908538 | 3.852418 | 3.14218 | 1.665112 | 2.010045 | 6.272841 |
| 2014 | 2 | 4.954903 | 3.897849 | 3.212592 | 1.574031 | 2.467623 | 6.309962 |
| 2015 | 2 | 4.978535 | 3.946305 | 3.324597 | 1.462548 | 3.027186 | 6.319845 |
| 2016 | 2 | 5.011043 | 4.043684 | 3.541444 | 1.447468 | 3.044932 | 6.384873 |
| 2017 | 2 | 5.060317 | 4.099639 | 3.762492 | 1.607455 | 2.286793 | 6.456434 |
| 2018 | 2 | 5.110882 | 4.106341 | 3.889817 | 1.631849 | 1.301247 | 6.473843 |
| 2019 | 2 | 5.163278 | 4.012576 | 3.767394 | 1.587711 | 1.893762 | 6.534761 |
| 2020 | 2 | 5.188232 | 4.204768 | 4.104009 | 1.565016 | 4.204771 | 6.556482 |
| 1986 | 3 | 5.329723 | 5.177536 | 3.352985 | 0 | 0 | 4.881738 |
| 1987 | 3 | 5.351642 | 5.188335 | 3.539447 | 0 | 0 | 4.959191 |
| 1988 | 3 | 5.278936 | 5.25609 | 3.343147 | 0 | 0 | 5.063048 |
| 1989 | 3 | 5.230066 | 5.335219 | 3.341405 | 0 | 0 | 5.144285 |
| 1990 | 3 | 5.189153 | 5.414515 | 3.412121 | 0 | 0 | 5.192938 |
| 1991 | 3 | 5.135641 | 5.475629 | 3.503321 | 2.536786 | 0 | 5.261536 |
| 1992 | 3 | 5.054268 | 5.534337 | 3.506198 | 2.774969 | 0 | 5.273788 |
| 1993 | 3 | 5.006936 | 5.584018 | 3.459275 | 3.823131 | 0 | 5.300361 |
| 1994 | 3 | 4.851503 | 5.64235 | 3.517838 | 4.335879 | 0 | 5.373405 |
| 1995 | 3 | 4.553883 | 5.695686 | 3.649681 | 4.404115 | 0 | 5.43798 |
| 1996 | 3 | 4.805569 | 5.751179 | 3.369405 | 4.415808 | 0 | 5.495947 |
| 1997 | 3 | 4.702172 | 5.802508 | 3.77505 | 4.478159 | 0 | 5.567141 |
| 1998 | 3 | 4.471585 | 5.847028 | 3.740998 | 4.394077 | 0 | 5.622722 |
| 1999 | 3 | 4.640481 | 5.88176 | 3.874869 | 4.389819 | 0 | 5.667681 |

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| --- | --- | --- | --- | --- | --- | --- | --- |
| 2000 | 3 | 4.544068 | 5.921558 | 3.886607 | 4.405435 | -0.14874 | 5.697937 |
| 2001 | 3 | 4.584105 | 5.97604 | 3.882346 | 4.391004 | 0.52763 | 5.777805 |
| 2002 | 3 | 4.644143 | 6.01959 | 3.893028 | 4.527882 | 0.866878 | 5.850739 |
| 2003 | 3 | 4.550473 | 6.085387 | 3.911376 | 4.569824 | 1.09691 | 5.905163 |
| 2004 | 3 | 0 | 6.122468 | 4.172785 | 4.635295 | 1.193959 | 5.958829 |
| 2005 | 3 | 0 | 6.169269 | 4.314383 | 4.650665 | 1.353916 | 6.040527 |
| 2006 | 3 | 0 | 6.214645 | 4.408127 | 4.77365 | 1.489255 | 6.1291 |
| 2007 | 3 | 0 | 6.264676 | 4.517452 | 4.860916 | 1.462548 | 6.222279 |
| 2008 | 3 | 0 | 6.32418 | 4.532377 | 4.844852 | 1.423246 | 6.281987 |
| 2009 | 3 | 0 | 6.374576 | 4.597724 | 4.897723 | 1.417804 | 6.289569 |
| 2010 | 3 | 4.53199 | 6.399272 | 4.641668 | 5.034997 | 1.31534 | 6.318685 |
| 2011 | 3 | 4.509471 | 6.439018 | 4.687959 | 5.067922 | 2.584026 | 6.35348 |
| 2012 | 3 | 0 | 6.480533 | 4.704906 | 5.161245 | 2.76575 | 6.375378 |
| 2013 | 3 | 0 | 6.512398 | 4.696428 | 5.145476 | 3.03222 | 6.400343 |
| 2014 | 3 | 0 | 6.549001 | 4.691272 | 5.15106 | 3.126031 | 6.430858 |
| 2015 | 3 | 0 | 6.580395 | 4.66169 | 5.140124 | 3.293747 | 6.473528 |
| 2016 | 3 | 4.130334 | 6.607442 | 4.673759 | 5.164475 | 3.251587 | 6.499159 |
| 2017 | 3 | 4.601517 | 6.639393 | 4.705204 | 5.25647 | 3.36973 | 6.526205 |
| 2018 | 3 | 4.063709 | 6.667787 | 4.713003 | 5.253595 | 3.429146 | 6.549867 |
| 2019 | 3 | 0 | 6.687877 | 4.740804 | 5.232579 | 3.357439 | 7.60206 |
| 2020 | 3 | 0 | 2.545842 | 4.74043 | 5.268009 | 4.432671 | 4.415807 |
| 1986 | 4 | 12.57291 | 10.02617 | 7.84968 | 9.616709 | 8.603612 | 11.92416 |
| 1987 | 4 | 12.54253 | 10.08999 | 7.893668 | 9.661672 | 8.7364 | 11.83623 |
| 1988 | 4 | 12.50655 | 10.09668 | 8.274515 | 9.682391 | 8.706158 | 11.84501 |
| 1989 | 4 | 12.46821 | 10.04689 | 7.963282 | 9.729536 | 8.757577 | 11.85553 |
| 1990 | 4 | 12.46593 | 10.04734 | 7.569082 | 9.81707 | 8.813791 | 11.85243 |
| 1991 | 4 | 12.48375 | 10.09462 | 7.729396 | 9.830411 | 8.859446 | 11.85881 |
| 1992 | 4 | 12.37556 | 10.05676 | 7.482197 | 9.875925 | 8.859321 | 11.77935 |
| 1993 | 4 | 12.18489 | 10.19028 | 7.15082 | 9.889039 | 8.84937 | 11.7373 |
| 1994 | 4 | 12.12719 | 10.02531 | 7.138016 | 9.971207 | 8.841692 | 11.83953 |
| 1995 | 4 | 12.02068 | 9.984255 | 7.186733 | 10.03955 | 8.805546 | 11.81194 |
| 1996 | 4 | 11.87758 | 10.02174 | 7.140923 | 10.04433 | 8.716144 | 9.765694 |
| 1997 | 4 | 11.79736 | 10.03477 | 6.980248 | 10.03147 | 8.612949 | 9.839697 |
| 1998 | 4 | 11.55238 | 10.02583 | 6.996148 | 10.05377 | 8.543517 | 9.872209 |
| 1999 | 4 | 11.64967 | 10.04916 | 7.117999 | 10.03203 | 8.441103 | 9.926427 |
| 2000 | 4 | 11.7482 | 10.00363 | 8.342856 | 10.02372 | 8.338512 | 10.00246 |
| 2001 | 4 | 11.12788 | 10.01583 | 8.531626 | 9.988953 | 8.252001 | 10.00839 |
| 2002 | 4 | 0 | 10.06368 | 8.806133 | 10.01224 | 8.15129 | 10.0918 |
| 2003 | 4 | 0 | 10.16283 | 8.814338 | 10.05722 | 8.162248 | 10.10018 |
| 2004 | 4 | 0 | 10.24132 | 8.925534 | 10.03566 | 8.068186 | 10.13138 |
| 2005 | 4 | 0 | 10.25392 | 8.984413 | 9.886496 | 7.922326 | 10.15527 |
| 2006 | 4 | 0 | 10.28682 | 9.239365 | 9.533843 | 7.661254 | 10.18921 |
| 2007 | 4 | 0 | 10.34957 | 9.467126 | 9.489333 | 7.607069 | 10.24942 |

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| --- | --- | --- | --- | --- | --- | --- | --- |
| 2008 | 4 | 0 | 10.42176 | 9.49316 | 9.452638 | 7.544366 | 10.30614 |
| 2009 | 4 | 0 | 10.41527 | 9.565319 | 9.510186 | 7.471057 | 10.3405 |
| 2010 | 4 | 0 | 10.41737 | 9.561417 | 9.503891 | 7.382431 | 10.39667 |
| 2011 | 4 | 0 | 10.46742 | 9.504976 | 9.490647 | 7.271168 | 10.43858 |
| 2012 | 4 | 0 | 10.46396 | 9.529007 | 9.58976 | 7.125058 | 10.43832 |
| 2013 | 4 | 0 | 10.50985 | 9.54058 | 9.713676 | 6.903199 | 10.48538 |
| 2014 | 4 | 0 | 10.54336 | 9.500815 | 9.76026 | 6.426023 | 10.53939 |
| 2015 | 4 | 0 | 10.49019 | 9.548544 | 9.86225 | 0 | 10.57603 |
| 2016 | 4 | 0 | 10.5135 | 9.347468 | 9.915924 | 0 | 10.59723 |
| 2017 | 4 | 0 | 10.54311 | 9.504714 | 10.02024 | 8.351011 | 12.6202 |
| 2018 | 4 | 0 | 10.58743 | 9.538992 | 10.06044 | 8.400643 | 12.67687 |
| 2019 | 4 | 0 | 10.59124 | 9.522402 | 10.0118 | 12.21117 | 11.98014 |
| 2020 | 4 | 0 | 10.59139 | 9.585634 | 10.01569 | 12.22658 | 12.00322 |

### APPENDIX III: NIGERIA REGRESSION ANALYSIS

**DESCRIPTIVE STAT**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | RGDP | FGBD | FGDD | FGXD | EXR | BRMS |
| Mean | 38404.46 | 7023.573 | 3544.393 | 2163.241 | 21.15770 | 836432.1 |
| Median | 31709.45 | 172.6000 | 1329.680 | 716.8700 | 10.65000 | 195292.1 |
| Maximum | 74694.00 | 107735.3 | 16023.89 | 12706.00 | 53.60000 | 3601488. |
| Minimum | 15237.99 | 3.380000 | 28.44000 | 41.45000 | 0.930000 | 2380.640 |
| Std. Dev. | 20262.25 | 19897.61 | 4497.421 | 2690.933 | 18.64761 | 1121051. |
| Skewness | 0.440692 | 4.062102 | 1.289876 | 2.128475 | 0.318944 | 1.194413 |
| Kurtosis | 1.603331 | 20.23236 | 3.454302 | 8.062852 | 1.453266 | 3.088077 |
| Jarque-Bera | 3.977639 | 529.3121 | 10.00637 | 63.80805 | 4.082291 | 8.333283 |
| Probability | 0.136857 | 0.000000 | 0.006717 | 0.000000 | 0.129880 | 0.015504 |
| Sum | 1344156. | 245825.1 | 124053.8 | 75713.44 | 740.5196 | 29275124 |
| Sum Sq. Dev. | 1.40E+10 | 1.35E+10 | 6.88E+08 | 2.46E+08 | 11822.93 | 4.27E+13 |
| Observations | 35 | 35 | 35 | 35 | 35 | 35 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Method: Fully Modified Least Squares (FMOLS) | | | | |
| Date: 09/08/21 Time: 15:17 | | | | |
| Sample (adjusted): 1987 2020 | | | | |
| Included observations: 32 after adjustments | | | | |
| No cointegrating equation deterministics | | | | |
| Long-run covariance estimate (Bartlett kernel, Newey-West fixed | | | | |
| bandwidth = 4.0000) |  |  |  |  |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| FGDD | 2.304615 | 0.673418 | 3.422263 | 0.002 |
| FGXD | 1.218523 | 0.505779 | 2.409203 | 0.0231 |
| FGBD | -0.405758 | 0.643078 | -0.630962 | 0.5334 |
| EXR | 3.366955 | 0.943624 | 3.56811 | 0.0014 |
| BRMS | -3.221187 | 0.897873 | -3.587575 | 0.0013 |
| R-squared | 0.592752 | Mean dependent var |  | 11.64157 |
| Adjusted R-squared | 0.532418 | S.D. dependent var |  | 3.238620 |
| S.E. of regression | 2.214566 | Sum squared resid |  | 132.4162 |
| Long-run variance | 5.955276 |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| Wald Test: |  |  |  |
| Equation: Untitled | | | |
| Test Statistic | Value | df | Probability |
| F-statistic | 196.6771 | (4, 27) | 0.0000 |
| Chi-square | 786.7083 | 4 | 0.0000 |
| Null Hypothesis: C(1)=C(2)=C(3)=C(4)=C(5) | | | |
| Null Hypothesis Summary: | | | |
| Normalized Restriction (= 0) | | Value | Std. Err. |
| C(1) - C(5) |  | 5.525802 | 1.430966 |
| C(2) - C(5) |  | 4.439711 | 1.111321 |
| C(3) - C(5) |  | 3.221187 | 0.897873 |
| C(4) - C(5) |  | 6.588142 | 1.833974 |

Restrictions are linear in coefficients.

NIGERIA DATA RGDP AT LEVEL

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Null Hypothesis: RGDP has a unit root | | | | |
| Exogenous: Constant |  |  |  |  |
| Bandwidth: 0 (Newey-West automatic) using Bartlett kernel | | | | |
|  |  | Adj. t-Stat | | Prob.\* |
| Phillips-Perron test statistic |  | -0.371414 | | 0.9031 |
| Test critical values: | 1% level | -3.639407 | |  |
|  | 5% level | -2.951125 | |  |
|  | 10% level | -2.614300 | |  |
| \*MacKinnon (1996) one-sided p-values. | | | | |
| Residual variance (no correction) | |  |  | 5.73E+21 |
| HAC corrected variance (Bartlett kernel) | |  |  | 5.73E+21 |
| Phillips-Perron Test Equation | | | | |
| Dependent Variable: D(RGDP) | | | | |
| Method: Least Squares |  |  |  |  |
| Date: 09/08/21 Time: 14:40 | | | | |
| Sample (adjusted): 1987 2020 | | | | |
| Included observations: 34 after adjustments | | | | |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| RGDP(-1) | -0.065627 | 0.176695 | -0.371414 | 0.7128 |
| C | 1.36E+10 | 1.36E+10 | 1.000001 | 0.3248 |
| R-squared | 0.004292 | Mean dependent var | | 1.27E+10 |
| Adjusted R-squared | -0.026823 | S.D. dependent var | | 7.70E+10 |
| S.E. of regression | 7.80E+10 | Akaike info criterion | | 53.05506 |
| Sum squared resid | 1.95E+23 | Schwarz criterion |  | 53.14485 |
| Log likelihood | -899.9361 | Hannan-Quinn criter. | | 53.08568 |
| F-statistic | 0.137948 | Durbin-Watson stat | | 2.000949 |
| Prob(F-statistic) | 0.712777 |  | |  |

RGDP AT FIRST DIFFERENCE

|  |  |  |  |
| --- | --- | --- | --- |
| Null Hypothesis: D(RGDP) has a unit root | | | |
| Exogenous: Constant |  |  |  |
| Bandwidth: 0 (Newey-West automatic) using Bartlett kernel | | | |
|  |  | Adj. t-Stat | Prob.\* |
| Phillips-Perron test statistic |  | -5.941341 | 0.0000 |
| Test critical values: | 1% level | -3.646342 |  |
|  | 5% level | -2.954021 |  |
| 10% level | | -2.615817 |  |
| \*MacKinnon (1996) one-sided p-values. | | | |
| Residual variance (no correction) | |  | 5.90E+21 |
| HAC corrected variance (Bartlett kernel) | |  | 5.90E+21 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Phillips-Perron Test Equation | | | | |
| Dependent Variable: D(RGDP,2) | | | | |
| Method: Least Squares |  |  |  |  |
| Date: 09/08/21 Time: 14:40 | | | | |
| Sample (adjusted): 1988 2020 | | | | |
| Included observations: 33 after adjustments | | | | |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| D(RGDP(-1)) | -1.066575 | 0.179518 | -5.941341 | 0.0000 |
| C | 1.40E+10 | 1.40E+10 | 1.000001 | 0.3251 |
| R-squared | 0.532425 | Mean dependent var | | -4.80E+08 |
| Adjusted R-squared | 0.517342 | S.D. dependent var | | 1.14E+11 |
| S.E. of regression | 7.92E+10 | Akaike info criterion | | 53.08750 |
| Sum squared resid | 1.95E+23 | Schwarz criterion |  | 53.17820 |
| Log likelihood | -873.9438 | Hannan-Quinn criter. | | 53.11802 |
| F-statistic | 35.29953 | Durbin-Watson stat | | 2.001008 |
| Prob(F-statistic) | 0.000001 |  | |  |

FGDD AT LEVEL

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Null Hypothesis: FGDD has a unit root | | | | |
| Exogenous: Constant |  |  |  |  |
| Bandwidth: 2 (Newey-West automatic) using Bartlett kernel | | | | |
|  |  | Adj. t-Stat | | Prob.\* |
| Phillips-Perron test statistic |  | -2.384389 | | 0.1535 |
| Test critical values: | 1% level | -3.639407 | |  |
|  | 5% level | -2.951125 | |  |
|  | 10% level | -2.614300 | |  |
| \*MacKinnon (1996) one-sided p-values. | | | | |
| Residual variance (no correction) | |  |  | 0.016684 |
| HAC corrected variance (Bartlett kernel) | |  |  | 0.020682 |
| Phillips-Perron Test Equation | | | | |
| Dependent Variable: D(FGDD) | | | | |
| Method: Least Squares |  |  |  |  |
| Date: 09/08/21 Time: 15:42 | | | | |
| Sample (adjusted): 1987 2020 | | | | |
| Included observations: 34 after adjustments | | | | |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| FGDD(-1) | -0.032856 | 0.012613 | -2.604905 | 0.0138 |
| C | 0.414493 | 0.090530 | 4.578515 | 0.0001 |
| R-squared | 0.174950 | Mean dependent var | | 0.186295 |
| Adjusted R-squared | 0.149167 | S.D. dependent var | | 0.144341 |
| S.E. of regression | 0.133141 | Akaike info criterion | | -1.137793 |
| Sum squared resid | 0.567249 | Schwarz criterion |  | -1.048007 |
| Log likelihood | 21.34248 | Hannan-Quinn criter. | | -1.107173 |
| F-statistic | 6.785528 | Durbin-Watson stat | | 1.712903 |
| Prob(F-statistic) | 0.013827 |  | |  |

FGDD AT FIRST DIFFERENCE

|  |
| --- |
| Null Hypothesis: D(FGDD) has a unit root |
| Exogenous: Constant |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Bandwidth: 0 (Newey-West automatic) using Bartlett kernel | | | | |
|  |  | Adj. t-Stat | | Prob.\* |
| Phillips-Perron test statistic |  | -4.246729 | | 0.0021 |
| Test critical values: | 1% level | -3.646342 | |  |
|  | 5% level | -2.954021 | |  |
|  | 10% level | -2.615817 | |  |
| \*MacKinnon (1996) one-sided p-values. | | | | |
| Residual variance (no correction) | |  |  | 0.019230 |
| HAC corrected variance (Bartlett kernel) | |  |  | 0.019230 |
| Phillips-Perron Test Equation | | | | |
| Dependent Variable: D(FGDD,2) | | | | |
| Method: Least Squares |  |  |  |  |
| Date: 09/08/21 Time: 15:42 | | | | |
| Sample (adjusted): 1988 2020 | | | | |
| Included observations: 33 after adjustments | | | | |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| D(FGDD(-1)) | -0.735528 | 0.173199 | -4.246729 | 0.0002 |
| C | 0.134304 | 0.041054 | 3.271381 | 0.0026 |
| R-squared | 0.367795 | Mean dependent var | | -0.004294 |
| Adjusted R-squared | 0.347401 | S.D. dependent var | | 0.177110 |
| S.E. of regression | 0.143076 | Akaike info criterion | | -0.992197 |
| Sum squared resid | 0.634589 | Schwarz criterion |  | -0.901499 |
| Log likelihood | 18.37124 | Hannan-Quinn criter. | | -0.961680 |
| F-statistic | 18.03471 | Durbin-Watson stat | | 2.081155 |
| Prob(F-statistic) | 0.000183 |  | |  |

FGXD AT LEVEL

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Null Hypothesis: FGXD has a unit root | | | | |
| Exogenous: Constant |  |  |  |  |
| Bandwidth: 3 (Newey-West automatic) using Bartlett kernel | | | | |
|  |  |  | Adj. t-Stat | Prob.\* |
| Phillips-Perron test statistic |  |  | 1.366690 | 0.9985 |
| Test critical values: | 1% level |  | -3.639407 |  |
|  | 5% level |  | -2.951125 |  |
|  | 10% level |  | -2.614300 |  |
| \*MacKinnon (1996) one-sided p-values. | | | | |
| Residual variance (no correction) | |  |  | 872391.8 |
| HAC corrected variance (Bartlett kernel) | |  |  | 1575803. |
| Phillips-Perron Test Equation | | | | |
| Dependent Variable: D(FGXD) | | | | |
| Method: Least Squares |  |  |  |  |
| Date: 09/08/21 Time: 15:43 | | | | |
| Sample (adjusted): 1987 2020 | | | | |
| Included observations: 34 after adjustments | | | | |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| FGXD(-1) | 0.210754 | 0.074527 | 2.827870 | 0.0080 |
| C | -37.72923 | 219.7818 | -0.171667 | 0.8648 |
| R-squared | 0.199937 | Mean dependent var | | 372.4756 |
| Adjusted R-squared | 0.174935 | S.D. dependent var | | 1059.928 |
| S.E. of regression | 962.7649 | Akaike info criterion | | 16.63452 |
| Sum squared resid | 29661322 | Schwarz criterion |  | 16.72430 |
| Log likelihood | -280.7868 | Hannan-Quinn criter. | | 16.66514 |
| F-statistic | 7.996847 | Durbin-Watson stat | | 1.030092 |
| Prob(F-statistic) | 0.008018 |  | |  |

FGXD AT FIRST DIFFERENCE

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Null Hypothesis: D(FGXD) has a unit root | | | | |
| Exogenous: Constant |  |  |  |  |
| Bandwidth: 1 (Newey-West automatic) using Bartlett kernel | | | | |
|  |  | Adj. t-Stat | | Prob.\* |
| Phillips-Perron test statistic |  | -4.241790 | | 0.0022 |
| Test critical values: | 1% level | -3.646342 | |  |
|  | 5% level | -2.954021 | |  |
|  | 10% level | -2.615817 | |  |
| \*MacKinnon (1996) one-sided p-values. | | | | |
| Residual variance (no correction) | |  |  | 0.185057 |
| HAC corrected variance (Bartlett kernel) | |  |  | 0.190006 |
| Phillips-Perron Test Equation | | | | |
| Dependent Variable: D(FGXD,2) | | | | |
| Method: Least Squares |  |  |  |  |
| Date: 09/08/21 Time: 15:44 | | | | |
| Sample (adjusted): 1988 2020 | | | | |
| Included observations: 33 after adjustments | | | | |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| D(FGXD(-1)) | -0.695116 | 0.164415 | -4.227820 | 0.0002 |
| C | 0.096836 | 0.081786 | 1.184020 | 0.2454 |
| R-squared | 0.365722 | Mean dependent var | | -0.016552 |
| Adjusted R-squared | 0.345261 | S.D. dependent var | | 0.548523 |
| S.E. of regression | 0.443843 | Akaike info criterion | | 1.271999 |
| Sum squared resid | 6.106888 | Schwarz criterion |  | 1.362696 |
| Log likelihood | -18.98798 | Hannan-Quinn criter. | | 1.302516 |
| F-statistic | 17.87446 | Durbin-Watson stat | | 1.938868 |
| Prob(F-statistic) | 0.000193 |  | |  |

FGBD AT LEVEL

|  |  |  |  |
| --- | --- | --- | --- |
| Null Hypothesis: FGBD has a unit root | | | |
| Exogenous: Constant |  |  |  |
| Bandwidth: 2 (Newey-West automatic) using Bartlett kernel | | | |
|  |  | Adj. t-Stat | Prob.\* |
| Phillips-Perron test statistic |  | -1.181297 | 0.6711 |
| Test critical values: | 1% level | -3.639407 |  |
|  | 5% level | -2.951125 |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | 10% level | -2.614300 | |  |
| \*MacKinnon (1996) one-sided p-values. | | | | |
| Residual variance (no correction) | |  |  | 3.13E+26 |
| HAC corrected variance (Bartlett kernel) | |  |  | 2.08E+26 |
| Phillips-Perron Test Equation | | | | |
| Dependent Variable: D(FGBD) | | | | |
| Method: Least Squares |  |  |  |  |
| Date: 09/08/21 Time: 15:45 | | | | |
| Sample (adjusted): 1987 2020 | | | | |
| Included observations: 34 after adjustments | | | | |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| FGBD(-1) | -0.193787 | 0.119413 | -1.622835 | 0.1144 |
| C | -4.93E+11 | 3.23E+12 | -0.152466 | 0.8798 |
| R-squared | 0.076042 | Mean dependent var | | -1.83E+12 |
| Adjusted R-squared | 0.047168 | S.D. dependent var | | 1.87E+13 |
| S.E. of regression | 1.82E+13 | Akaike info criterion | | 63.96430 |
| Sum squared resid | 1.06E+28 | Schwarz criterion |  | 64.05409 |
| Log likelihood | -1085.393 | Hannan-Quinn criter. | | 63.99492 |
| F-statistic | 2.633594 | Durbin-Watson stat | | 2.411945 |
| Prob(F-statistic) | 0.114437 |  | |  |

FGBD AT FIRST DIFFERENCE

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Null Hypothesis: D(FGBD) has a unit root | | | | |
| Exogenous: Constant |  |  |  |  |
| Bandwidth: 1 (Newey-West automatic) using Bartlett kernel | | | | |
|  |  |  | Adj. t-Stat | Prob.\* |
| Phillips-Perron test statistic |  |  | -9.118954 | 0.0000 |
| Test critical values: | 1% level |  | -3.646342 |  |
|  | 5% level |  | -2.954021 |  |
|  | 10% level |  | -2.615817 |  |
| \*MacKinnon (1996) one-sided p-values. | | | | |
| Residual variance (no correction) | |  |  | 2.51E+26 |
| HAC corrected variance (Bartlett kernel) | |  |  | 2.55E+26 |
| Phillips-Perron Test Equation | | | | |
| Dependent Variable: D(FGBD,2) | | | | |
| Method: Least Squares |  |  |  |  |
| Date: 09/08/21 Time: 15:46 | | | | |
| Sample (adjusted): 1988 2020 | | | | |
| Included observations: 33 after adjustments | | | | |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| D(FGBD(-1)) | -1.616014 | 0.176593 | -9.151083 | 0.0000 |
| C | -2.00E+12 | 2.84E+12 | -0.703986 | 0.4867 |
| R-squared | 0.729829 | Mean dependent var | | -1.68E+12 |
| Adjusted R-squared | 0.721114 | S.D. dependent var | | 3.09E+13 |
| S.E. of regression | 1.63E+13 | Akaike info criterion | | 63.74544 |

|  |  |  |  |
| --- | --- | --- | --- |
| Sum squared resid | 8.27E+27 | Schwarz criterion | 63.83614 |
| Log likelihood | -1049.800 | Hannan-Quinn criter. | 63.77596 |
| F-statistic | 83.74231 | Durbin-Watson stat | 1.961430 |
| Prob(F-statistic) | 0.000000 |  |  |

FOER AT LEVEL

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Null Hypothesis: FOER has a unit root | | | | |
| Exogenous: Constant |  |  |  |  |
| Bandwidth: 6 (Newey-West automatic) using Bartlett kernel | | | | |
|  |  | Adj. t-Stat | | Prob.\* |
| Phillips-Perron test statistic |  | -0.948469 | | 0.7592 |
| Test critical values: | 1% level | -3.653730 | |  |
|  | 5% level | -2.957110 | |  |
|  | 10% level | -2.617434 | |  |
| \*MacKinnon (1996) one-sided p-values. | | | | |
| Residual variance (no correction) | |  |  | 3.45E+19 |
| HAC corrected variance (Bartlett kernel) | |  |  | 3.89E+19 |
| Phillips-Perron Test Equation | | | | |
| Dependent Variable: D(EXR) | | | | |
| Method: Least Squares |  |  |  |  |
| Date: 09/08/21 Time: 15:47 | | | | |
| Sample (adjusted): 1987 2020 | | | | |
| Included observations: 32 after adjustments | | | | |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| EXR(-1) | -0.052456 | 0.058858 | -0.891220 | 0.3799 |
| C | 2.19E+09 | 1.57E+09 | 1.398709 | 0.1722 |
| R-squared | 0.025793 | Mean dependent var | | 1.17E+09 |
| Adjusted R-squared | -0.006681 | S.D. dependent var | | 6.05E+09 |
| S.E. of regression | 6.07E+09 | Akaike info criterion | | 47.95036 |
| Sum squared resid | 1.10E+21 | Schwarz criterion |  | 48.04197 |
| Log likelihood | -765.2058 | Hannan-Quinn criter. | | 47.98073 |
| F-statistic | 0.794273 | Durbin-Watson stat | | 0.980683 |
| Prob(F-statistic) | 0.379904 |  | |  |

EXR AT FIRST DIFFERENCE

|  |  |  |  |
| --- | --- | --- | --- |
| Null Hypothesis: D(EXR) has a unit root | | | |
| Exogenous: Constant |  |  |  |
| Bandwidth: 22 (Newey-West automatic) using Bartlett kernel | | | |
|  |  | Adj. t-Stat | Prob.\* |
| Phillips-Perron test statistic |  | -6.493316 | 0.0000 |
| Test critical values: | 1% level | -3.670170 |  |
|  | 5% level | -2.963972 |  |
| 10% level | | -2.621007 |  |
| \*MacKinnon (1996) one-sided p-values. | | | |
| Residual variance (no correction) | |  | 0.207200 |
| HAC corrected variance (Bartlett kernel) | |  | 0.031402 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Phillips-Perron Test Equation | | | | |
| Dependent Variable: D(FOER,2) | | | | |
| Method: Least Squares |  |  |  |  |
| Date: 09/08/21 Time: 15:47 | | | | |
| Sample (adjusted): 1988 2017 | | | | |
| Included observations: 30 after adjustments | | | | |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| D(EXR(-1)) | -0.920068 | 0.189433 | -4.856949 | 0.0000 |
| C | 0.101828 | 0.088129 | 1.155439 | 0.2577 |
| R-squared | 0.457259 | Mean dependent var | | 0.008812 |
| Adjusted R-squared | 0.437875 | S.D. dependent var | | 0.628435 |
| S.E. of regression | 0.471169 | Akaike info criterion | | 1.397140 |
| Sum squared resid | 6.216001 | Schwarz criterion |  | 1.490553 |
| Log likelihood | -18.95710 | Hannan-Quinn criter. | | 1.427023 |
| F-statistic | 23.58995 | Durbin-Watson stat | | 1.882303 |
| Prob(F-statistic) | 0.000041 |  | |  |

FGDD AT LEVEL

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Null Hypothesis: FGDD has a unit root | | | | |
| Exogenous: Constant |  |  |  |  |
| Bandwidth: 2 (Newey-West automatic) using Bartlett kernel | | | | |
|  |  | Adj. t-Stat | | Prob.\* |
| Phillips-Perron test statistic |  | -2.384389 | | 0.1535 |
| Test critical values: | 1% level | -3.639407 | |  |
|  | 5% level | -2.951125 | |  |
|  | 10% level | -2.614300 | |  |
| \*MacKinnon (1996) one-sided p-values. | | | | |
| Residual variance (no correction) | |  |  | 0.016684 |
| HAC corrected variance (Bartlett kernel) | |  |  | 0.020682 |
| Phillips-Perron Test Equation | | | | |
| Dependent Variable: D(FGDD) | | | | |
| Method: Least Squares |  |  |  |  |
| Date: 09/08/21 Time: 15:48 | | | | |
| Sample (adjusted): 1987 2020 | | | | |
| Included observations: 34 after adjustments | | | | |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| FGDD(-1) | -0.032856 | 0.012613 | -2.604905 | 0.0138 |
| C | 0.414493 | 0.090530 | 4.578515 | 0.0001 |
| R-squared | 0.174950 | Mean dependent var | | 0.186295 |
| Adjusted R-squared | 0.149167 | S.D. dependent var | | 0.144341 |
| S.E. of regression | 0.133141 | Akaike info criterion | | -1.137793 |
| Sum squared resid | 0.567249 | Schwarz criterion |  | -1.048007 |
| Log likelihood | 21.34248 | Hannan-Quinn criter. | | -1.107173 |
| F-statistic | 6.785528 | Durbin-Watson stat | | 1.712903 |
| Prob(F-statistic) | 0.013827 |  | |  |

FGDD AT FIRST DIFFERENCE

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Null Hypothesis: D(FGDD) has a unit root | | | | |
| Exogenous: Constant |  |  |  |  |
| Bandwidth: 0 (Newey-West automatic) using Bartlett kernel | | | | |
|  |  | Adj. t-Stat | | Prob.\* |
| Phillips-Perron test statistic |  | -4.246729 | | 0.0021 |
| Test critical values: | 1% level | -3.646342 | |  |
|  | 5% level | -2.954021 | |  |
|  | 10% level | -2.615817 | |  |
| \*MacKinnon (1996) one-sided p-values. | | | | |
| Residual variance (no correction) | |  |  | 0.019230 |
| HAC corrected variance (Bartlett kernel) | |  |  | 0.019230 |
| Phillips-Perron Test Equation | | | | |
| Dependent Variable: D(FGDD,2) | | | | |
| Method: Least Squares |  |  |  |  |
| Date: 09/08/21 Time: 15:49 | | | | |
| Sample (adjusted): 1988 2020 | | | | |
| Included observations: 33 after adjustments | | | | |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| D(FGDD(-1)) | -0.735528 | 0.173199 | -4.246729 | 0.0002 |
| C | 0.134304 | 0.041054 | 3.271381 | 0.0026 |
| R-squared | 0.367795 | Mean dependent var | | -0.004294 |
| Adjusted R-squared | 0.347401 | S.D. dependent var | | 0.177110 |
| S.E. of regression | 0.143076 | Akaike info criterion | | -0.992197 |
| Sum squared resid | 0.634589 | Schwarz criterion |  | -0.901499 |
| Log likelihood | 18.37124 | Hannan-Quinn criter. | | -0.961680 |
| F-statistic | 18.03471 | Durbin-Watson stat | | 2.081155 |
| Prob(F-statistic) | 0.000183 |  | |  |

**NIGERIA-JOHANSEN COINTEGRATION TEST**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Date: 09/09/21 Time: 01:03 | | | | |
| Sample (adjusted): 1988 2020 | | | | |
| Included observations: 33 after adjustments | | | | |
| Trend assumption: No deterministic trend (restricted constant) | | | | |
| Series: RGDP FGBD FGDD FGXD FOER BRMS | | | | |
| Lags interval (in first differences): 1 to 1 | | | | |
| Unrestricted Cointegration Rank Test (Trace) | | | | |
| Hypothesized |  | Trace | 0.05 |  |
| No. of CE(s) | Eigenvalue | Statistic | Critical Value | Prob.\*\* |
| None \* | 0.926611 | 206.1164 | 103.8473 | 0.0000 |
| At most 1 \* | 0.760325 | 119.9209 | 76.97277 | 0.0000 |
| At most 2 \* | 0.706194 | 72.78132 | 54.07904 | 0.0005 |
| At most 3 | 0.393458 | 32.36171 | 35.19275 | 0.0979 |
| At most 4 | 0.306911 | 15.86233 | 20.26184 | 0.1809 |
| At most 5 | 0.107814 | 3.764650 | 9.164546 | 0.4483 |
| Trace test indicates 3 cointegrating eqn(s) at the 0.05 level | | | |  |
| \* denotes rejection of the hypothesis at the 0.05 level | | | |  |
| \*\*MacKinnon-Haug-Michelis (1999) p-values | | | |  |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Unrestricted Cointegration Rank Test (Maximum Eigenvalue) | | | | | | |
| Hypothesized |  | Max-Eigen | 0.05 |  |  |  |
| No. of CE(s) | Eigenvalue | Statistic | Critical Value | Prob.\*\* |  |  |
| None \* | 0.926611 | 86.19555 | 40.95680 | 0.0000 |  |  |
| At most 1 \* | 0.760325 | 47.13956 | 34.80587 | 0.0011 |  |  |
| At most 2 \* | 0.706194 | 40.41961 | 28.58808 | 0.0010 |  |  |
| At most 3 | 0.393458 | 16.49939 | 22.29962 | 0.2642 |  |  |
| At most 4 | 0.306911 | 12.09768 | 15.89210 | 0.1804 |  |  |
| At most 5 | 0.107814 | 3.764650 | 9.164546 | 0.4483 |  |  |
| Max-eigenvalue test indicates 3 cointegrating eqn(s) at the 0.05 level | | | | | | |
| \* denotes rejection of the hypothesis at the 0.05 level | | | | | | |
| \*\*MacKinnon-Haug-Michelis (1999) p-values | | | | | | |
| Unrestricted Cointegrating Coefficients (normalized by b'\*S11\*b=I): | | | | | | |
| RGDP | FGBD | FGDD | FGXD | EXR | BRMS | C |
| 0.000496 | 1.41E-06 | -0.002781 | 6.34E-06 | -0.177572 | -8.37E-06 | 0.376987 |
| 0.000110 | -3.59E-06 | -0.003365 | 0.000443 | 0.007559 | 1.06E-05 | 0.352133 |
| 0.000198 | 1.95E-05 | 0.003006 | -0.000754 | 0.042712 | -1.91E-05 | -0.861385 |
| 5.74E-05 | -1.72E-05 | -0.003529 | -0.000257 | -0.044130 | 1.09E-05 | 0.805627 |
| -8.80E-05 | -5.66E-05 | 0.000535 | -0.000506 | -0.028851 | 3.09E-06 | 1.676478 |
| 6.35E-05 | -2.90E-05 | 0.001318 | 0.000263 | 0.041025 | -8.91E-06 | -1.183719 |
| Unrestricted Adjustment Coefficients (alpha): | | | | | | |
| D(RGDP) | -595.0162 | 1224.035 | -396.1696 | -718.2547 | -89.26745 | 142.5686 |
| D(FGBD) | -36.06336 | 2879.784 | -3593.103 | 4012.642 | 9161.966 | 2850.936 |
| D(FGDD) | 461.6787 | 243.3145 | -111.9309 | -23.60745 | 66.32349 | -85.58930 |
| D(FGXD) | 406.4942 | -83.37884 | -43.34158 | -254.8560 | 293.9600 | -160.9293 |
| D(EXR) | 3.797660 | -0.523770 | -1.196216 | -1.213050 | -0.376230 | 0.398245 |
| D(BRMS) | 13610.75 | 40986.62 | 50713.11 | -22470.59 | 5159.910 | 7408.179 |
| 1 Cointegrating Equation(s): | | Log likelihood | -1664.871 |  |  |  |
| Normalized cointegrating coefficients (standard error in parentheses) | | | | | | |
| RGDP | FGBD | FGDD | FGXD | FOER | BRMS | C |
| 1.000000 | 0.002833 | -5.606449 | 0.012784 | -357.9935 | -0.016869 | 760.0216 |
|  | (0.00771) | (0.73313) | (0.12088) | (16.1530) | (0.00300) | (283.649) |
| Adjustment coefficients (standard error in parentheses) | | | | | | |
| D(RGDP) | -0.295141 |  |  |  |  |  |
|  | (0.18829) |  |  |  |  |  |
| D(FGBD) | -0.017888 |  |  |  |  |  |
|  | (1.99124) |  |  |  |  |  |
| D(FGDD) | 0.229002 |  |  |  |  |  |
|  | (0.04309) |  |  |  |  |  |
| D(FGXD) | 0.201630 |  |  |  |  |  |
|  | (0.08207) |  |  |  |  |  |
| D(EXR) | 0.001884 |  |  |  |  |  |
|  | (0.00030) |  |  |  |  |  |
| D(BRMS) | 6.751217 |  |  |  |  |  |
|  | (8.56100) |  |  |  |  |  |
| 2 Cointegrating Equation(s): | | Log likelihood | -1641.301 |  |  |  |
| Normalized cointegrating coefficients (standard error in parentheses) | | | | | | |
| RGDP | FGBD | FGDD | FGXD | EXR | BRMS | C |
| 1.000000 | 0.000000 | -7.600578 | 0.332868 | -323.9474 | -0.007814 | 954.8350 |
|  |  | (0.85034) | (0.13904) | (18.1495) | (0.00347) | (271.822) |
| 0.000000 | 1.000000 | 703.9308 | -112.9902 | -12018.34 | -3.196537 | -68769.41 |
|  |  | (185.768) | (30.3756) | (3965.00) | (0.75903) | (59383.3) |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Adjustment coefficients (standard error in parentheses) | | | | | | |
| D(RGDP) | -0.160520 | -0.005235 |  |  |  |  |
|  | (0.14940) | (0.00113) |  |  |  |  |
| D(FGBD) | 0.298833 | -0.010399 |  |  |  |  |
|  | (2.01931) | (0.01534) |  |  |  |  |
| D(FGDD) | 0.255762 | -0.000226 |  |  |  |  |
|  | (0.03688) | (0.00028) |  |  |  |  |
| D(FGXD) | 0.192460 | 0.000871 |  |  |  |  |
|  | (0.08365) | (0.00064) |  |  |  |  |
| D(EXR) | 0.001826 | 7.22E-06 |  |  |  |  |
|  | (0.00030) | (2.3E-06) |  |  |  |  |
| D(BRMS) | 11.25896 | -0.128158 |  |  |  |  |
|  | (7.75987) | (0.05893) |  |  |  |  |
| 3 Cointegrating Equation(s): | | Log likelihood | -1621.092 |  |  |  |
| Normalized cointegrating coefficients (standard error in parentheses) | | | | | | |
| RGDP | FGBD | FGDD | FGXD | EXR | BRMS | C |
| 1.000000 | 0.000000 | 0.000000 | -0.808235 | -605.9554 | -0.044734 | 717.0038 |
|  |  |  | (0.37894) | (46.2058) | (0.00125) | (785.276) |
| 0.000000 | 1.000000 | 0.000000 | -7.306393 | 14099.95 | 0.222826 | -46742.58 |
|  |  |  | (14.9107) | (1818.13) | (0.04914) | (30899.4) |
| 0.000000 | 0.000000 | 1.000000 | -0.150134 | -37.10349 | -0.004858 | -31.29119 |
|  |  |  | (0.05538) | (6.75317) | (0.00018) | (114.771) |
| Adjustment coefficients (standard error in parentheses) | | | | | | |
| D(RGDP) | -0.239038 | -0.012943 | -3.655550 |  |  |  |
|  | (0.15467) | (0.00563) | (1.50325) |  |  |  |
| D(FGBD) | -0.413293 | -0.080307 | -20.39157 |  |  |  |
|  | (2.13317) | (0.07759) | (20.7328) |  |  |  |
| D(FGDD) | 0.233578 | -0.002403 | -2.439195 |  |  |  |
|  | (0.03773) | (0.00137) | (0.36671) |  |  |  |
| D(FGXD) | 0.183870 | 2.75E-05 | -0.980093 |  |  |  |
|  | (0.08967) | (0.00326) | (0.87151) |  |  |  |
| D(EXR) | 0.001589 | -1.61E-05 | -0.012394 |  |  |  |
|  | (0.00029) | (1.1E-05) | (0.00285) |  |  |  |
| D(BRMS) | 21.30991 | 0.858529 | -23.35714 |  |  |  |
|  | (6.32137) | (0.22991) | (61.4387) |  |  |  |
| 4 Cointegrating Equation(s): | | Log likelihood | -1612.842 |  |  |  |
| Normalized cointegrating coefficients (standard error in parentheses) | | | | | | |
| RGDP | FGBD | FGDD | FGXD | EXR | BRMS | C |
| 1.000000 | 0.000000 | 0.000000 | 0.000000 | -701.2959 | -0.044838 | 856.7315 |
|  |  |  |  | (58.8422) | (0.00158) | (870.629) |
| 0.000000 | 1.000000 | 0.000000 | 0.000000 | 13238.08 | 0.221881 | -45479.45 |
|  |  |  |  | (1681.03) | (0.04526) | (24872.5) |
| 0.000000 | 0.000000 | 1.000000 | 0.000000 | -54.81346 | -0.004877 | -5.336070 |
|  |  |  |  | (9.27731) | (0.00025) | (137.267) |
| 0.000000 | 0.000000 | 0.000000 | 1.000000 | -117.9612 | -0.000129 | 172.8799 |
|  |  |  |  | (34.7399) | (0.00094) | (514.012) |
| Adjustment coefficients (standard error in parentheses) | | |  |  |  |  |
| D(RGDP) | -0.280262 | -0.000591 | -1.120797 | 1.021225 |  |  |
|  | (0.13498) | (0.00646) | (1.56746) | (0.22425) |  |  |
| D(FGBD) | -0.182988 | -0.149309 | -34.55237 | 2.950734 |  |  |
|  | (2.10110) | (0.10058) | (24.3985) | (3.49066) |  |  |
| D(FGDD) | 0.232223 | -0.001997 | -2.355883 | 0.201048 |  |  |
|  | (0.03785) | (0.00181) | (0.43957) | (0.06289) |  |  |
| D(FGXD) | 0.169242 | 0.004410 | -0.080694 | 0.063849 |  |  |
|  | (0.08590) | (0.00411) | (0.99746) | (0.14271) |  |  |
| D(EXR) | 0.001519 | 4.80E-06 | -0.008113 | 0.001006 |  |  |
|  | (0.00026) | (1.3E-05) | (0.00307) | (0.00044) |  |  |
| D(BRMS) | 20.02022 | 1.244934 | 55.94260 | -14.21299 |  |  |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | (5.87899) | (0.28144) | (68.2683) | (9.76706) |  |  |
| 5 Cointegrating Equation(s): | | Log likelihood | -1606.793 |  |  |  |
| Normalized cointegrating coefficients (standard error in parentheses) | | | | | | |
| RGDP | FGBD | FGDD | FGXD | EXR | BRMS | C |
| 1.000000 | 0.000000 | 0.000000 | 0.000000 | 0.000000 | -0.028936 | 38.46002 |
|  |  |  |  |  | (0.00220) | (1106.86) |
| 0.000000 | 1.000000 | 0.000000 | 0.000000 | 0.000000 | -0.078302 | -30033.27 |
|  |  |  |  |  | (0.02137) | (10744.7) |
| 0.000000 | 0.000000 | 1.000000 | 0.000000 | 0.000000 | -0.003634 | -69.29238 |
|  |  |  |  |  | (0.00020) | (102.353) |
| 0.000000 | 0.000000 | 0.000000 | 1.000000 | 0.000000 | 0.002545 | 35.24287 |
|  |  |  |  |  | (0.00103) | (516.758) |
| 0.000000 | 0.000000 | 0.000000 | 0.000000 | 1.000000 | 2.27E-05 | -1.166799 |
|  |  |  |  |  | (4.2E-06) | (2.09752) |
| Adjustment coefficients (standard error in parentheses) | | |  |  |  |  |
| D(RGDP) | -0.272407 | 0.004465 | -1.168548 | 1.066436 | 132.2622 |  |
|  | (0.13636) | (0.01533) | (1.56900) | (0.25593) | (46.7112) |  |
| D(FGBD) | -0.989175 | -0.668252 | -29.65137 | -1.689514 | -566.7067 |  |
|  | (1.87948) | (0.21127) | (21.6252) | (3.52742) | (643.811) |  |
| D(FGDD) | 0.226387 | -0.005754 | -2.320405 | 0.167457 | -85.79455 |  |
|  | (0.03765) | (0.00423) | (0.43321) | (0.07066) | (12.8974) |  |
| D(FGXD) | 0.143376 | -0.012240 | 0.076553 | -0.085032 | -71.89797 |  |
|  | (0.08089) | (0.00909) | (0.93072) | (0.15182) | (27.7087) |  |
| D(EXR) | 0.001553 | 2.61E-05 | -0.008314 | 0.001196 | -0.665025 |  |
|  | (0.00026) | (3.0E-05) | (0.00304) | (0.00050) | (0.09050) |  |
| D(BRMS) | 19.56618 | 0.952671 | 58.70279 | -16.82633 | 901.7402 |  |
|  | (5.92761) | (0.66630) | (68.2029) | (11.1250) | (2030.49) |  |

VEC RESULT

|  |  |
| --- | --- |
| Vector Error Correction Estimates | |
| Date: 09/08/21 Time: 16:02 | |
| Sample (adjusted): 1988 2017 | |
| Included observations: 30 after adjustments | |
| Standard errors in ( ) & t-statistics in [ ] | |
| Cointegrating Eq: | CointEq1 |
| RGDP(-1) | 1.000000 |
| FGDD(-1) | -0.933245 |
|  | (0.14404) |
|  | [-6.47898] |
| FGXD(-1) | -0.013784 |
|  | (0.03677) |
|  | [-0.37492] |
| FGBD(-1) | -1.32E-14 |
|  | (2.2E-15) |
|  | [-6.01674] |
| EXR(-1) | -0.422747 |
|  | (0.08021) |
|  | [-5.27030] |
| BRMS(-1) | 0.226990 |
|  | (0.13221) |
|  | [ 1.71685] |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| C | -1.077378 |  |  |  |  |  |
| Error Correction: | D(RGDP) | D(FGDD) | D(FGXD) | D(FGBD) | D(EXR) | D(BRMS) |
| CointEq1 | -0.225903 | -0.197342 | -0.393388 | -1.35E+13 | 1.210922 | -0.146995 |
|  | (0.08088) | (0.14320) | (0.42386) | (4.2E+12) | (0.33875) | (0.10350) |
|  | [-2.79322] | [-1.37805] | [-0.92810] | [-3.24077] | [ 3.57471] | [-1.42024] |
| D(RGDP(-1)) | 0.420231 | -0.211420 | -1.484791 | 1.69E+13 | 1.731632 | -0.132839 |
|  | (0.16787) | (0.29724) | (0.87978) | (8.6E+12) | (0.70312) | (0.21483) |
|  | [ 2.50333] | [-0.71128] | [-1.68768] | [ 1.95527] | [ 2.46280] | [-0.61835] |
| D(FGDD(-1)) | 0.065607 | 0.004152 | -0.518091 | -1.49E+13 | 0.657392 | 0.044164 |
|  | (0.15871) | (0.28102) | (0.83178) | (8.2E+12) | (0.66475) | (0.20311) |
|  | [ 0.41338] | [ 0.01477] | [-0.62287] | [-1.82679] | [ 0.98893] | [ 0.21745] |
| D(FGXD(-1)) | 0.000625 | 0.009557 | 0.150821 | 4.49E+12 | 0.215074 | -0.092572 |
|  | (0.03572) | (0.06325) | (0.18722) | (1.8E+12) | (0.14962) | (0.04572) |
|  | [ 0.01750] | [ 0.15109] | [ 0.80560] | [ 2.44030] | [ 1.43745] | [-2.02498] |
| D(FGBD(-1)) | -6.72E-15 | -2.57E-15 | -9.82E-15 | -0.374937 | 4.41E-14 | 4.37E-15 |
|  | (4.6E-15) | (8.2E-15) | (2.4E-14) | (0.23893) | (1.9E-14) | (5.9E-15) |
|  | [-1.44712] | [-0.31223] | [-0.40382] | [-1.56924] | [ 2.26962] | [ 0.73574] |
| D(EXR(-1)) | -0.054711 | -0.025973 | -0.447915 | -7.89E+10 | 0.347642 | -0.043512 |
|  | (0.04532) | (0.08025) | (0.23754) | (2.3E+12) | (0.18984) | (0.05800) |
|  | [-1.20709] | [-0.32363] | [-1.88562] | [-0.03381] | [ 1.83122] | [-0.75016] |
| D(BRMS(-1)) | -0.100459 | -0.054144 | -0.099834 | -1.79E+12 | 0.584358 | 0.282444 |
|  | (0.14481) | (0.25641) | (0.75893) | (7.5E+12) | (0.60653) | (0.18532) |
|  | [-0.69374] | [-0.21117] | [-0.13155] | [-0.24017] | [ 0.96345] | [ 1.52411] |
| C | 0.103114 | 0.240270 | 0.532967 | -3.80E+12 | -0.439646 | 0.204401 |
|  | (0.05544) | (0.09817) | (0.29057) | (2.9E+12) | (0.23222) | (0.07095) |
|  | [ 1.85985] | [ 2.44752] | [ 1.83423] | [-1.33003] | [-1.89325] | [ 2.88085] |
| R-squared | 0.577749 | 0.176509 | 0.312636 | 0.547991 | 0.528348 | 0.526132 |
| Adj. R-squared | 0.443397 | -0.085511 | 0.093929 | 0.404169 | 0.378278 | 0.375356 |
| Sum sq. resids | 0.168179 | 0.527280 | 4.619392 | 4.45E+26 | 2.950429 | 0.275433 |
| S.E. equation | 0.087433 | 0.154814 | 0.458227 | 4.50E+12 | 0.366211 | 0.111891 |
| F-statistic | 4.300251 | 0.673646 | 1.429477 | 3.810221 | 3.520658 | 3.489491 |
| Log likelihood | 35.19074 | 18.05015 | -14.50414 | -911.9685 | -7.779453 | 27.79095 |
| Akaike AIC | -1.812716 | -0.670010 | 1.500276 | 61.33123 | 1.051964 | -1.319397 |
| Schwarz SC | -1.439063 | -0.296358 | 1.873929 | 61.70489 | 1.425616 | -0.945744 |
| Mean dependent | 0.179271 | 0.194513 | 0.135014 | -2.59E+12 | 0.109909 | 0.226668 |
| S.D. dependent | 0.117193 | 0.148591 | 0.481393 | 5.83E+12 | 0.464444 | 0.141573 |
| Determinant resid covariance (dof adj.) | | 4.05E+17 |  |  |  |  |
| Determinant resid covariance |  | 6.30E+16 |  |  |  |  |
| Log likelihood |  | -835.6359 |  |  |  |  |
| Akaike information criterion |  | 59.30906 |  |  |  |  |
| Schwarz criterion |  | 61.83122 |  |  |  |  |

|  |
| --- |
| Dependent Variable: D(RGDP) |
| Method: Least Squares (Gauss-Newton / Marquardt steps) |
| Date: 09/08/21 Time: 16:04 |
| Sample (adjusted): 1988 2018 |
| Included observations: 31 after adjustments |
| D(RGDP) = C(1)\*( RGDP(-1) - 0.933245299089 |
| \*FGDD(-1) - 0.0137840403016\*FGXD(-1) - |
| 1.31850554186E-14\*FGBD(-1) - 0.42274667707\*FOER(-1) + |
| 0.226989891161\*BRMS(-1) - 1.0773782962 ) + C(2) |
| \*D(RGDP(-1)) + C(3)\*D(FGDD(-1)) + C(4) |
| \*D(FGXD(-1)) + C(5)\*D(FGBD(-1)) + C(6)\*D(LOG(FOER( |
| -1))) + C(7)\*D(BRMS(-1)) + C(8) |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Coefficient | Std. Error | t-Statistic | Prob. |
| C(1) | -0.207774 | 0.076536 | -2.714732 | 0.0124 |
| C(2) | 0.423974 | 0.166235 | 2.550456 | 0.0179 |
| C(3) | 0.090104 | 0.153934 | 0.585344 | 0.5640 |
| C(4) | 0.004680 | 0.034990 | 0.133743 | 0.8948 |
| C(5) | -6.57E-15 | 4.59E-15 | -1.428940 | 0.1665 |
| C(6) | -0.045230 | 0.043158 | -1.048025 | 0.3055 |
| C(7) | -0.107855 | 0.143134 | -0.753524 | 0.4588 |
| C(8) | 0.099991 | 0.054774 | 1.825510 | 0.0809 |
| R-squared | 0.574825 | Mean dependent var | | 0.176416 |
| Adjusted R-squared | 0.445424 | S.D. dependent var | | 0.116314 |
| S.E. of regression | 0.086619 | Akaike info criterion | | -1.836954 |
| Sum squared resid | 0.172567 | Schwarz criterion |  | -1.466892 |
| Log likelihood | 36.47278 | Hannan-Quinn criter. | | -1.716323 |
| F-statistic | 4.442197 | Durbin-Watson stat | | 2.186939 |
| Prob(F-statistic) | 0.002983 |  | |  |

COINTEGRATION TEST

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Date: 09/08/21 Time: 16:12 | | | | | |
| Sample (adjusted): 1988 2017 | | | | | |
| Included observations: 30 after adjustments | | | | | |
| Trend assumption: Linear deterministic trend | | | | | |
| Series: RGDPFGDDFGXD FGBD FOERBRMS | | | | | |
| Lags interval (in first differences): 1 to 1 | | | | | |
| Unrestricted Cointegration Rank Test (Trace) | | | | | |
| Hypothesized |  | Trace | 0.05 |  |  |
| No. of CE(s) | Eigenvalue | Statistic | Critical Value | Prob.\*\* |  |
| None \* | 0.826176 | 139.6065 | 95.75366 | 0.0000 |  |
| At most 1 \* | 0.726324 | 87.11512 | 69.81889 | 0.0011 |  |
| At most 2 \* | 0.577949 | 48.24081 | 47.85613 | 0.0460 |  |
| At most 3 | 0.376501 | 22.36197 | 29.79707 | 0.2788 |  |
| At most 4 | 0.209387 | 8.189700 | 15.49471 | 0.4453 |  |
| At most 5 | 0.037328 | 1.141282 | 3.841466 | 0.2854 |  |
| Trace test indicates 3 cointegrating eqn(s) at the 0.05 level | | | | | |
| \* denotes rejection of the hypothesis at the 0.05 level | | | | | |
| \*\*MacKinnon-Haug-Michelis (1999) p-values | | | | | |
| Unrestricted Cointegration Rank Test (Maximum Eigenvalue) | | | | | |
| Hypothesized |  | Max-Eigen | 0.05 |  |  |
| No. of CE(s) | Eigenvalue | Statistic | Critical Value | Prob.\*\* |  |
| None \* | 0.826176 | 52.49137 | 40.07757 | 0.0012 |  |
| At most 1 \* | 0.726324 | 38.87431 | 33.87687 | 0.0116 |  |
| At most 2 | 0.577949 | 25.87885 | 27.58434 | 0.0813 |  |
| At most 3 | 0.376501 | 14.17227 | 21.13162 | 0.3511 |  |
| At most 4 | 0.209387 | 7.048418 | 14.26460 | 0.4834 |  |
| At most 5 | 0.037328 | 1.141282 | 3.841466 | 0.2854 |  |
| Max-eigenvalue test indicates 2 cointegrating eqn(s) at the 0.05 level | | | | | |
| \* denotes rejection of the hypothesis at the 0.05 level | | | | | |
| \*\*MacKinnon-Haug-Michelis (1999) p-values | | | | | |
| Unrestricted Cointegrating Coefficients (normalized by b'\*S11\*b=I): | | | | | |
| RGDP | FGDD | FGXD | FGBD | EXR | BRMS |
| 5.066454 | -4.728244 | -0.069836 | -6.68E-14 | -2.141826 | 1.150034 |
| -7.524852 | 0.856153 | 0.093768 | 3.78E-14 | -1.593392 | 6.133284 |
| -3.990718 | 5.038328 | -0.715489 | -2.58E-14 | 3.158102 | -2.018551 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| -2.233762 | -2.777425 | 1.220801 | 2.07E-14 | 0.974865 | 3.267273 |  |
| -1.617328 | 4.892912 | -0.024661 | 3.56E-14 | 0.328721 | -2.253010 |  |
| 0.442882 | -1.369845 | 1.269824 | -9.39E-14 | 0.946462 | -0.740923 |  |
| Unrestricted Adjustment Coefficients (alpha): | | | | | | |
| D(RGDP) | -0.044588 | 0.031716 | -0.027654 | 0.010187 | 0.014127 | 0.006833 |
| D(FGDD) | -0.038951 | 0.021063 | 0.023071 | 0.007012 | -0.053000 | 0.009019 |
| D(FGXD) | -0.077646 | 0.104056 | 0.042527 | -0.214965 | -0.039696 | -0.012836 |
| D(FGBD) | -2.66E+12 | -1.62E+12 | -2.27E+12 | 4.07E+11 | 3.09E+10 | -1.12E+11 |
| D(FOER) | 0.239008 | -0.099528 | -0.199013 | -0.034825 | -0.008406 | 0.004742 |
| D(BRMS) | -0.029013 | -0.048337 | 0.013771 | -0.014166 | -0.007287 | 0.013207 |
| 1 Cointegrating Equation(s): | | Log likelihood | -835.6359 |  |  |  |
| Normalized cointegrating coefficients (standard error in parentheses) | | | |  |  |  |
| RGDP | FGDD | FGXD | FGBD | EXR | BRMS |  |
| 1.000000 | -0.933245 | -0.013784 | -1.32E-14 | -0.422747 | 0.226990 |  |
|  | (0.14404) | (0.03677) | (2.2E-15) | (0.08021) | (0.13221) |  |
| Adjustment coefficients (standard error in parentheses) | | |  |  |  |  |
| D(RGDP) | -0.225903 |  |  |  |  |  |
|  | (0.08088) |  |  |  |  |  |
| D(FGDD) | -0.197342 |  |  |  |  |  |
|  | (0.14320) |  |  |  |  |  |
| D(FGXD) | -0.393388 |  |  |  |  |  |
|  | (0.42386) |  |  |  |  |  |
| D(FGBD) | -1.35E+13 |  |  |  |  |  |
|  | (4.2E+12) |  |  |  |  |  |
| D(EXR) | 1.210922 |  |  |  |  |  |
|  | (0.33875) |  |  |  |  |  |
| D(BRMS) | -0.146995 |  |  |  |  |  |
|  | (0.10350) |  |  |  |  |  |
| 2 Cointegrating Equation(s): | | Log likelihood | -816.1988 |  |  |  |
| Normalized cointegrating coefficients (standard error in parentheses) | | | |  |  |  |
| RGDP | FGDD | FGXD | FGBD | FOER | BRMS |  |
| 1.000000 | 0.000000 | -0.012277 | -3.88E-15 | 0.299846 | -0.959752 |  |
|  |  | (0.03029) | (2.2E-15) | (0.07205) | (0.05056) |  |
| 0.000000 | 1.000000 | 0.001614 | 9.97E-15 | 0.774279 | -1.271629 |  |
|  |  | (0.04805) | (3.6E-15) | (0.11430) | (0.08021) |  |
| Adjustment coefficients (standard error in parentheses) | | |  |  |  |  |
| D(RGDP) | -0.464560 | 0.237977 |  |  |  |  |
|  | (0.13117) | (0.06948) |  |  |  |  |
| D(FGDD) | -0.355838 | 0.202201 |  |  |  |  |
|  | (0.25315) | (0.13409) |  |  |  |  |
| D(FGXD) | -1.176396 | 0.456215 |  |  |  |  |
|  | (0.73176) | (0.38761) |  |  |  |  |
| D(FGBD) | -1.27E+12 | 1.12E+13 |  |  |  |  |
|  | (6.8E+12) | (3.6E+12) |  |  |  |  |
| D(FOER) | 1.959857 | -1.215299 |  |  |  |  |
|  | (0.57517) | (0.30467) |  |  |  |  |
| D(BRMS) | 0.216736 | 0.095798 |  |  |  |  |
|  | (0.16001) | (0.08476) |  |  |  |  |
| 3 Cointegrating Equation(s): | | Log likelihood | -803.2594 |  |  |  |
| Normalized cointegrating coefficients (standard error in parentheses) | | | |  |  |  |
| RGDP | FGDD | FGXD | FGBD | FOER | BRMS |  |
| 1.000000 | 0.000000 | 0.000000 | -2.43E-15 | 0.292637 | -0.968623 |  |
|  |  |  | (2.2E-15) | (0.06731) | (0.04113) |  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 0.000000 | 1.000000 | 0.000000 | 9.77E-15 | 0.775227 | -1.270463 |
|  |  |  | (3.4E-15) | (0.10134) | (0.06193) |
| 0.000000 | 0.000000 | 1.000000 | 1.18E-13 | -0.587132 | -0.722522 |
|  |  |  | (3.0E-14) | (0.88940) | (0.54356) |
| Adjustment coefficients (standard error in parentheses) | | | | | |
| D(RGDP) | -0.354201 | 0.098647 | 0.025874 |  |  |
|  | (0.13085) | (0.09193) | (0.00957) |  |  |
| D(FGDD) | -0.447906 | 0.318439 | -0.011812 |  |  |
|  | (0.27223) | (0.19125) | (0.01991) |  |  |
| D(FGXD) | -1.346111 | 0.670482 | -0.015248 |  |  |
|  | (0.79437) | (0.55806) | (0.05811) |  |  |
| D(FGBD) | 7.80E+12 | -2.58E+11 | 1.66E+12 |  |  |
|  | (5.6E+12) | (3.9E+12) | (4.1E+11) |  |  |
| D(FOER) | 2.754064 | -2.217994 | 0.116368 |  |  |
|  | (0.46693) | (0.32803) | (0.03416) |  |  |
| D(BRMS) | 0.161781 | 0.165179 | -0.012359 |  |  |
|  | (0.17237) | (0.12109) | (0.01261) |  |  |
| 4 Cointegrating Equation(s): | | Log likelihood | -796.1732 |  |  |
| Normalized cointegrating coefficients (standard error in parentheses) | | | | | |
| RGDP | FGDD | FGXD | FGBD | FOER | BRMS |
| 1.000000 | 0.000000 | 0.000000 | 0.000000 | 0.185495 | -0.931873 |
|  |  |  |  | (0.06931) | (0.04036) |
| 0.000000 | 1.000000 | 0.000000 | 0.000000 | 1.205918 | -1.418189 |
|  |  |  |  | (0.14586) | (0.08494) |
| 0.000000 | 0.000000 | 1.000000 | 0.000000 | 4.629349 | -2.511764 |
|  |  |  |  | (1.04571) | (0.60898) |
| 0.000000 | 0.000000 | 0.000000 | 1.000000 | -4.41E+13 | 1.51E+13 |
|  |  |  |  | (1.2E+13) | (7.0E+12) |
| Adjustment coefficients (standard error in parentheses) | | | | | |
| D(RGDP) | -0.376956 | 0.070353 | 0.038310 | 5.10E-15 |  |
|  | (0.13231) | (0.09762) | (0.01849) | (1.1E-15) |  |
| D(FGDD) | -0.463569 | 0.298965 | -0.003252 | 2.95E-15 |  |
|  | (0.27865) | (0.20560) | (0.03894) | (2.3E-15) |  |
| D(FGXD) | -0.865931 | 1.267530 | -0.277677 | 3.57E-15 |  |
|  | (0.66805) | (0.49292) | (0.09337) | (5.5E-15) |  |
| D(FGBD) | 6.89E+12 | -1.39E+12 | 2.16E+12 | 0.183545 |  |
|  | (5.7E+12) | (4.2E+12) | (7.9E+11) | (0.04671) |  |
| D(FOER) | 2.831856 | -2.121269 | 0.073853 | -1.53E-14 |  |
|  | (0.47266) | (0.34875) | (0.06606) | (3.9E-15) |  |
| D(BRMS) | 0.193425 | 0.204525 | -0.029653 | -5.35E-16 |  |
|  | (0.17401) | (0.12839) | (0.02432) | (1.4E-15) |  |
| 5 Cointegrating Equation(s): | | Log likelihood | -792.6490 |  |  |
| Normalized cointegrating coefficients (standard error in parentheses) | | | | | |
| RGDP | FGDD | FGXD | FGBD | FOER | BRMS |
| 1.000000 | 0.000000 | 0.000000 | 0.000000 | 0.000000 | -0.798591 |
|  |  |  |  |  | (0.02161) |
| 0.000000 | 1.000000 | 0.000000 | 0.000000 | 0.000000 | -0.551709 |
|  |  |  |  |  | (0.10185) |
| 0.000000 | 0.000000 | 1.000000 | 0.000000 | 0.000000 | 0.814533 |
|  |  |  |  |  | (0.43743) |
| 0.000000 | 0.000000 | 0.000000 | 1.000000 | 0.000000 | -1.65E+13 |
|  |  |  |  |  | (4.6E+12) |
| 0.000000 | 0.000000 | 0.000000 | 0.000000 | 1.000000 | -0.718524 |
|  |  |  |  |  | (0.08744) |
| Adjustment coefficients (standard error in parentheses) | | | | | |
| D(RGDP) | -0.399805 | 0.139478 | 0.037962 | 5.60E-15 | -0.027795 |
|  | (0.13034) | (0.11342) | (0.01799) | (1.2E-15) | (0.05399) |
| D(FGDD) | -0.377850 | 0.039640 | -0.001945 | 1.06E-15 | 0.112136 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | (0.25710) | (0.22372) | (0.03549) | (2.3E-15) | (0.10650) |
| D(FGXD) | -0.801728 | 1.073298 | -0.276698 | 2.15E-15 | -0.087804 |
|  | (0.67084) | (0.58374) | (0.09260) | (5.9E-15) | (0.27789) |
| D(FGBD) | 6.84E+12 | -1.24E+12 | 2.16E+12 | 0.184643 | 1.52E+12 |
|  | (5.8E+12) | (5.0E+12) | (7.9E+11) | (0.05077) | (2.4E+12) |
| D(FOER) | 2.845452 | -2.162399 | 0.074060 | -1.56E-14 | -1.018544 |
|  | (0.47826) | (0.41617) | (0.06602) | (4.2E-15) | (0.19811) |
| D(BRMS) | 0.205211 | 0.168871 | -0.029473 | -7.95E-16 | 0.166445 |
|  | (0.17547) | (0.15269) | (0.02422) | (1.5E-15) | (0.07269) |

KENYA

## APPENDIX 4: KENYA REGRESSION RESULTS

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | RGDP | FGBD | FGDD | FGXD | FOER | BRMS |
| Mean | 2106532. | -62176.71 | 1.04E+08 | 71697932 | 2542.035 | 1056029. |
| Median | 1020220. | 207360.0 | 931.1830 | 973.0450 | 1274.563 | 441657.0 |
| Maximum | 8904980. | 401280.0 | 5.09E+08 | 3.79E+08 | 8196.865 | 4414885. |
| Minimum | 95503.38 | -6193064. | 0.004000 | 1.114000 | 79.54926 | 35693.90 |
| Std. Dev. | 2465665. | 1153405. | 1.50E+08 | 1.09E+08 | 2679.030 | 1231808. |
| Skewness | 1.393512 | -4.700759 | 1.257410 | 1.522833 | 1.032160 | 1.279573 |
| Kurtosis | 3.869448 | 24.64457 | 3.383851 | 4.121047 | 2.572223 | 3.479612 |
| Jarque-Bera | 12.43002 | 812.1110 | 9.437842 | 15.36037 | 6.481430 | 9.886419 |
| Probability | 0.001999 | 0.000000 | 0.008925 | 0.000462 | 0.039136 | 0.007132 |
| Sum | 73728621 | -2176185. | 3.64E+09 | 2.51E+09 | 88971.21 | 36961002 |
| Sum Sq. Dev. | 2.07E+14 | 4.52E+13 | 7.63E+17 | 4.05E+17 | 2.44E+08 | 5.16E+13 |
| Observations | 35 | 35 | 35 | 35 | 35 | 35 |

**Note: All Were Logged before running the regression**

RGDP AT LEVEL

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Null Hypothesis: RGDP has a unit root | | | | |
| Exogenous: Constant |  |  |  |  |
| Bandwidth: 0 (Newey-West automatic) using Bartlett kernel | | | | |
|  |  | Adj. t-Stat | | Prob.\* |
| Phillips-Perron test statistic |  | -1.662042 | | 0.4409 |
| Test critical values: | 1% level | -3.639407 | |  |
|  | 5% level | -2.951125 | |  |
|  | 10% level | -2.614300 | |  |
| \*MacKinnon (1996) one-sided p-values. | | | | |
| Residual variance (no correction) | |  |  | 0.107154 |
| HAC corrected variance (Bartlett kernel) | |  |  | 0.107154 |
| Phillips-Perron Test Equation | | | | |
| Dependent Variable: D(RGDP) | | | | |
| Method: Least Squares |  |  |  |  |
| Date: 09/09/21 Time: 01:38 | | | | |
| Sample (adjusted): 1987 2020 | | | | |
| Included observations: 34 after adjustments | | | | |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| RGDP(-1) | -0.166387 | 0.100110 | -1.662042 | 0.1063 |
| C | 1.996185 | 1.204025 | 1.657926 | 0.1071 |
| R-squared | 0.079465 | Mean dependent var | | -0.002643 |
| Adjusted R-squared | 0.050698 | S.D. dependent var | | 0.346311 |
| S.E. of regression | 0.337419 | Akaike info criterion | | 0.722038 |
| Sum squared resid | 3.643242 | Schwarz criterion |  | 0.811823 |
| Log likelihood | -10.27464 | Hannan-Quinn criter. | | 0.752657 |
| F-statistic | 2.762385 | Durbin-Watson stat | | 1.809430 |
| Prob(F-statistic) | 0.106271 |  | |  |

RGDP AT FIRST DIFFERENCE

Null Hypothesis: D(RGDP) has a unit root

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Exogenous: Constant |  |  |  |  |
| Bandwidth: 0 (Newey-West automatic) using Bartlett kernel | | | | |
|  |  | Adj. t-Stat | | Prob.\* |
| Phillips-Perron test statistic |  | -5.474709 | | 0.0001 |
| Test critical values: | 1% level | -3.646342 | |  |
|  |  | -2.954021 | |  |
|  | 5% level |  | |  |
|  | 10% level | -2.615817 | |  |
| \*MacKinnon (1996) one-sided p-values. | | | | |
| Residual variance (no correction) | |  |  | 0.119817 |
| HAC corrected variance (Bartlett kernel) | |  |  | 0.119817 |
| Phillips-Perron Test Equation | | | | |
| Dependent Variable: D(RGDP,2) | | | | |
| Method: Least Squares |  |  |  |  |
| Date: 09/09/21 Time: 01:39 | | | | |
| Sample (adjusted): 1988 2020 | | | | |
| Included observations: 33 after adjustments | | | | |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| D(RGDP(-1)) | -0.982834 | 0.179523 | -5.474709 | 0.0000 |
| C | -0.004136 | 0.062171 | -0.066524 | 0.9474 |
| R-squared | 0.491574 | Mean dependent var | | -0.001904 |
| Adjusted R-squared | 0.475173 | S.D. dependent var | | 0.492977 |
| S.E. of regression | 0.357137 | Akaike info criterion | | 0.837295 |
| Sum squared resid | 3.953945 | Schwarz criterion |  | 0.927993 |
| Log likelihood | -11.81537 | Hannan-Quinn criter. | | 0.867812 |
| F-statistic | 29.97244 | Durbin-Watson stat | | 2.000476 |
| Prob(F-statistic) | 0.000006 |  | |  |

FGBD AT LEVEL

|  |  |  |  |
| --- | --- | --- | --- |
| Null Hypothesis: FGBD has a unit root | | | |
| Exogenous: Constant |  |  |  |
| Bandwidth: 0 (Newey-West automatic) using Bartlett kernel | | | |
|  |  | Adj. t-Stat | Prob.\* |
| Phillips-Perron test statistic |  | -0.365593 | 0.9041 |
| Test critical values: | 1% level | -3.639407 |  |
|  | 5% level | -2.951125 |  |
| 10% level | | -2.614300 |  |
| \*MacKinnon (1996) one-sided p-values. | | | |
| Residual variance (no correction) | |  | 3.846814 |
| HAC corrected variance (Bartlett kernel) | |  | 3.846814 |
| Phillips-Perron Test Equation | |  |  |
| Dependent Variable: D(FGBD) | |  |  |
| Method: Least Squares | |  |  |
| Date: 09/09/21 Time: 01:39 | |  |  |
| Sample (adjusted): 1987 2020 | |  |  |
| Included observations: 34 after adjustments | |  |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| FGBD(-1) | -0.066313 | 0.181385 | -0.365593 | 0.7171 |
| C | 0.390012 | 2.007177 | 0.194309 | 0.8472 |
| R-squared | 0.004159 | Mean dependent var | | -0.332768 |
| Adjusted R-squared | -0.026961 | S.D. dependent var | | 1.994978 |
| S.E. of regression | 2.021692 | Akaike info criterion | | 4.302769 |
| Sum squared resid | 130.7917 | Schwarz criterion |  | 4.392555 |
| Log likelihood | -71.14708 | Hannan-Quinn criter. | | 4.333389 |
| F-statistic | 0.133658 | Durbin-Watson stat | | 1.953632 |
| Prob(F-statistic) | 0.717074 |  | |  |

FGBD AT FIRST DIFFERENCE

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Null Hypothesis: D(FGBD) has a unit root | | | | |
| Exogenous: Constant |  |  |  |  |
| Bandwidth: 0 (Newey-West automatic) using Bartlett kernel | | | | |
|  |  | Adj. t-Stat | | Prob.\* |
| Phillips-Perron test statistic |  | -5.797549 | | 0.0000 |
| Test critical values: | 1% level | -3.646342 | |  |
|  | 5% level | -2.954021 | |  |
|  | 10% level | -2.615817 | |  |
| \*MacKinnon (1996) one-sided p-values. | | | | |
| Residual variance (no correction) | |  |  | 3.969613 |
| HAC corrected variance (Bartlett kernel) | |  |  | 3.969613 |
| Phillips-Perron Test Equation | | | | |
| Dependent Variable: D(FGBD,2) | | | | |
| Method: Least Squares |  |  |  |  |
| Date: 09/09/21 Time: 01:40 | | | | |
| Sample (adjusted): 1988 2020 | | | | |
| Included observations: 33 after adjustments | | | | |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| D(FGBD(-1)) | -1.040371 | 0.179450 | -5.797549 | 0.0000 |
| C | -0.357243 | 0.363094 | -0.983886 | 0.3328 |
| R-squared | 0.520210 | Mean dependent var | | -0.000550 |
| Adjusted R-squared | 0.504733 | S.D. dependent var | | 2.920992 |
| S.E. of regression | 2.055655 | Akaike info criterion | | 4.337758 |
| Sum squared resid | 130.9972 | Schwarz criterion |  | 4.428455 |
| Log likelihood | -69.57300 | Hannan-Quinn criter. | | 4.368275 |
| F-statistic | 33.61157 | Durbin-Watson stat | | 2.000604 |
| Prob(F-statistic) | 0.000002 |  | |  |

FGDD AT LEVEL

|  |  |  |  |
| --- | --- | --- | --- |
| Null Hypothesis: FGDD has a unit root | | | |
| Exogenous: Constant |  |  |  |
| Bandwidth: 0 (Newey-West automatic) using Bartlett kernel | | | |
|  |  | Adj. t-Stat | Prob.\* |
| Phillips-Perron test statistic |  | -1.458542 | 0.5421 |
| Test critical values: | 1% level | -3.639407 |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | 5% level | -2.951125 | |  |
|  | 10% level | -2.614300 | |  |
| \*MacKinnon (1996) one-sided p-values. | | | | |
| Residual variance (no correction) | |  |  | 3.103550 |
| HAC corrected variance (Bartlett kernel) | |  |  | 3.103550 |
| Phillips-Perron Test Equation | | | | |
| Dependent Variable: D(FGDD) | | | | |
| Method: Least Squares |  |  |  |  |
| Date: 09/09/21 Time: 01:40 | | | | |
| Sample (adjusted): 1987 2020 | | | | |
| Included observations: 34 after adjustments | | | | |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| FGDD(-1) | -0.139498 | 0.095642 | -1.458542 | 0.1544 |
| C | 1.642727 | 1.060638 | 1.548809 | 0.1313 |
| R-squared | 0.062335 | Mean dependent var | | 0.163930 |
| Adjusted R-squared | 0.033033 | S.D. dependent var | | 1.846665 |
| S.E. of regression | 1.815908 | Akaike info criterion | | 4.088071 |
| Sum squared resid | 105.5207 | Schwarz criterion |  | 4.177857 |
| Log likelihood | -67.49720 | Hannan-Quinn criter. | | 4.118690 |
| F-statistic | 2.127344 | Durbin-Watson stat | | 2.241704 |
| Prob(F-statistic) | 0.154438 |  | |  |

FGDD AT FIRST DIFFERENCE

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Null Hypothesis: D(FGDD) has a unit root | | | | |
| Exogenous: Constant |  |  |  |  |
| Bandwidth: 4 (Newey-West automatic) using Bartlett kernel | | | | |
|  |  |  | Adj. t-Stat | Prob.\* |
| Phillips-Perron test statistic |  |  | -7.096184 | 0.0000 |
| Test critical values: | 1% level |  | -3.646342 |  |
|  | 5% level |  | -2.954021 |  |
|  | 10% level |  | -2.615817 |  |
| \*MacKinnon (1996) one-sided p-values. | | | | |
| Residual variance (no correction) | |  |  | 3.259526 |
| HAC corrected variance (Bartlett kernel) | |  |  | 2.558508 |
| Phillips-Perron Test Equation | | | | |
| Dependent Variable: D(FGDD,2) | | | | |
| Method: Least Squares |  |  |  |  |
| Date: 09/09/21 Time: 01:41 | | | | |
| Sample (adjusted): 1988 2020 | | | | |
| Included observations: 33 after adjustments | | | | |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| D(FGDD(-1)) | -1.210046 | 0.175600 | -6.890923 | 0.0000 |
| C | 0.201375 | 0.325580 | 0.618513 | 0.5408 |
| R-squared | 0.605019 | Mean dependent var | | -0.000285 |
| Adjusted R-squared | 0.592278 | S.D. dependent var | | 2.917234 |

|  |  |  |  |
| --- | --- | --- | --- |
| S.E. of regression | 1.862745 | Akaike info criterion | 4.140671 |
| Sum squared resid | 107.5644 | Schwarz criterion | 4.231368 |
| Log likelihood | -66.32107 | Hannan-Quinn criter. | 4.171188 |
| F-statistic | 47.48482 | Durbin-Watson stat | 2.042500 |
| Prob(F-statistic) | 0.000000 |  |  |

FGXD AT LEVEL

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Null Hypothesis: FGXD has a unit root | | | | |
| Exogenous: Constant |  |  |  |  |
| Bandwidth: 0 (Newey-West automatic) using Bartlett kernel | | | | |
|  |  | Adj. t-Stat | | Prob.\* |
| Phillips-Perron test statistic |  | -1.060606 | | 0.7197 |
| Test critical values: | 1% level | -3.639407 | |  |
|  | 5% level | -2.951125 | |  |
|  | 10% level | -2.614300 | |  |
| \*MacKinnon (1996) one-sided p-values. | | | | |
| Residual variance (no correction) | |  |  | 1.665301 |
| HAC corrected variance (Bartlett kernel) | |  |  | 1.665301 |
| Phillips-Perron Test Equation | | | | |
| Dependent Variable: D(FGXD) | | | | |
| Method: Least Squares |  |  |  |  |
| Date: 09/09/21 Time: 01:41 | | | | |
| Sample (adjusted): 1987 2020 | | | | |
| Included observations: 34 after adjustments | | | | |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| FGXD(-1) | -0.081772 | 0.077099 | -1.060606 | 0.2968 |
| C | 1.048669 | 0.863840 | 1.213962 | 0.2336 |
| R-squared | 0.033959 | Mean dependent var | | 0.165000 |
| Adjusted R-squared | 0.003770 | S.D. dependent var | | 1.332696 |
| S.E. of regression | 1.330181 | Akaike info criterion | | 3.465530 |
| Sum squared resid | 56.62024 | Schwarz criterion |  | 3.555316 |
| Log likelihood | -56.91401 | Hannan-Quinn criter. | | 3.496150 |
| F-statistic | 1.124885 | Durbin-Watson stat | | 2.095134 |
| Prob(F-statistic) | 0.296809 |  | |  |

FGXD AT FIRST DIFFERENCE

|  |  |  |  |
| --- | --- | --- | --- |
| Null Hypothesis: D(FGXD) has a unit root | | | |
| Exogenous: Constant |  |  |  |
| Bandwidth: 2 (Newey-West automatic) using Bartlett kernel | | | |
|  |  | Adj. t-Stat | Prob.\* |
| Phillips-Perron test statistic |  | -6.159177 | 0.0000 |
| Test critical values: | 1% level | -3.646342 |  |
|  | 5% level | -2.954021 |  |
| 10% level | | -2.615817 |  |
| \*MacKinnon (1996) one-sided p-values. | | | |
| Residual variance (no correction) | |  | 1.758627 |
| HAC corrected variance (Bartlett kernel) | |  | 1.671950 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Phillips-Perron Test Equation | | | | |
| Dependent Variable: D(FGXD,2) | | | | |
| Method: Least Squares |  |  |  |  |
| Date: 09/09/21 Time: 01:42 | | | | |
| Sample (adjusted): 1988 2020 | | | | |
| Included observations: 33 after adjustments | | | | |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| D(FGXD(-1)) | -1.098540 | 0.178730 | -6.146352 | 0.0000 |
| C | 0.183965 | 0.240052 | 0.766358 | 0.4493 |
| R-squared | 0.549272 | Mean dependent var | | 0.000100 |
| Adjusted R-squared | 0.534733 | S.D. dependent var | | 2.005911 |
| S.E. of regression | 1.368242 | Akaike info criterion | | 3.523622 |
| Sum squared resid | 58.03468 | Schwarz criterion |  | 3.614320 |
| Log likelihood | -56.13977 | Hannan-Quinn criter. | | 3.554139 |
| F-statistic | 37.77764 | Durbin-Watson stat | | 2.010822 |
| Prob(F-statistic) | 0.000001 |  | |  |

FOER AT LEVEL

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Null Hypothesis: FOER has a unit root | | | | |
| Exogenous: Constant |  |  |  |  |
| Bandwidth: 2 (Newey-West automatic) using Bartlett kernel | | | | |
|  |  | Adj. t-Stat | | Prob.\* |
| Phillips-Perron test statistic |  | -1.245506 | | 0.6430 |
| Test critical values: | 1% level | -3.639407 | |  |
|  | 5% level | -2.951125 | |  |
|  | 10% level | -2.614300 | |  |
| \*MacKinnon (1996) one-sided p-values. | | | | |
| Residual variance (no correction) | |  |  | 0.042767 |
| HAC corrected variance (Bartlett kernel) | |  |  | 0.038725 |
| Phillips-Perron Test Equation | | | | |
| Dependent Variable: D(FOER) | | | | |
| Method: Least Squares |  |  |  |  |
| Date: 09/09/21 Time: 01:42 | | | | |
| Sample (adjusted): 1987 2020 | | | | |
| Included observations: 34 after adjustments | | | | |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| FOER(-1) | -0.085802 | 0.066567 | -1.288947 | 0.2067 |
| C | 0.796087 | 0.608286 | 1.308738 | 0.1999 |
| R-squared | 0.049356 | Mean dependent var | | 0.013456 |
| Adjusted R-squared | 0.019648 | S.D. dependent var | | 0.215291 |
| S.E. of regression | 0.213166 | Akaike info criterion | | -0.196470 |
| Sum squared resid | 1.454070 | Schwarz criterion |  | -0.106684 |
| Log likelihood | 5.339986 | Hannan-Quinn criter. | | -0.165850 |
| F-statistic | 1.661384 | Durbin-Watson stat | | 1.977219 |
| Prob(F-statistic) | 0.206657 |  | |  |

FOER AT FIRST DIFFERENCE

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Null Hypothesis: D(FOER) has a unit root | | | | |
| Exogenous: Constant |  |  |  |  |
| Bandwidth: 0 (Newey-West automatic) using Bartlett kernel | | | | |
|  |  | Adj. t-Stat | | Prob.\* |
| Phillips-Perron test statistic |  | -5.853191 | | 0.0000 |
| Test critical values: | 1% level | -3.646342 | |  |
|  | 5% level | -2.954021 | |  |
|  | 10% level | -2.615817 | |  |
| \*MacKinnon (1996) one-sided p-values. | | | | |
| Residual variance (no correction) | |  |  | 0.045124 |
| HAC corrected variance (Bartlett kernel) | |  |  | 0.045124 |
| Phillips-Perron Test Equation | | | | |
| Dependent Variable: D(FOER,2) | | | | |
| Method: Least Squares |  |  |  |  |
| Date: 09/09/21 Time: 01:43 | | | | |
| Sample (adjusted): 1988 2020 | | | | |
| Included observations: 33 after adjustments | | | | |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| D(FOER(-1)) | -1.039314 | 0.177564 | -5.853191 | 0.0000 |
| C | 0.019906 | 0.038255 | 0.520344 | 0.6065 |
| R-squared | 0.524976 | Mean dependent var | | 0.003508 |
| Adjusted R-squared | 0.509653 | S.D. dependent var | | 0.312986 |
| S.E. of regression | 0.219168 | Akaike info criterion | | -0.139263 |
| Sum squared resid | 1.489076 | Schwarz criterion |  | -0.048565 |
| Log likelihood | 4.297838 | Hannan-Quinn criter. | | -0.108746 |
| F-statistic | 34.25985 | Durbin-Watson stat | | 2.010292 |
| Prob(F-statistic) | 0.000002 |  | |  |

BRMS AT LEVEL

|  |  |  |  |
| --- | --- | --- | --- |
| Null Hypothesis: BRMS has a unit root | | | |
| Exogenous: Constant |  |  |  |
| Bandwidth: 3 (Newey-West automatic) using Bartlett kernel | | | |
|  |  | Adj. t-Stat | Prob.\* |
| Phillips-Perron test statistic |  | -1.114762 | 0.6986 |
| Test critical values: | 1% level | -3.639407 |  |
|  | 5% level | -2.951125 |  |
| 10% level | | -2.614300 |  |
| \*MacKinnon (1996) one-sided p-values. | | | |
| Residual variance (no correction) | |  | 0.000754 |
| HAC corrected variance (Bartlett kernel) | |  | 0.001758 |
| Phillips-Perron Test Equation | |  |  |
| Dependent Variable: D(BRMS) | |  |  |
| Method: Least Squares | |  |  |
| Date: 09/09/21 Time: 01:49 | |  |  |
| Sample (adjusted): 1987 2020 | |  |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Included observations: 34 after adjustments | | | | |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| BRMS(-1) | -0.012158 | 0.007959 | -1.527480 | 0.1365 |
| C | 0.202992 | 0.092732 | 2.189006 | 0.0360 |
| R-squared | 0.067957 | Mean dependent var | | 0.061539 |
| Adjusted R-squared | 0.038831 | S.D. dependent var | | 0.028871 |
| S.E. of regression | 0.028305 | Akaike info criterion | | -4.234557 |
| Sum squared resid | 0.025637 | Schwarz criterion |  | -4.144771 |
| Log likelihood | 73.98747 | Hannan-Quinn criter. | | -4.203938 |
| F-statistic | 2.333194 | Durbin-Watson stat | | 0.715310 |
| Prob(F-statistic) | 0.136467 |  | |  |

BRMS AT FIRST DIFFERENCE

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Null Hypothesis: D(BRMS) has a unit root | | | | |
| Exogenous: Constant, Linear Trend | | | | |
| Bandwidth: 1 (Newey-West automatic) using Bartlett kernel | | | | |
|  |  | Adj. t-Stat | | Prob.\* |
| Phillips-Perron test statistic |  | -5.696724 | | 0.0000 |
| Test critical values: | 1% level | -3.646342 | |  |
|  | 5% level | -2.954021 | |  |
|  | 10% level | -2.615817 | |  |
| \*MacKinnon (1996) one-sided p-values. | | | | |
| Residual variance (no correction) | |  |  | 0.000451 |
| HAC corrected variance (Bartlett kernel) | |  |  | 0.000455 |
| Phillips-Perron Test Equation | | | | |
| Dependent Variable: D(BRMS,2) | | | | |
| Method: Least Squares |  |  |  |  |
| Date: 09/09/21 Time: 02:03 | | | | |
| Sample (adjusted): 1988 2020 | | | | |
| Included observations: 33 after adjustments | | | | |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| D(BRMS(-1)) | -0.372316 | 0.138398 | -2.690182 | 0.0116 |
| C | 0.030424 | 0.013252 | 2.295689 | 0.0289 |
| R-squared | 0.196594 | Mean dependent var | | 0.000251 |
| Adjusted R-squared | 0.143034 | S.D. dependent var | | 0.024063 |
| S.E. of regression | 0.022276 | Akaike info criterion | | -4.684135 |
| Sum squared resid | 0.014886 | Schwarz criterion |  | -4.548089 |
| Log likelihood | 80.28822 | Hannan-Quinn criter. | | -4.638359 |
| F-statistic | 3.670512 | Durbin-Watson stat | | 1.941207 |
| Prob(F-statistic) | 0.037499 |  | |  |

**FULLY MODIFIED OLS**

|  |
| --- |
| Dependent Variable: RGDP |
| Method: Fully Modified Least Squares (FMOLS) |
| Date: 09/09/21 Time: 01:54 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Sample (adjusted): 1987 2020 | | | | |
| Included observations: 34 after adjustments | | | | |
| Cointegrating equation deterministics: C @TREND | | | | |
| Long-run covariance estimate (Bartlett kernel, Newey-West fixed | | | | |
| bandwidth = 4.0000) | | | | |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| FGBD | 0.171096 | 0.004429 | 38.62767 | 0.0000 |
| FGDD | -0.003265 | 0.003732 | -0.874848 | 0.3894 |
| FGXD | -0.008868 | 0.004868 | -1.821606 | 0.0796 |
| FOER | 0.054525 | 0.042833 | 1.272942 | 0.2139 |
| BRMS | 0.978269 | 0.096346 | 10.15376 | 0.0000 |
| C | -1.525601 | 1.015913 | -1.501704 | 0.1448 |
| @TREND | -0.004573 | 0.006370 | -0.717926 | 0.4790 |
| R-squared | 0.996541 | Mean dependent var | | 12.01050 |
| Adjusted R-squared | 0.995772 | S.D. dependent var | | 0.591289 |
| S.E. of regression | 0.038446 | Sum squared resid | | 0.039908 |
| Long-run variance | 0.001351 |  | |  |

WALD TEST

|  |  |  |  |
| --- | --- | --- | --- |
| Wald Test: |  |  |  |
| Equation: Untitled | | | |
| Test Statistic | Value | df | Probability |
| F-statistic | 867.5724 | (4, 27) | 0.0000 |
| Chi-square | 3470.290 | 4 | 0.0000 |
| Null Hypothesis: C(1)=C(2)=C(3)=C(4)=C(5) | | | |
| Null Hypothesis Summary: | | | |
| Normalized Restriction (= 0) | | Value | Std. Err. |
| C(1) - C(5) |  | -0.807173 | 0.096313 |
| C(2) - C(5) |  | -0.981535 | 0.096577 |
| C(3) - C(5) |  | -0.987138 | 0.094925 |
| C(4) - C(5) |  | -0.923745 | 0.112472 |
| Restrictions are linear in coefficients. | | |  |

COINTEGRATION TEST

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Date: 09/09/21 Time: 01:56 | | | | |
| Sample (adjusted): 1988 2020 | | | | |
| Included observations: 33 after adjustments | | | | |
| Trend assumption: No deterministic trend | | | | |
| Series: RGDP FGBD FGDD FGXD FOER BRMS | | | | |
| Lags interval (in first differences): 1 to 1 | | | | |
| Unrestricted Cointegration Rank Test (Trace) | | | | |
| Hypothesized |  | Trace | 0.05 |  |
| No. of CE(s) | Eigenvalue | Statistic | Critical Value | Prob.\*\* |
| None \* | 0.860616 | 133.2266 | 83.93712 | 0.0000 |
| At most 1 \* | 0.634800 | 68.19942 | 60.06141 | 0.0088 |
| At most 2 | 0.383743 | 34.95821 | 40.17493 | 0.1519 |
| At most 3 | 0.340789 | 18.98322 | 24.27596 | 0.2012 |
| At most 4 | 0.081301 | 5.231754 | 12.32090 | 0.5355 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| At most 5 | 0.071088 | 2.433471 | 4.129906 | 0.1403 |  |  |
| Trace test indicates 2 cointegrating eqn(s) at the 0.05 level | | | | | | |
| \* denotes rejection of the hypothesis at the 0.05 level | | | | | | |
| \*\*MacKinnon-Haug-Michelis (1999) p-values | | | | | | |
| Unrestricted Cointegration Rank Test (Maximum Eigenvalue) | | | | | | |
| Hypothesized |  | Max-Eigen | 0.05 |  |  |  |
| No. of CE(s) | Eigenvalue | Statistic | Critical Value | Prob.\*\* |  |  |
| None \* | 0.860616 | 65.02715 | 36.63019 | 0.0000 |  |  |
| At most 1 \* | 0.634800 | 33.24120 | 30.43961 | 0.0218 |  |  |
| At most 2 | 0.383743 | 15.97500 | 24.15921 | 0.4237 |  |  |
| At most 3 | 0.340789 | 13.75146 | 17.79730 | 0.1834 |  |  |
| At most 4 | 0.081301 | 2.798283 | 11.22480 | 0.8183 |  |  |
| At most 5 | 0.071088 | 2.433471 | 4.129906 | 0.1403 |  |  |
| Max-eigenvalue test indicates 2 cointegrating eqn(s) at the 0.05 level | | | | | | |
| \* denotes rejection of the hypothesis at the 0.05 level | | | | | | |
| \*\*MacKinnon-Haug-Michelis (1999) p-values | | | | | | |
| Unrestricted Cointegrating Coefficients (normalized by b'\*S11\*b=I): | | | | | | |
| RGDP | FGBD | FGDD | FGXD | FOER | BRMS |  |
| -18.54289 | 2.422539 | -10.61168 | 11.69356 | 1.763921 | 14.54007 |  |
| 30.52537 | -3.025912 | -6.353123 | 7.569683 | -4.890650 | -26.06804 |  |
| -26.32452 | 3.742610 | -1.076832 | 1.390808 | -7.652446 | 29.62662 |  |
| 5.187900 | 1.367487 | -2.252860 | 2.725937 | 0.467369 | -7.326408 |  |
| -10.69631 | 2.518227 | -3.654384 | 4.307413 | 1.080054 | 7.131531 |  |
| -14.46452 | 0.824631 | 0.686553 | -0.527421 | -0.288418 | 14.36980 |  |
| Unrestricted Adjustment Coefficients (alpha): | | | | | | |
| D(RGDP) | 0.014507 | -0.085002 | -0.004042 | -0.045138 | 0.034454 | -0.076982 |
| D(FGBD) | 0.077375 | -0.425682 | -0.083790 | -0.295092 | 0.185624 | -0.457454 |
| D(FGDD) | -0.220743 | 0.015225 | 0.017579 | -0.002361 | 0.025367 | -0.007681 |
| D(FGXD) | 1.157346 | 0.022384 | -0.052604 | -0.010523 | -0.002041 | -0.014156 |
| D(FOER) | 0.006895 | -0.003644 | 0.053042 | -0.083849 | 0.005286 | -0.030698 |
| D(BRMS) | -3.43E-05 | 0.001890 | 0.004843 | 0.011696 | -0.001340 | -0.000802 |
| 1 Cointegrating Equation(s): | | Log likelihood | 118.7678 |  |  |  |
| Normalized cointegrating coefficients (standard error in parentheses) | | | |  |  |  |
| RGDP | FGBD | FGDD | FGXD | FOER | BRMS |  |
| 1.000000 | -0.130645 | 0.572277 | -0.630622 | -0.095127 | -0.784131 |  |
|  | (0.01130) | (0.05582) | (0.06332) | (0.03969) | (0.03132) |  |
| Adjustment coefficients (standard error in parentheses) | | | |  |  |  |
| D(RGDP) | -0.268993 |  |  |  |  |  |
|  | (1.23537) |  |  |  |  |  |
| D(FGBD) | -1.434750 |  |  |  |  |  |
|  | (7.20716) |  |  |  |  |  |
| D(FGDD) | 4.093216 |  |  |  |  |  |
|  | (0.48550) |  |  |  |  |  |
| D(FGXD) | -21.46054 |  |  |  |  |  |
|  | (1.73693) |  |  |  |  |  |
| D(FOER) | -0.127851 |  |  |  |  |  |
|  | (0.74164) |  |  |  |  |  |
| D(BRMS) | 0.000635 |  |  |  |  |  |
|  | (0.08126) |  |  |  |  |  |
| 2 Cointegrating Equation(s): | | Log likelihood | 135.3884 |  |  |  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Normalized cointegrating coefficients (standard error in parentheses) | | | | | |
| RGDP | FGBD | FGDD | FGXD | FOER | BRMS |
| 1.000000 | 0.000000 | -2.662634 | 3.011341 | -0.364934 | -1.073665 |
|  |  | (0.27931) | (0.31411) | (0.22175) | (0.17165) |
| 0.000000 | 1.000000 | -24.76106 | 27.87675 | -2.065190 | -2.216181 |
|  |  | (2.36617) | (2.66098) | (1.87852) | (1.45416) |
| Adjustment coefficients (standard error in parentheses) | | | | | |
| D(RGDP) | -2.863724 | 0.292353 |  |  |  |
|  | (2.30380) | (0.25003) |  |  |  |
| D(FGBD) | -14.42885 | 1.475520 |  |  |  |
|  | (13.5580) | (1.47142) |  |  |  |
| D(FGDD) | 4.557972 | -0.580829 |  |  |  |
|  | (0.92903) | (0.10083) |  |  |  |
| D(FGXD) | -20.77726 | 2.735983 |  |  |  |
|  | (3.34189) | (0.36269) |  |  |  |
| D(FOER) | -0.239090 | 0.027730 |  |  |  |
|  | (1.42827) | (0.15501) |  |  |  |
| D(BRMS) | 0.058334 | -0.005803 |  |  |  |
|  | (0.15595) | (0.01692) |  |  |  |
| 3 Cointegrating Equation(s): | | Log likelihood | 143.3759 |  |  |
| Normalized cointegrating coefficients (standard error in parentheses) | | | | | |
| RGDP | FGBD | FGDD | FGXD | FOER | BRMS |
| 1.000000 | 0.000000 | 0.000000 | 0.080315 | -1.545070 | 0.122231 |
|  |  |  | (0.01917) | (0.31482) | (0.24088) |
| 0.000000 | 1.000000 | 0.000000 | 0.619803 | -13.03982 | 8.904999 |
|  |  |  | (0.17048) | (2.79956) | (2.14210) |
| 0.000000 | 0.000000 | 1.000000 | -1.100799 | -0.443221 | 0.449140 |
|  |  |  | (0.00766) | (0.12572) | (0.09620) |
| Adjustment coefficients (standard error in parentheses) | | | | | |
| D(RGDP) | -2.757332 | 0.277227 | 0.390445 |  |  |
|  | (2.86173) | (0.34753) | (0.80074) |  |  |
| D(FGBD) | -12.22312 | 1.161927 | 1.973563 |  |  |
|  | (16.8269) | (2.04344) | (4.70832) |  |  |
| D(FGDD) | 4.095201 | -0.515036 | 2.226798 |  |  |
|  | (1.14393) | (0.13892) | (0.32008) |  |  |
| D(FGXD) | -19.39249 | 2.539109 | -12.36694 |  |  |
|  | (4.12622) | (0.50108) | (1.15456) |  |  |
| D(FOER) | -1.635403 | 0.226247 | -0.107132 |  |  |
|  | (1.71322) | (0.20805) | (0.47937) |  |  |
| D(BRMS) | -0.069158 | 0.012323 | -0.016860 |  |  |
|  | (0.18909) | (0.02296) | (0.05291) |  |  |
| 4 Cointegrating Equation(s): | | Log likelihood | 150.2516 |  |  |
| Normalized cointegrating coefficients (standard error in parentheses) | | | | | |
| RGDP | FGBD | FGDD | FGXD | FOER | BRMS |
| 1.000000 | 0.000000 | 0.000000 | 0.000000 | 0.451767 | -1.386355 |
|  |  |  |  | (0.17080) | (0.13663) |
| 0.000000 | 1.000000 | 0.000000 | 0.000000 | 2.370111 | -2.737010 |
|  |  |  |  | (1.21816) | (0.97448) |
| 0.000000 | 0.000000 | 1.000000 | 0.000000 | -27.81196 | 21.12588 |
|  |  |  |  | (4.91496) | (3.93178) |
| 0.000000 | 0.000000 | 0.000000 | 1.000000 | -24.86261 | 18.78339 |
|  |  |  |  | (4.40279) | (3.52206) |
| Adjustment coefficients (standard error in parentheses) | | |  |  |  |
| D(RGDP) | -2.991501 | 0.215501 | 0.492134 | -0.602473 |  |
|  | (2.85396) | (0.35515) | (0.80611) | (0.91117) |  |
| D(FGBD) | -13.75403 | 0.758392 | 2.638365 | -3.238432 |  |
|  | (16.7431) | (2.08353) | (4.72917) | (5.34549) |  |
| D(FGDD) | 4.082954 | -0.518264 | 2.232116 | -2.448008 |  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | (1.15154) | (0.14330) | (0.32526) | (0.36765) |  |
| D(FGXD) | -19.44709 | 2.524718 | -12.34324 | 13.60108 |  |
|  | (4.15331) | (0.51684) | (1.17312) | (1.32601) |  |
| D(FOER) | -2.070406 | 0.111584 | 0.081769 | -0.101757 |  |
|  | (1.56065) | (0.19421) | (0.44081) | (0.49826) |  |
| D(BRMS) | -0.008482 | 0.028317 | -0.043209 | 0.052525 |  |
|  | (0.16045) | (0.01997) | (0.04532) | (0.05123) |  |
| 5 Cointegrating Equation(s): | | Log likelihood | 151.6508 |  |  |
| Normalized cointegrating coefficients (standard error in parentheses) | | | | | |
| RGDP | FGBD | FGDD | FGXD | FOER | BRMS |
| 1.000000 | 0.000000 | 0.000000 | 0.000000 | 0.000000 | -1.009112 |
|  |  |  |  |  | (0.01275) |
| 0.000000 | 1.000000 | 0.000000 | 0.000000 | 0.000000 | -0.757878 |
|  |  |  |  |  | (0.07306) |
| 0.000000 | 0.000000 | 1.000000 | 0.000000 | 0.000000 | -2.098155 |
|  |  |  |  |  | (0.70832) |
| 0.000000 | 0.000000 | 0.000000 | 1.000000 | 0.000000 | -1.977825 |
|  |  |  |  |  | (0.63343) |
| 0.000000 | 0.000000 | 0.000000 | 0.000000 | 1.000000 | -0.835038 |
|  |  |  |  |  | (0.02548) |
| Adjustment coefficients (standard error in parentheses) | | | | | |
| D(RGDP) | -3.360034 | 0.302265 | 0.366225 | -0.454064 | 0.488350 |
|  | (2.91817) | (0.38770) | (0.83454) | (0.94648) | (0.59248) |
| D(FGBD) | -15.73952 | 1.225834 | 1.960024 | -2.438874 | 2.922109 |
|  | (17.1350) | (2.27653) | (4.90025) | (5.55756) | (3.47893) |
| D(FGDD) | 3.811620 | -0.454384 | 2.139415 | -2.338741 | -0.572066 |
|  | (1.16183) | (0.15436) | (0.33226) | (0.37683) | (0.23589) |
| D(FGXD) | -19.42525 | 2.519578 | -12.33578 | 13.59229 | 2.327418 |
|  | (4.27067) | (0.56740) | (1.22132) | (1.38515) | (0.86708) |
| D(FOER) | -2.126949 | 0.124895 | 0.062451 | -0.078987 | -0.409398 |
|  | (1.60406) | (0.21311) | (0.45873) | (0.52026) | (0.32567) |
| D(BRMS) | 0.005846 | 0.024943 | -0.038313 | 0.046755 | -0.042347 |
|  | (0.16455) | (0.02186) | (0.04706) | (0.05337) | (0.03341) |

VECM REGRESSION RESULT

|  |  |
| --- | --- |
| Vector Error Correction Estimates | |
| Date: 09/09/21 Time: 01:57 | |
| Sample (adjusted): 1989 2020 | |
| Included observations: 32 after adjustments | |
| Standard errors in ( ) & t-statistics in [ ] | |
| Cointegrating Eq: | CointEq1 |
| RGDP(-1) | 1.000000 |
| FGBD(-1) | 0.068132 |
|  | (0.01539) |
|  | [ 4.42565] |
| FGDD(-1) | 0.370124 |
|  | (0.03387) |
|  | [ 10.9283] |
| FGXD(-1) | -0.433858 |
|  | (0.03791) |
|  | [-11.4453] |
| FOER(-1) | 0.048846 |
|  | (0.01679) |
|  | [ 2.90959] |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| BRMS(-1) | -0.851806 |  |  |  |  |  |
|  | (0.01255) |  |  |  |  |  |
|  | [-67.8828] |  |  |  |  |  |
| C | -2.514827 |  |  |  |  |  |
| Error Correction: | D(RGDP) | D(FGBD) | D(FGDD) | D(FGXD) | D(FOER) | D(BRMS) |
| CointEq1 | -0.103872 | -61.69607 | 1.457810 | -27.55083 | -7.891440 | 0.461140 |
|  | (0.04003) | (23.5020) | (2.21555) | (8.45777) | (1.84582) | (0.26730) |
|  | [-2.59466] | [-2.62514] | [ 0.65799] | [-3.25746] | [-4.27530] | [ 1.72521] |
| D(RGDP(-1)) | 14.41028 | 83.32776 | 0.015237 | 15.99840 | 9.408970 | -0.440209 |
|  | (5.03431) | (29.5547) | (2.78614) | (10.6360) | (2.32119) | (0.33613) |
|  | [ 2.86241] | [ 2.81944] | [ 0.00547] | [ 1.50418] | [ 4.05350] | [-1.30962] |
| D(RGDP(-2)) | -2.380313 | -12.91797 | 3.107799 | -7.510314 | -1.243878 | -0.398404 |
|  | (3.49623) | (20.5252) | (1.93492) | (7.38649) | (1.61202) | (0.23344) |
|  | [-0.68082] | [-0.62937] | [ 1.60616] | [-1.01676] | [-0.77162] | [-1.70667] |
| D(FGBD(-1)) | 0.087726 | 0.841369 | -0.434522 | 4.295754 | 0.340857 | -0.034137 |
|  | (0.56544) | (3.31953) | (0.31293) | (1.19462) | (0.26071) | (0.03775) |
|  | [ 0.15515] | [ 0.25346] | [-1.38854] | [ 3.59593] | [ 1.30740] | [-0.90419] |
| D(FGBD(-2)) | 2.249878 | 12.43469 | -0.158593 | 3.118296 | 1.529718 | -0.037292 |
|  | (0.99184) | (5.82275) | (0.54891) | (2.09546) | (0.45731) | (0.06622) |
|  | [ 2.26839] | [ 2.13553] | [-0.28892] | [ 1.48812] | [ 3.34502] | [-0.56312] |
| D(FGDD(-1)) | 2.283304 | 14.03714 | 1.814463 | -4.151786 | 1.796845 | -0.106769 |
|  | (1.41480) | (8.30579) | (0.78299) | (2.98904) | (0.65233) | (0.09446) |
|  | [ 1.61387] | [ 1.69004] | [ 2.31735] | [-1.38900] | [ 2.75452] | [-1.13026] |
| D(FGDD(-2)) | -0.037224 | -0.217514 | 0.002107 | -0.107498 | -0.046048 | 0.003453 |
|  | (0.04675) | (0.27445) | (0.02587) | (0.09877) | (0.02156) | (0.00312) |
|  | [-0.79623] | [-0.79254] | [ 0.08144] | [-1.08838] | [-2.13629] | [ 1.10627] |
| D(FGXD(-1)) | -5.028604 | -29.79890 | 2.467404 | -15.25371 | -3.798692 | 0.223792 |
|  | (1.90133) | (11.1621) | (1.05225) | (4.01694) | (0.87666) | (0.12695) |
|  | [-2.64478] | [-2.66966] | [ 2.34487] | [-3.79734] | [-4.33316] | [ 1.76284] |
| D(FGXD(-2)) | -3.312891 | -20.30062 | -2.417576 | 5.121182 | -2.590334 | 0.155510 |
|  | (1.96451) | (11.5330) | (1.08722) | (4.15043) | (0.90579) | (0.13117) |
|  | [-1.68637] | [-1.76022] | [-2.22363] | [ 1.23389] | [-2.85976] | [ 1.18558] |
| D(FOER(-1)) | -0.102466 | -0.357473 | -0.041609 | 0.443920 | -0.092043 | -0.027955 |
|  | (0.47934) | (2.81406) | (0.26528) | (1.01271) | (0.22101) | (0.03201) |
|  | [-0.21376] | [-0.12703] | [-0.15685] | [ 0.43835] | [-0.41646] | [-0.87345] |
| D(FOER(-2)) | 0.129677 | 0.531783 | -0.437136 | 1.754309 | -0.256165 | 0.006130 |
|  | (0.43667) | (2.56356) | (0.24167) | (0.92256) | (0.20134) | (0.02916) |
|  | [ 0.29697] | [ 0.20744] | [-1.80883] | [ 1.90157] | [-1.27231] | [ 0.21024] |
| D(BRMS(-1)) | -8.741720 | -53.87430 | -0.821485 | -8.693404 | -3.023684 | 0.982672 |
|  | (4.58239) | (26.9017) | (2.53603) | (9.68122) | (2.11282) | (0.30596) |
|  | [-1.90768] | [-2.00264] | [-0.32393] | [-0.89797] | [-1.43111] | [ 3.21176] |
| D(BRMS(-2)) | -2.126324 | -16.07903 | -0.112778 | -9.432225 | -3.815347 | 0.480396 |
|  | (4.85344) | (28.4929) | (2.68604) | (10.2539) | (2.23780) | (0.32406) |
|  | [-0.43811] | [-0.56432] | [-0.04199] | [-0.91987] | [-1.70496] | [ 1.48244] |
| C | 1.920687 | 11.48321 | -0.393576 | 5.642162 | 1.469476 | -0.065044 |
|  | (0.84063) | (4.93505) | (0.46523) | (1.77600) | (0.38759) | (0.05613) |
|  | [ 2.28482] | [ 2.32687] | [-0.84598] | [ 3.17689] | [ 3.79128] | [-1.15885] |
| R-squared | 0.899754 | 0.376301 | 0.993541 | 0.819168 | 0.661832 | 0.599730 |
| Adj. R-squared | -0.783756 | -0.074148 | 0.988876 | 0.688567 | 0.417599 | 0.310646 |
| Sum sq. resids | 2.371993 | 81.74994 | 0.726507 | 10.58741 | 0.504262 | 0.010575 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| S.E. equation | 0.363012 | 2.131118 | 0.200902 | 0.766935 | 0.167375 | 0.024238 |
| F-statistic | 0.922133 | 0.835391 | 212.9746 | 6.272304 | 2.709843 | 2.074587 |
| Log likelihood | -3.773947 | -60.41290 | 15.15787 | -27.70891 | 21.00029 | 82.83467 |
| Akaike AIC | 1.110872 | 4.650806 | -0.072367 | 2.606807 | -0.437518 | -4.302167 |
| Schwarz SC | 1.752131 | 5.292066 | 0.568893 | 3.248066 | 0.203741 | -3.660908 |
| Mean dependent | -0.005971 | -0.354847 | 0.173578 | 0.174715 | 0.019794 | 0.062903 |
| S.D. dependent | 0.357035 | 2.056247 | 1.904783 | 1.374284 | 0.219321 | 0.029193 |
| Determinant resid covariance (dof adj.) | | 2.94E-11 |  |  |  |  |
| Determinant resid covariance |  | 9.31E-13 |  |  |  |  |
| Log likelihood |  | 170.8015 |  |  |  |  |
| Akaike information criterion |  | -5.050092 |  |  |  |  |
| Schwarz criterion |  | -0.927710 |  |  |  |  |

VECM ESTIMATES

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Dependent Variable: D(RGDP) | | | | |
| Method: Least Squares (Gauss-Newton / Marquardt steps) | | | | |
| Date: 09/09/21 Time: 01:58 | | | | |
| Sample (adjusted): 1989 2020 | | | | |
| Included observations: 32 after adjustments | | | | |
| D(RGDP) = C(1)\*( RGDP(-1) + 0.0681319903112\*FGBD(-1) + | | | | |
| 0.370123859892\*FGDD(-1) - 0.433857821226\*FGXD(-1) + | | | | |
| 0.0488460357328\*FOER(-1) - 0.851805543038\*BRMS(-1) - | | | | |
| 2.51482677771 ) + C(2)\*D(RGDP(-1)) + C(3)\*D(RGDP(-2)) + C(4) | | | | |
| \*D(FGBD(-1)) + C(5)\*D(FGBD(-2)) + C(6)\*D(FGDD(-1)) + C(7) | | | | |
| \*D(FGDD(-2)) + C(8)\*D(FGXD(-1)) + C(9)\*D(FGXD(-2)) + C(10) | | | | |
| \*D(FOER(-1)) + C(11)\*D(FOER(-2)) + C(12)\*D(BRMS(-1)) + C(13) | | | | |
| \*D(BRMS(-2)) + C(14) | | | | |
|  | Coefficient | Std. Error | t-Statistic | Prob. |
| C(1) | -0.103872 | 0.004003 | -2.594661 | 0.0183 |
| C(2) | 14.41028 | 5.034312 | 2.862412 | 0.0104 |
| C(3) | -2.380313 | 3.496232 | -0.680822 | 0.5046 |
| C(4) | 0.087726 | 0.565445 | 0.155145 | 0.8784 |
| C(5) | 2.249878 | 0.991839 | 2.268390 | 0.0358 |
| C(6) | 2.283304 | 1.414796 | 1.613874 | 0.1239 |
| C(7) | -0.037224 | 0.046750 | -0.796231 | 0.4363 |
| C(8) | -5.028604 | 1.901331 | -2.644782 | 0.0165 |
| C(9) | -3.312891 | 1.964511 | -1.686369 | 0.1090 |
| C(10) | -0.102466 | 0.479343 | -0.213762 | 0.8331 |
| C(11) | 0.129677 | 0.436673 | 0.296967 | 0.7699 |
| C(12) | -8.741720 | 4.582389 | -1.907677 | 0.0725 |
| C(13) | -2.126324 | 4.853440 | -0.438107 | 0.6665 |
| C(14) | 1.920687 | 0.840630 | 2.284819 | 0.0347 |
| R-squared | 0.899754 | Mean dependent var | | -0.005971 |
| Adjusted R-squared | -0.783756 | S.D. dependent var | | 0.357035 |
| S.E. of regression | 0.363012 | Akaike info criterion | | 1.110872 |
| Sum squared resid | 2.371993 | Schwarz criterion |  | 1.752131 |
| Log likelihood | -3.773947 | Hannan-Quinn criter. | | 1.323431 |
| F-statistic | 0.922133 | Durbin-Watson stat | | 2.110473 |
| Prob(F-statistic) | 0.550397 |  | |  |

# APPENDIX 5: SOUTH AFRICA REGRESSION RESULT

FGBD AT FIRST DIFFERENCE

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Null Hypothesis: D(FGBD) has a unit root | | | | |
| Exogenous: Constant |  |  |  |  |
| Bandwidth: 10 (Newey-West automatic) using Bartlett kernel | | | | |
|  |  | Adj. t-Stat | | Prob.\* |
| Phillips-Perron test statistic |  | -4.194388 | | 0.0025 |
| Test critical values: | 1% level | -3.646342 | |  |
|  | 5% level | -2.954021 | |  |
|  | 10% level | -2.615817 | |  |
| \*MacKinnon (1996) one-sided p-values. | | | | |
| Residual variance (no correction) | |  |  | 8.34E+08 |
| HAC corrected variance (Bartlett kernel) | |  |  | 4.49E+08 |
| Phillips-Perron Test Equation | | | | |
| Dependent Variable: D(FGBD,2) | | | | |
| Method: Least Squares |  |  |  |  |
| Date: 09/08/21 Time: 16:32 | | | | |
| Sample (adjusted): 1988 2020 | | | | |
| Included observations: 33 after adjustments | | | | |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| D(FGBD(-1)) | -0.754715 | 0.173240 | -4.356474 | 0.0001 |
| C | -5602.520 | 5325.497 | -1.052018 | 0.3009 |
| R-squared | 0.379738 | Mean dependent var | | -333.8712 |
| Adjusted R-squared | 0.359729 | S.D. dependent var | | 37233.83 |
| S.E. of regression | 29793.36 | Akaike info criterion | | 23.50065 |
| Sum squared resid | 2.75E+10 | Schwarz criterion |  | 23.59135 |
| Log likelihood | -385.7607 | Hannan-Quinn criter. | | 23.53117 |
| F-statistic | 18.97886 | Durbin-Watson stat | | 1.805638 |
| Prob(F-statistic) | 0.000134 |  | |  |

**SOUTH AFRICA JOHASEN COINTEGRATION TEST**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Date: 09/09/21 Time: 01:01 | | | | |
| Sample (adjusted): 1988 2020 | | | | |
| Included observations: 33 after adjustments | | | | |
| Trend assumption: Linear deterministic trend | | | | |
| Series: RGDP FGBD FGDD FGXD FOER BRMS | | | | |
| Lags interval (in first differences): 1 to 1 | | | | |
| Unrestricted Cointegration Rank Test (Trace) | | | | |
| Hypothesized |  | Trace | 0.05 |  |
| No. of CE(s) | Eigenvalue | Statistic | Critical Value | Prob.\*\* |
| None \* | 0.878523 | 167.4091 | 95.75366 | 0.0000 |
| At most 1 \* | 0.806967 | 97.84421 | 69.81889 | 0.0001 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| At most 2 | 0.454197 | 43.56271 | 47.85613 | 0.1195 |  |  |
| At most 3 | 0.355317 | 23.58129 | 29.79707 | 0.2187 |  |  |
| At most 4 | 0.148980 | 9.094392 | 15.49471 | 0.3567 |  |  |
| At most 5 | 0.107982 | 3.770859 | 3.841466 | 0.0521 |  |  |
| Trace test indicates 2 cointegrating eqn(s) at the 0.05 level | | | | | | |
| \* denotes rejection of the hypothesis at the 0.05 level | | | | | | |
| \*\*MacKinnon-Haug-Michelis (1999) p-values | | | | | | |
| Unrestricted Cointegration Rank Test (Maximum Eigenvalue) | | | | | | |
| Hypothesized |  | Max-Eigen | 0.05 |  |  |  |
| No. of CE(s) | Eigenvalue | Statistic | Critical Value | Prob.\*\* |  |  |
| None \* | 0.878523 | 69.56490 | 40.07757 | 0.0000 |  |  |
| At most 1 \* | 0.806967 | 54.28150 | 33.87687 | 0.0001 |  |  |
| At most 2 | 0.454197 | 19.98143 | 27.58434 | 0.3424 |  |  |
| At most 3 | 0.355317 | 14.48689 | 21.13162 | 0.3264 |  |  |
| At most 4 | 0.148980 | 5.323533 | 14.26460 | 0.7006 |  |  |
| At most 5 | 0.107982 | 3.770859 | 3.841466 | 0.0521 |  |  |
| Max-eigenvalue test indicates 2 cointegrating eqn(s) at the 0.05 level | | | | | | |
| \* denotes rejection of the hypothesis at the 0.05 level | | | | | | |
| \*\*MacKinnon-Haug-Michelis (1999) p-values | | | | | | |
| Unrestricted Cointegrating Coefficients (normalized by b'\*S11\*b=I): | | | | | | |
| RGDP | FGBD | FGDD | FGXD | FOER | BRMS |  |
| -3.66E-06 | -1.07E-05 | -0.001002 | -5.43E-06 | -0.000113 | 1.10E-05 |  |
| 6.77E-06 | 2.22E-05 | 0.000304 | 7.56E-05 | 0.000185 | -1.54E-05 |  |
| -5.52E-06 | 8.42E-06 | -0.001947 | 3.77E-05 | -0.000400 | 1.35E-05 |  |
| 1.41E-05 | 1.71E-05 | -0.006528 | -6.56E-05 | -0.000135 | -6.90E-06 |  |
| -7.08E-07 | 9.74E-06 | 0.000375 | -8.36E-05 | 0.000152 | 2.69E-06 |  |
| 9.40E-06 | -3.28E-06 | 0.004040 | -0.000126 | 0.000307 | -1.38E-05 |  |
| Unrestricted Adjustment Coefficients (alpha): | | | | | | |
| D(RGDP) | 20143.88 | 722.2130 | -20178.75 | 6063.251 | -5124.078 | 5927.279 |
| D(FGBD) | 9290.177 | -16351.53 | -5285.301 | -5507.902 | -598.1504 | -2060.661 |
| D(FGDD) | -0.370839 | 87.03269 | -68.07001 | 1.517184 | 8.398017 | -29.23126 |
| D(FGXD) | 597.7448 | -1068.205 | -1031.766 | 2372.224 | 2390.004 | 318.7272 |
| D(FOER) | 273.8931 | -823.8404 | 559.0773 | 1005.630 | -108.8618 | 3.754886 |
| D(BRMS) | 2058456. | 1436415. | 2996451. | -567926.0 | -244541.7 | 591741.9 |
| 1 Cointegrating Equation(s): | | Log likelihood | -2142.771 |  |  |  |
| Normalized cointegrating coefficients (standard error in parentheses) | | | |  |  |  |
| RGDP | FGBD | FGDD | FGXD | FOER | BRMS |  |
| 1.000000 | 2.923998 | 273.7368 | 1.481490 | 30.77469 | -3.002771 |  |
|  | (0.55985) | (157.536) | (3.29993) | (10.8143) | (0.32289) |  |
| Adjustment coefficients (standard error in parentheses) | | | |  |  |  |
| D(RGDP) | -0.073765 | | |  |  |  |
|  | (0.02891) | | |  |  |  |
| D(FGBD) | -0.034020 | | |  |  |  |
|  | (0.01689) | | |  |  |  |
| D(FGDD) | 1.36E-06 | | |  |  |  |
|  | (0.00012) | | |  |  |  |
| D(FGXD) | -0.002189 | | |  |  |  |
|  | (0.00562) | | |  |  |  |
| D(FOER) | -0.001003 | | |  |  |  |
|  | (0.00155) | | |  |  |  |
| D(BRMS) | -7.537826 | | |  |  |  |
|  | (3.83803) | | |  |  |  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 2 Cointegrating Equation(s): | | Log likelihood | -2115.630 |  |  |
| Normalized cointegrating coefficients (standard error in parentheses) | | | | | |
| RGDP | FGBD | FGDD | FGXD | FOER | BRMS |
| 1.000000 | 0.000000 | 2113.208 | -76.45347 | 58.03355 | -8.854608 |
|  |  | (1545.74) | (31.1083) | (110.776) | (3.45187) |
| 0.000000 | 1.000000 | -629.0946 | 26.65356 | -9.322461 | 2.001313 |
|  |  | (487.605) | (9.81313) | (34.9443) | (1.08890) |
| Adjustment coefficients (standard error in parentheses) | | | | | |
| D(RGDP) | -0.068877 | -0.199619 |  |  |  |
|  | (0.06074) | (0.19491) |  |  |  |
| D(FGBD) | -0.144678 | -0.463283 |  |  |  |
|  | (0.02503) | (0.08031) |  |  |  |
| D(FGDD) | 0.000590 | 0.001940 |  |  |  |
|  | (0.00022) | (0.00071) |  |  |  |
| D(FGXD) | -0.009418 | -0.030167 |  |  |  |
|  | (0.01170) | (0.03754) |  |  |  |
| D(FOER) | -0.006578 | -0.021263 |  |  |  |
|  | (0.00299) | (0.00961) |  |  |  |
| D(BRMS) | 2.183066 | 9.918649 |  |  |  |
|  | (7.75594) | (24.8883) |  |  |  |
| 3 Cointegrating Equation(s): | | Log likelihood | -2105.640 |  |  |
| Normalized cointegrating coefficients (standard error in parentheses) | | | | | |
| RGDP | FGBD | FGDD | FGXD | FOER | BRMS |
| 1.000000 | 0.000000 | 0.000000 | 9.219202 | 58.26697 | -1.497528 |
|  |  |  | (6.43555) | (11.5983) | (0.39485) |
| 0.000000 | 1.000000 | 0.000000 | 1.149109 | -9.391950 | -0.188863 |
|  |  |  | (1.59874) | (2.88130) | (0.09809) |
| 0.000000 | 0.000000 | 1.000000 | -0.040542 | -0.000110 | -0.003481 |
|  |  |  | (0.01699) | (0.03063) | (0.00104) |
| Adjustment coefficients (standard error in parentheses) | | | | | |
| D(RGDP) | 0.042476 | -0.369455 | 19.30639 |  |  |
|  | (0.06424) | (0.17698) | (14.9963) |  |  |
| D(FGBD) | -0.115512 | -0.507767 | -3.997653 |  |  |
|  | (0.02913) | (0.08025) | (6.79982) |  |  |
| D(FGDD) | 0.000966 | 0.001367 | 0.159344 |  |  |
|  | (0.00024) | (0.00066) | (0.05552) |  |  |
| D(FGXD) | -0.003724 | -0.038851 | 1.084308 |  |  |
|  | (0.01426) | (0.03929) | (3.32963) |  |  |
| D(FOER) | -0.009663 | -0.016557 | -1.613387 |  |  |
|  | (0.00353) | (0.00972) | (0.82404) |  |  |
| D(BRMS) | -14.35236 | 35.13851 | -7459.215 |  |  |
|  | (7.67413) | (21.1421) | (1791.52) |  |  |
| 4 Cointegrating Equation(s): | | Log likelihood | -2098.396 |  |  |
| Normalized cointegrating coefficients (standard error in parentheses) | | | | | |
| RGDP | FGBD | FGDD | FGXD | FOER | BRMS |
| 1.000000 | 0.000000 | 0.000000 | 0.000000 | 42.95721 | -1.599325 |
|  |  |  |  | (6.81933) | (0.13436) |
| 0.000000 | 1.000000 | 0.000000 | 0.000000 | -11.30021 | -0.201552 |
|  |  |  |  | (3.44481) | (0.06787) |
| 0.000000 | 0.000000 | 1.000000 | 0.000000 | 0.067214 | -0.003034 |
|  |  |  |  | (0.00951) | (0.00019) |
| 0.000000 | 0.000000 | 0.000000 | 1.000000 | 1.660638 | 0.011042 |
|  |  |  |  | (0.65301) | (0.01287) |
| Adjustment coefficients (standard error in parentheses) | | |  |  |  |
| D(RGDP) | 0.127920 | -0.265928 | -20.27221 | -1.213477 |  |
|  | (0.11332) | (0.20811) | (46.0013) | (0.71505) |  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| D(FGBD) | -0.193129 | -0.601812 | 31.95585 | -1.124955 |  |
|  | (0.04876) | (0.08955) | (19.7940) | (0.30768) |  |
| D(FGDD) | 0.000987 | 0.001393 | 0.149440 | 0.003917 |  |
|  | (0.00043) | (0.00078) | (0.17309) | (0.00269) |  |
| D(FGXD) | 0.029705 | 0.001653 | -14.40067 | -0.278584 |  |
|  | (0.02427) | (0.04457) | (9.85249) | (0.15315) |  |
| D(FOER) | 0.004508 | 0.000614 | -8.177760 | -0.108687 |  |
|  | (0.00533) | (0.00979) | (2.16312) | (0.03362) |  |
| D(BRMS) | -22.35559 | 25.44151 | -3752.009 | 247.7311 |  |
|  | (13.6240) | (25.0188) | (5530.33) | (85.9640) |  |
| 5 Cointegrating Equation(s): | | Log likelihood | -2095.734 |  |  |
| Normalized cointegrating coefficients (standard error in parentheses) | | | | | |
| RGDP | FGBD | FGDD | FGXD | FOER | BRMS |
| 1.000000 | 0.000000 | 0.000000 | 0.000000 | 0.000000 | -2.188542 |
|  |  |  |  |  | (0.17939) |
| 0.000000 | 1.000000 | 0.000000 | 0.000000 | 0.000000 | -0.046554 |
|  |  |  |  |  | (0.04658) |
| 0.000000 | 0.000000 | 1.000000 | 0.000000 | 0.000000 | -0.003956 |
|  |  |  |  |  | (0.00035) |
| 0.000000 | 0.000000 | 0.000000 | 1.000000 | 0.000000 | -0.011736 |
|  |  |  |  |  | (0.00744) |
| 0.000000 | 0.000000 | 0.000000 | 0.000000 | 1.000000 | 0.013716 |
|  |  |  |  |  | (0.00468) |
| Adjustment coefficients (standard error in parentheses) | | | | | |
| D(RGDP) | 0.131549 | -0.315857 | -22.19161 | -0.784959 | 4.341439 |
|  | (0.11208) | (0.21545) | (45.5230) | (0.89638) | (3.29041) |
| D(FGBD) | -0.192706 | -0.607640 | 31.73179 | -1.074933 | -1.307125 |
|  | (0.04876) | (0.09374) | (19.8061) | (0.38999) | (1.43158) |
| D(FGDD) | 0.000981 | 0.001475 | 0.152586 | 0.003215 | 0.044499 |
|  | (0.00043) | (0.00082) | (0.17296) | (0.00341) | (0.01250) |
| D(FGXD) | 0.028012 | 0.024941 | -13.50542 | -0.478456 | 0.191066 |
|  | (0.02289) | (0.04401) | (9.29914) | (0.18311) | (0.67214) |
| D(FOER) | 0.004585 | -0.000447 | -8.218538 | -0.099583 | -0.560029 |
|  | (0.00532) | (0.01023) | (2.16110) | (0.04255) | (0.15620) |
| D(BRMS) | -22.18238 | 23.05870 | -3843.610 | 268.1817 | -1125.895 |
|  | (13.6105) | (26.1635) | (5528.20) | (108.854) | (399.579) |

## APPENDIX 6: CAMEROON REGRESSION RESULT

DESCRIPTIVE STATISTICS

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | RGDP | FGBD | FGDD | FOXD | FOER | BRMS |
| Mean | 20102.98 | -604173.1 | 94867.99 | 7545.451 | 1491.896 | 518538.0 |
| Median | 15498.18 | -125070.0 | 224.3940 | 7700.089 | 652.1352 | 30576.10 |
| Maximum | 39029.58 | 3740290. | 1684910. | 11493.28 | 3851.532 | 4751920. |
| Minimum | 9643.953 | -5837800. | 0.000000 | 2835.554 | 9.555391 | 5830.340 |
| Std. Dev. | 10275.26 | 2782240. | 389885.3 | 3080.208 | 1554.817 | 1046958. |
| Skewness | 0.586988 | -0.263879 | 3.817990 | -0.191757 | 0.356967 | 3.178486 |
| Kurtosis | 1.803620 | 2.017768 | 15.58324 | 1.494732 | 1.298822 | 12.61240 |
| Jarque-Bera | 4.097253 | 1.813160 | 315.9424 | 3.518836 | 4.963741 | 193.6801 |
| Probability | 0.128912 | 0.403903 | 0.000000 | 0.172145 | 0.083587 | 0.000000 |
| Sum | 703604.4 | -21146059 | 3320380. | 264090.8 | 52216.36 | 18148830 |
| Sum Sq. Dev. | 3.59E+09 | 2.63E+14 | 5.17E+12 | 3.23E+08 | 82193512 | 3.73E+13 |
| Observations | 35 | 35 | 35 | 35 | 35 | 35 |

UNIT ROOT TEST RGDP AT LEVEL

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Null Hypothesis: RGDP has a unit root | | | | |
| Exogenous: Constant, Linear Trend | | | | |
| Bandwidth: 3 (Newey-West automatic) using Bartlett kernel | | | | |
|  |  |  | Adj. t-Stat | Prob.\* |
| Phillips-Perron test statistic | |  | -1.505599 | 0.8079 |
| Test critical values: | 1% level |  | -4.252879 |  |
|  | 5% level |  | -3.548490 |  |
|  | 10% level |  | -3.207094 |  |
| \*MacKinnon (1996) one-sided p-values. | | | | |
| Residual variance (no correction) | |  |  | 3571176. |
| HAC corrected variance (Bartlett kernel) | | |  | 2469256. |
| Phillips-Perron Test Equation | | | | |
| Dependent Variable: D(RGDP) | | | | |
| Method: Least Squares | | | | |
| Date: 09/09/21 Time: 03:12 | | | | |
| Sample (adjusted): 1987 2020 | | | | |
| Included observations: 34 after adjustments | | | | |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| RGDP(-1) | -0.134250 | 0.080990 | -1.657609 | 0.1075 |
| C | 472.0649 | 761.7751 | 0.619691 | 0.5400 |
| @TREND("1986") | 170.7187 | 80.35053 | 2.124674 | 0.0417 |
| R-squared | 0.135985 | Mean dependent var | | 835.5418 |
| Adjusted R-squared | 0.080242 | S.D. dependent var | | 2063.609 |
| S.E. of regression | 1979.084 | Akaike info criterion | | 18.10275 |
| Sum squared resid | 1.21E+08 | Schwarz criterion | | 18.23743 |
| Log likelihood | -304.7468 | Hannan-Quinn criter. | | 18.14868 |
| F-statistic | 2.439500 | Durbin-Watson stat | | 2.193357 |
| Prob(F-statistic) | 0.103772 |  | |  |

RGDP AT FIRST DIFFERENCE

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Null Hypothesis: D(RGDP) has a unit root | | | | |
| Exogenous: Constant, Linear Trend | | | | |
| Bandwidth: 5 (Newey-West automatic) using Bartlett kernel | | | | |
|  |  |  | Adj. t-Stat | Prob.\* |
| Phillips-Perron test statistic | |  | -6.785404 | 0.0000 |
| Test critical values: | 1% level |  | -4.262735 |  |
|  | 5% level |  | -3.552973 |  |
|  | 10% level |  | -3.209642 |  |
| \*MacKinnon (1996) one-sided p-values. | | | | |
| Residual variance (no correction) | |  |  | 3784067. |
| HAC corrected variance (Bartlett kernel) | | |  | 2778987. |
| Phillips-Perron Test Equation | | | | |
| Dependent Variable: D(RGDP,2) | | | | |
| Method: Least Squares | | | | |
| Date: 09/09/21 Time: 03:13 | | | | |
| Sample (adjusted): 1988 2020 | | | | |
| Included observations: 33 after adjustments | | | | |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| D(RGDP(-1)) | -1.178873 | 0.179564 | -6.565189 | 0.0000 |
| C | -309.9225 | 760.5368 | -0.407505 | 0.6865 |
| @TREND("1986") | 70.76356 | 38.81917 | 1.822902 | 0.0783 |
| R-squared | 0.589613 | Mean dependent var | | -50.52485 |
| Adjusted R-squared | 0.562254 | S.D. dependent var | | 3083.646 |
| S.E. of regression | 2040.214 | Akaike info criterion | | 18.16601 |
| Sum squared resid | 1.25E+08 | Schwarz criterion | | 18.30205 |
| Log likelihood | -296.7391 | Hannan-Quinn criter. | | 18.21178 |
| F-statistic | 21.55086 | Durbin-Watson stat | | 2.064872 |
| Prob(F-statistic) | 0.000002 |  | |  |

FGBD AT LEVEL

|  |  |  |  |
| --- | --- | --- | --- |
| Null Hypothesis: FGBD has a unit root | | | |
| Exogenous: Constant, Linear Trend | | | |
| Bandwidth: 1 (Newey-West automatic) using Bartlett kernel | | | |
|  |  | Adj. t-Stat | Prob.\* |
| Phillips-Perron test statistic | | -2.051239 | 0.5533 |
| Test critical values: | 1% level | -4.252879 |  |
|  | 5% level | -3.548490 |  |
|  | 10% level | -3.207094 |  |
| \*MacKinnon (1996) one-sided p-values. | | | |
| Residual variance (no correction) | |  | 1.79E+11 |
| HAC corrected variance (Bartlett kernel) | |  | 2.11E+11 |
| Phillips-Perron Test Equation | |  |  |
| Dependent Variable: D(FGBD) | |  |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Method: Least Squares | | | | |
| Date: 09/09/21 Time: 03:14 | | | | |
| Sample (adjusted): 1987 2020 | | | | |
| Included observations: 34 after adjustments | | | | |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| FGBD(-1) | -0.239480 | 0.129364 | -1.851221 | 0.0737 |
| C | 701525.8 | 568496.8 | 1.234001 | 0.2265 |
| @TREND("1986") | -60107.95 | 35805.80 | -1.678721 | 0.1033 |
| R-squared | 0.108727 | Mean dependent var | | -230204.9 |
| Adjusted R-squared | 0.051225 | S.D. dependent var | | 454553.1 |
| S.E. of regression | 442757.8 | Akaike info criterion | | 28.92353 |
| Sum squared resid | 6.08E+12 | Schwarz criterion | | 29.05821 |
| Log likelihood | -488.7000 | Hannan-Quinn criter. | | 28.96946 |
| F-statistic | 1.890849 | Durbin-Watson stat | | 1.624307 |
| Prob(F-statistic) | 0.167946 |  | |  |

FBD AT FIRST DIFFERENCE

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Null Hypothesis: D(FGBD) has a unit root | | | | |
| Exogenous: Constant, Linear Trend | | | | |
| Bandwidth: 0 (Newey-West automatic) using Bartlett kernel | | | | |
|  |  |  | Adj. t-Stat | Prob.\* |
| Phillips-Perron test statistic | |  | -5.069365 | 0.0013 |
| Test critical values: | 1% level |  | -4.262735 |  |
|  | 5% level |  | -3.552973 |  |
|  | 10% level |  | -3.209642 |  |
| \*MacKinnon (1996) one-sided p-values. | | | | |
| Residual variance (no correction) | |  |  | 2.03E+11 |
| HAC corrected variance (Bartlett kernel) | | |  | 2.03E+11 |
| Phillips-Perron Test Equation | | | | |
| Dependent Variable: D(FGBD,2) | | | | |
| Method: Least Squares | | | | |
| Date: 09/09/21 Time: 03:15 | | | | |
| Sample (adjusted): 1988 2020 | | | | |
| Included observations: 33 after adjustments | | | | |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| D(FGBD(-1)) | -0.923433 | 0.182160 | -5.069365 | 0.0000 |
| C | -294388.8 | 184738.8 | -1.593540 | 0.1215 |
| @TREND("1986") | 4606.043 | 8674.564 | 0.530983 | 0.5993 |
| R-squared | 0.461489 | Mean dependent var | | 6134.030 |
| Adjusted R-squared | 0.425588 | S.D. dependent var | | 623827.5 |
| S.E. of regression | 472798.5 | Akaike info criterion | | 29.05723 |
| Sum squared resid | 6.71E+12 | Schwarz criterion | | 29.19328 |
| Log likelihood | -476.4444 | Hannan-Quinn criter. | | 29.10301 |
| F-statistic | 12.85459 | Durbin-Watson stat | | 2.000649 |
| Prob(F-statistic) | 0.000093 |  | |  |

FGDD AT LEVEL

|  |
| --- |
| Null Hypothesis: FGDD has a unit root |
| Exogenous: Constant, Linear Trend |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Bandwidth: 2 (Newey-West automatic) using Bartlett kernel | | | | |
|  |  |  | Adj. t-Stat | Prob.\* |
| Phillips-Perron test statistic | |  | -1.619674 | 0.7639 |
| Test critical values: | 1% level |  | -4.252879 |  |
|  | 5% level |  | -3.548490 |  |
|  | 10% level |  | -3.207094 |  |
| \*MacKinnon (1996) one-sided p-values. | | | | |
| Residual variance (no correction) | |  |  | 1455036. |
| HAC corrected variance (Bartlett kernel) | | |  | 2625349. |
| Phillips-Perron Test Equation | | | | |
| Dependent Variable: D(FGDD) | | | | |
| Method: Least Squares | | | | |
| Date: 09/09/21 Time: 03:15 | | | | |
| Sample (adjusted): 1987 2020 | | | | |
| Included observations: 34 after adjustments | | | | |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| FGDD(-1) | -0.088732 | 0.071249 | -1.245375 | 0.2223 |
| C | 904.1470 | 694.4962 | 1.301875 | 0.2026 |
| R-squared | 0.048236 | Mean dependent var | | 183.2512 |
| Adjusted R-squared | -0.013168 | S.D. dependent var | | 1255.032 |
| S.E. of regression | 1263.268 | Akaike info criterion | | 17.20489 |
| Sum squared resid | 49471232 | Schwarz criterion | | 17.33957 |
| Log likelihood | -289.4831 | Hannan-Quinn criter. | | 17.25082 |
| F-statistic | 0.785545 | Durbin-Watson stat | | 0.942692 |
| Prob(F-statistic) | 0.464735 |  | |  |

FGDD AT FIRST DIFFERENCE

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Null Hypothesis: D(FGDD) has a unit root | | | | |
| Exogenous: Constant |  |  |  |  |
| Bandwidth: 6 (Newey-West automatic) using Bartlett kernel | | | | |
|  |  |  | Adj. t-Stat | Prob.\* |
| Phillips-Perron test statistic | |  | -3.098373 | 0.0364 |
| Test critical values: | 1% level |  | -3.646342 |  |
|  | 5% level |  | -2.954021 |  |
|  | 10% level |  | -2.615817 |  |
| \*MacKinnon (1996) one-sided p-values. | | | | |
| Residual variance (no correction) | |  |  | 1161180. |
| HAC corrected variance (Bartlett kernel) | | |  | 1068658. |
| Phillips-Perron Test Equation | | | | |
| Dependent Variable: D(FGDD,2) | | | | |
| Method: Least Squares | | | | |
| Date: 09/09/21 Time: 03:16 | | | | |
| Sample (adjusted): 1988 2020 | | | | |
| Included observations: 33 after adjustments | | | | |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| D(FGDD(-1)) | -0.488717 | 0.154223 | -3.168892 | 0.0034 |
| C | 80.02686 | 195.6536 | 0.409023 | 0.6853 |
| R-squared | 0.244674 | Mean dependent var | | -10.87788 |
| Adjusted R-squared | 0.220309 | S.D. dependent var | | 1259.113 |
| S.E. of regression | 1111.798 | Akaike info criterion | | 16.92404 |
| Sum squared resid | 38318949 | Schwarz criterion | | 17.01473 |
| Log likelihood | -277.2466 | Hannan-Quinn criter. | | 16.95455 |
| F-statistic | 10.04187 | Durbin-Watson stat | | 1.791940 |
| Prob(F-statistic) | 0.003431 |  | |  |

FGXD AT LEVEL

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Null Hypothesis: FGXD has a unit root | | | | |
| Exogenous: Constant |  |  |  |  |
| Bandwidth: 3 (Newey-West automatic) using Bartlett kernel | | | | |
|  |  |  | Adj. t-Stat | Prob.\* |
| Phillips-Perron test statistic | |  | -0.316660 | 0.9121 |
| Test critical values: | 1% level |  | -3.639407 |  |
|  | 5% level |  | -2.951125 |  |
|  | 10% level |  | -2.614300 |  |
| \*MacKinnon (1996) one-sided p-values. | | | | |
| Residual variance (no correction) | |  |  | 166204.1 |
| HAC corrected variance (Bartlett kernel) | | |  | 177410.4 |
| Phillips-Perron Test Equation | | | | |
| Dependent Variable: D(FGXD) | | | | |
| Method: Least Squares | | | | |
| Date: 09/09/21 Time: 03:18 | | | | |
| Sample (adjusted): 1987 2020 | | | | |
| Included observations: 34 after adjustments | | | | |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| FGXD(-1) | -0.013154 | 0.048058 | -0.273721 | 0.7861 |
| C | 129.9118 | 99.33386 | 1.307830 | 0.2002 |
| R-squared | 0.002336 | Mean dependent var | | 111.1997 |
| Adjusted R-squared | -0.028841 | S.D. dependent var | | 414.2965 |
| S.E. of regression | 420.2284 | Akaike info criterion | | 14.97650 |
| Sum squared resid | 5650941. | Schwarz criterion | | 15.06628 |
| Log likelihood | -252.6004 | Hannan-Quinn criter. | | 15.00712 |
| F-statistic | 0.074923 | Durbin-Watson stat | | 2.214355 |
| Prob(F-statistic) | 0.786058 |  | |  |

FGXD AT FIRST DIFFERENCE

|  |  |  |
| --- | --- | --- |
| Null Hypothesis: D(FGXD) has a unit root | | |
| Exogenous: Constant |  |  |
| Bandwidth: 3 (Newey-West automatic) using Bartlett kernel | | |
|  | Adj. t-Stat | Prob.\* |
| Phillips-Perron test statistic | -6.289718 | 0.0000 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Test critical values: | 1% level |  | -3.646342 |  |
|  | 5% level |  | -2.954021 |  |
|  | 10% level |  | -2.615817 |  |
| \*MacKinnon (1996) one-sided p-values. | | | | |
| Residual variance (no correction) | |  |  | 168102.2 |
| HAC corrected variance (Bartlett kernel) | | |  | 214914.9 |
| Phillips-Perron Test Equation | | | | |
| Dependent Variable: D(FGXD,2) | | | | |
| Method: Least Squares | | | | |
| Date: 09/09/21 Time: 03:18 | | | | |
| Sample (adjusted): 1988 2020 | | | | |
| Included observations: 33 after adjustments | | | | |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| D(FGXD(-1)) | -1.138769 | 0.180534 | -6.307767 | 0.0000 |
| C | 128.0451 | 75.76619 | 1.690003 | 0.1011 |
| R-squared | 0.562072 | Mean dependent var | | 15.58545 |
| Adjusted R-squared | 0.547945 | S.D. dependent var | | 629.1691 |
| S.E. of regression | 423.0219 | Akaike info criterion | | 14.99142 |
| Sum squared resid | 5547372. | Schwarz criterion | | 15.08211 |
| Log likelihood | -245.3584 | Hannan-Quinn criter. | | 15.02193 |
| F-statistic | 39.78792 | Durbin-Watson stat | | 1.933153 |
| Prob(F-statistic) | 0.000001 |  | |  |

**FOER AT LEVEL**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Null Hypothesis: FOER has a unit root | | | | |
| Exogenous: Constant |  |  |  |  |
| Bandwidth: 2 (Newey-West automatic) using Bartlett kernel | | | | |
|  |  |  | Adj. t-Stat | Prob.\* |
| Phillips-Perron test statistic | |  | -0.727021 | 0.8265 |
| Test critical values: | 1% level |  | -3.639407 |  |
|  | 5% level |  | -2.951125 |  |
|  | 10% level |  | -2.614300 |  |
| \*MacKinnon (1996) one-sided p-values. | | | | |
| Residual variance (no correction) | |  |  | 0.069291 |
| HAC corrected variance (Bartlett kernel) | | |  | 0.090969 |
| Phillips-Perron Test Equation | | | | |
| Dependent Variable: D(FOER) | | | | |
| Method: Least Squares | | | | |
| Date: 09/09/21 Time: 03:19 | | | | |
| Sample (adjusted): 1987 2020 | | | | |
| Included observations: 34 after adjustments | | | | |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| FOER(-1) | -0.028135 | 0.048111 | -0.584786 | 0.5628 |
| C | 0.290815 | 0.412624 | 0.704794 | 0.4860 |
| R-squared | 0.010574 | Mean dependent var | | 0.051057 |

|  |  |  |  |
| --- | --- | --- | --- |
| Adjusted R-squared | -0.020346 | S.D. dependent var | 0.268615 |
| S.E. of regression | 0.271334 | Akaike info criterion | 0.286086 |
| Sum squared resid | 2.355900 | Schwarz criterion | 0.375872 |
| Log likelihood | -2.863468 | Hannan-Quinn criter. | 0.316706 |
| F-statistic | 0.341974 | Durbin-Watson stat | 1.631701 |
| Prob(F-statistic) | 0.562793 |  |  |

FOER AT FIRST DIFFERENCE

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Null Hypothesis: D(FOER) has a unit root | | | | |
| Exogenous: Constant |  |  |  |  |
| Bandwidth: 1 (Newey-West automatic) using Bartlett kernel | | | | |
|  |  |  | Adj. t-Stat | Prob.\* |
| Phillips-Perron test statistic | |  | -4.686193 | 0.0007 |
| Test critical values: | 1% level |  | -3.646342 |  |
|  | 5% level |  | -2.954021 |  |
|  | 10% level |  | -2.615817 |  |
| \*MacKinnon (1996) one-sided p-values. | | | | |
| Residual variance (no correction) | |  |  | 0.070072 |
| HAC corrected variance (Bartlett kernel) | | |  | 0.069474 |
| Phillips-Perron Test Equation | | | | |
| Dependent Variable: D(FOER,2) | | | | |
| Method: Least Squares | | | | |
| Date: 09/09/21 Time: 03:19 | | | | |
| Sample (adjusted): 1988 2020 | | | | |
| Included observations: 33 after adjustments | | | | |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| D(FOER(-1)) | -0.830188 | 0.177001 | -4.690308 | 0.0001 |
| C | 0.042664 | 0.048383 | 0.881808 | 0.3847 |
| R-squared | 0.415083 | Mean dependent var | | 0.000583 |
| Adjusted R-squared | 0.396215 | S.D. dependent var | | 0.351485 |
| S.E. of regression | 0.273116 | Akaike info criterion | | 0.300854 |
| Sum squared resid | 2.312368 | Schwarz criterion | | 0.391551 |
| Log likelihood | -2.964089 | Hannan-Quinn criter. | | 0.331371 |
| F-statistic | 21.99899 | Durbin-Watson stat | | 1.969521 |
| Prob(F-statistic) | 0.000052 |  | |  |

BRMS AT LEVEL

|  |  |  |  |
| --- | --- | --- | --- |
| Null Hypothesis: BRMS has a unit root | | | |
| Exogenous: Constant |  |  |  |
| Bandwidth: 0 (Newey-West automatic) using Bartlett kernel | | | |
|  |  | Adj. t-Stat | Prob.\* |
| Phillips-Perron test statistic | | 0.032869 | 0.9552 |
| Test critical values: | 1% level | -3.639407 |  |
|  | 5% level | -2.951125 |  |
|  | 10% level | -2.614300 |  |
| \*MacKinnon (1996) one-sided p-values. | |  |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Residual variance (no correction) | |  |  | 7.54E+10 |
| HAC corrected variance (Bartlett kernel) | | |  | 7.54E+10 |
| Phillips-Perron Test Equation | | | | |
| Dependent Variable: D(BRMS) | | | | |
| Method: Least Squares | | | | |
| Date: 09/09/21 Time: 03:20 | | | | |
| Sample (adjusted): 1987 2020 | | | | |
| Included observations: 34 after adjustments | | | | |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| BRMS(-1) | 0.005808 | 0.176699 | 0.032869 | 0.9740 |
| C | 49265.00 | 49278.97 | 0.999716 | 0.3249 |
| R-squared | 0.000034 | Mean dependent var | | 49544.37 |
| Adjusted R-squared | -0.031215 | S.D. dependent var | | 278720.2 |
| S.E. of regression | 283036.9 | Akaike info criterion | | 28.00156 |
| Sum squared resid | 2.56E+12 | Schwarz criterion | | 28.09135 |
| Log likelihood | -474.0266 | Hannan-Quinn criter. | | 28.03218 |
| F-statistic | 0.001080 | Durbin-Watson stat | | 2.000868 |
| Prob(F-statistic) | 0.973983 |  | |  |

BRMS AT FIRST DIFFERENCE

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Null Hypothesis: D(BRMS) has a unit root | | | | |
| Exogenous: Constant |  |  |  |  |
| Bandwidth: 0 (Newey-West automatic) using Bartlett kernel | | | | |
|  |  |  | Adj. t-Stat | Prob.\* |
| Phillips-Perron test statistic | |  | -5.543156 | 0.0001 |
| Test critical values: | 1% level |  | -3.646342 |  |
|  | 5% level |  | -2.954021 |  |
|  | 10% level |  | -2.615817 |  |
| \*MacKinnon (1996) one-sided p-values. | | | | |
| Residual variance (no correction) | |  |  | 7.76E+10 |
| HAC corrected variance (Bartlett kernel) | | |  | 7.76E+10 |
| Phillips-Perron Test Equation | | | | |
| Dependent Variable: D(BRMS,2) | | | | |
| Method: Least Squares | | | | |
| Date: 09/09/21 Time: 03:20 | | | | |
| Sample (adjusted): 1988 2020 | | | | |
| Included observations: 33 after adjustments | | | | |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| D(BRMS(-1)) | -0.995097 | 0.179518 | -5.543156 | 0.0000 |
| C | 50799.81 | 50810.10 | 0.999798 | 0.3251 |
| R-squared | 0.497785 | Mean dependent var | | 1775.649 |
| Adjusted R-squared | 0.481585 | S.D. dependent var | | 399197.1 |
| S.E. of regression | 287426.1 | Akaike info criterion | | 28.03401 |
| Sum squared resid | 2.56E+12 | Schwarz criterion | | 28.12471 |
| Log likelihood | -460.5612 | Hannan-Quinn criter. | | 28.06453 |
| F-statistic | 30.72658 | Durbin-Watson stat | | 2.001003 |
| Prob(F-statistic) | 0.000005 |  | |  |

COINTEGRATION TEST

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Date: 09/09/21 Time: 04:31 | | | | | | |
| Sample (adjusted): 1989 2020 | | | | | | |
| Included observations: 32 after adjustments | | | | | | |
| Trend assumption: Linear deterministic trend | | | | | | |
| Series: RGDP FGBD FGDD FOXD FOER BRMS | | | | | | |
| Lags interval (in first differences): 1 to 2 | | | | | | |
| Unrestricted Cointegration Rank Test (Trace) | | | | | | |
| Hypothesized |  | Trace | 0.05 |  |  |  |
| No. of CE(s) | Eigenvalue | Statistic | Critical Value | Prob.\*\* |  |  |
| None \* | 0.878059 | 150.2610 | 95.75366 | 0.0000 |  |  |
| At most 1 \* | 0.689935 | 82.92600 | 69.81889 | 0.0032 |  |  |
| At most 2 | 0.520665 | 45.45488 | 47.85613 | 0.0826 |  |  |
| At most 3 | 0.329523 | 21.92347 | 29.79707 | 0.3028 |  |  |
| At most 4 | 0.246495 | 9.130979 | 15.49471 | 0.3534 |  |  |
| At most 5 | 0.002320 | 0.074337 | 3.841466 | 0.7851 |  |  |
| Trace test indicates 2 cointegrating eqn(s) at the 0.05 level | | | | | | |
| \* denotes rejection of the hypothesis at the 0.05 level | | | | | | |
| \*\*MacKinnon-Haug-Michelis (1999) p-values | | | | | | |
| Unrestricted Cointegration Rank Test (Maximum Eigenvalue) | | | | | | |
| Hypothesized |  | Max-Eigen | 0.05 |  |  |  |
| No. of CE(s) | Eigenvalue | Statistic | Critical Value | Prob.\*\* |  |  |
| None \* | 0.878059 | 67.33500 | 40.07757 | 0.0000 |  |  |
| At most 1 \* | 0.689935 | 37.47112 | 33.87687 | 0.0178 |  |  |
| At most 2 | 0.520665 | 23.53141 | 27.58434 | 0.1519 |  |  |
| At most 3 | 0.329523 | 12.79249 | 21.13162 | 0.4715 |  |  |
| At most 4 | 0.246495 | 9.056641 | 14.26460 | 0.2815 |  |  |
| At most 5 | 0.002320 | 0.074337 | 3.841466 | 0.7851 |  |  |
| Max-eigenvalue test indicates 2 cointegrating eqn(s) at the 0.05 level | | | | | | |
| \* denotes rejection of the hypothesis at the 0.05 level | | | | | | |
| \*\*MacKinnon-Haug-Michelis (1999) p-values | | | | | | |
| Unrestricted Cointegrating Coefficients (normalized by b'\*S11\*b=I): | | | | | | |
| RGDP | FGBD | FGDD | FOXD | FOER | BRMS |  |
| -8.026774 | -1.002316 | 0.399126 | -2.746877 | -4.012877 | 1.930722 |  |
| -6.951308 | 0.240677 | 0.240720 | 7.045865 | 3.424252 | -1.806080 |  |
| 15.18885 | -0.004952 | 0.731230 | -2.515660 | -3.207924 | -0.824709 |  |
| 2.067858 | 0.019890 | 0.042858 | 2.458277 | -1.105208 | 0.838587 |  |
| -5.497332 | 0.492304 | 0.659120 | 3.338968 | 4.797694 | -0.610774 |  |
| -7.851964 | -0.233183 | -0.528770 | -6.852601 | -1.647705 | -0.215065 |  |
| Unrestricted Adjustment Coefficients (alpha): | | | | | | |
| D(RGDP) | 0.004749 | 0.012075 | -0.016577 | -0.016933 | -0.001279 | -0.000430 |
| D(FGBD) | 0.233188 | -0.266661 | -0.069730 | -0.314770 | -0.260800 | 0.031215 |
| D(FGDD) | -0.238908 | -0.062870 | -0.662143 | 0.339279 | -0.642725 | -0.018212 |
| D(FOXD) | -0.031646 | -0.041881 | 0.017479 | -0.005595 | 0.001406 | -0.001118 |
| D(FOER) | -0.028206 | 0.121488 | 0.118051 | 0.014559 | -0.049083 | -0.000803 |
| D(BRMS) | -0.260656 | 0.033813 | -0.056896 | 0.024049 | -0.054523 | 0.000120 |
| 1 Cointegrating Equation(s): | | Log likelihood | 24.11779 |  |  |  |
| Normalized cointegrating coefficients (standard error in parentheses) | | | |  |  |  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| RGDP | FGBD | FGDD | FOXD | FOER | BRMS |
| 1.000000 | 0.124872 | -0.049724 | 0.342214 | 0.499936 | -0.240535 |
|  | (0.01244) | (0.01277) | (0.12298) | (0.08329) | (0.03213) |
| Adjustment coefficients (standard error in parentheses) | | | | | |
| D(RGDP) | -0.038119 |  |  |  |  |
|  | (0.07797) |  |  |  |  |
| D(FGBD) | -1.871748 |  |  |  |  |
|  | (1.99908) |  |  |  |  |
| D(FGDD) | 1.917658 |  |  |  |  |
|  | (3.28992) |  |  |  |  |
| D(FOXD) | 0.254016 |  |  |  |  |
|  | (0.11830) |  |  |  |  |
| D(FOER) | 0.226406 |  |  |  |  |
|  | (0.45940) |  |  |  |  |
| D(BRMS) | 2.092227 |  |  |  |  |
|  | (0.33381) |  |  |  |  |
| 2 Cointegrating Equation(s): | | Log likelihood | 42.85335 |  |  |
| Normalized cointegrating coefficients (standard error in parentheses) | | | | | |
| RGDP | FGBD | FGDD | FOXD | FOER | BRMS |
| 1.000000 | 0.000000 | -0.037906 | -0.719281 | -0.277144 | 0.151201 |
|  |  | (0.02095) | (0.15655) | (0.03944) | (0.03507) |
| 0.000000 | 1.000000 | -0.094642 | 8.500695 | 6.223034 | -3.137117 |
|  |  | (0.18452) | (1.37920) | (0.34741) | (0.30893) |
| Adjustment coefficients (standard error in parentheses) | | | | | |
| D(RGDP) | -0.122060 | -0.001854 |  |  |  |
|  | (0.09862) | (0.00957) |  |  |  |
| D(FGBD) | -0.018105 | -0.297907 |  |  |  |
|  | (2.55893) | (0.24841) |  |  |  |
| D(FGDD) | 2.354686 | 0.224330 |  |  |  |
|  | (4.34929) | (0.42222) |  |  |  |
| D(FOXD) | 0.545144 | 0.021640 |  |  |  |
|  | (0.11621) | (0.01128) |  |  |  |
| D(FOER) | -0.618094 | 0.057511 |  |  |  |
|  | (0.52620) | (0.05108) |  |  |  |
| D(BRMS) | 1.857181 | 0.269398 |  |  |  |
|  | (0.43341) | (0.04207) |  |  |  |
| 3 Cointegrating Equation(s): | | Log likelihood | 54.61905 |  |  |
| Normalized cointegrating coefficients (standard error in parentheses) | | | | | |
| RGDP | FGBD | FGDD | FOXD | FOER | BRMS |
| 1.000000 | 0.000000 | 0.000000 | -0.474075 | -0.247191 | 0.060192 |
|  |  |  | (0.09119) | (0.02037) | (0.02312) |
| 0.000000 | 1.000000 | 0.000000 | 9.112906 | 6.297819 | -3.364343 |
|  |  |  | (1.33847) | (0.29903) | (0.33935) |
| 0.000000 | 0.000000 | 1.000000 | 6.468724 | 0.790182 | -2.400907 |
|  |  |  | (2.06699) | (0.46180) | (0.52406) |
| Adjustment coefficients (standard error in parentheses) | | | |  |  |
| D(RGDP) | -0.373839 | -0.001772 | -0.007319 |  |  |
|  | (0.15616) | (0.00869) | (0.00731) |  |  |
| D(FGBD) | -1.077227 | -0.297562 | -0.022108 |  |  |
|  | (4.45574) | (0.24784) | (0.20849) |  |  |
| D(FGDD) | -7.702509 | 0.227609 | -0.594668 |  |  |
|  | (7.01827) | (0.39037) | (0.32839) |  |  |
| D(FOXD) | 0.810625 | 0.021553 | -0.009931 |  |  |
|  | (0.18791) | (0.01045) | (0.00879) |  |  |
| D(FOER) | 1.174960 | 0.056926 | 0.104309 |  |  |
|  | (0.75995) | (0.04227) | (0.03556) |  |  |
| D(BRMS) | 0.993001 | 0.269679 | -0.137499 |  |  |
|  | (0.71444) | (0.03974) | (0.03343) |  |  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 4 Cointegrating Equation(s): | | Log likelihood | 61.01530 |  |  |
| Normalized cointegrating coefficients (standard error in parentheses) | | | | | |
| RGDP | FGBD | FGDD | FOXD | FOER | BRMS |
| 1.000000 | 0.000000 | 0.000000 | 0.000000 | -0.367007 | 0.200808 |
|  |  |  |  | (0.07717) | (0.10388) |
| 0.000000 | 1.000000 | 0.000000 | 0.000000 | 8.600986 | -6.067334 |
|  |  |  |  | (1.48305) | (1.99641) |
| 0.000000 | 0.000000 | 1.000000 | 0.000000 | 2.425068 | -4.319604 |
|  |  |  |  | (1.11683) | (1.50343) |
| 0.000000 | 0.000000 | 0.000000 | 1.000000 | -0.252737 | 0.296611 |
|  |  |  |  | (0.16079) | (0.21645) |
| Adjustment coefficients (standard error in parentheses) | | | | | |
| D(RGDP) | -0.408854 | -0.002108 | -0.008045 | 0.072112 |  |
|  | (0.13838) | (0.00765) | (0.00644) | (0.06189) |  |
| D(FGBD) | -1.728126 | -0.303823 | -0.035599 | -3.117770 |  |
|  | (4.26459) | (0.23579) | (0.19856) | (1.90740) |  |
| D(FGDD) | -7.000929 | 0.234357 | -0.580127 | 2.713045 |  |
|  | (6.90259) | (0.38164) | (0.32138) | (3.08728) |  |
| D(FOXD) | 0.799055 | 0.021442 | -0.010171 | -0.265886 |  |
|  | (0.18747) | (0.01037) | (0.00873) | (0.08385) |  |
| D(FOER) | 1.205066 | 0.057216 | 0.104933 | 0.672282 |  |
|  | (0.76198) | (0.04213) | (0.03548) | (0.34081) |  |
| D(BRMS) | 1.042731 | 0.270158 | -0.136468 | 1.156482 |  |
|  | (0.71106) | (0.03931) | (0.03311) | (0.31803) |  |
| 5 Cointegrating Equation(s): | | Log likelihood | 65.54362 |  |  |
| Normalized cointegrating coefficients (standard error in parentheses) | | | | | |
| RGDP | FGBD | FGDD | FOXD | FOER | BRMS |
| 1.000000 | 0.000000 | 0.000000 | 0.000000 | 0.000000 | -0.685991 |
|  |  |  |  |  | (0.23998) |
| 0.000000 | 1.000000 | 0.000000 | 0.000000 | 0.000000 | 14.71523 |
|  |  |  |  |  | (5.93725) |
| 0.000000 | 0.000000 | 1.000000 | 0.000000 | 0.000000 | 1.540087 |
|  |  |  |  |  | (1.01924) |
| 0.000000 | 0.000000 | 0.000000 | 1.000000 | 0.000000 | -0.314077 |
|  |  |  |  |  | (0.11065) |
| 0.000000 | 0.000000 | 0.000000 | 0.000000 | 1.000000 | -2.416300 |
|  |  |  |  |  | (0.89232) |
| Adjustment coefficients (standard error in parentheses) | | | | | |
| D(RGDP) | -0.401823 | -0.002738 | -0.008888 | 0.067842 | 0.088047 |
|  | (0.14415) | (0.00847) | (0.00808) | (0.06661) | (0.05855) |
| D(FGBD) | -0.294421 | -0.432216 | -0.207497 | -3.988574 | -2.528534 |
|  | (4.28243) | (0.25167) | (0.24012) | (1.97896) | (1.73949) |
| D(FGDD) | -3.467656 | -0.082059 | -1.003760 | 0.567007 | -0.591041 |
|  | (6.56603) | (0.38588) | (0.36816) | (3.03424) | (2.66708) |
| D(FOXD) | 0.791324 | 0.022134 | -0.009244 | -0.261190 | -0.059559 |
|  | (0.19534) | (0.01148) | (0.01095) | (0.09027) | (0.07935) |
| D(FOER) | 1.474891 | 0.033052 | 0.072581 | 0.508396 | -0.101079 |
|  | (0.76190) | (0.04478) | (0.04272) | (0.35208) | (0.30948) |
| D(BRMS) | 1.342465 | 0.243316 | -0.172406 | 0.974430 | 1.056116 |
|  | (0.69795) | (0.04102) | (0.03913) | (0.32253) | (0.28350) |

VEC ESTMATE

|  |
| --- |
| Vector Error Correction Estimates |
| Date: 09/09/21 Time: 04:11 |
| Sample (adjusted): 1990 2020 |
| Included observations: 31 after adjustments |
| Standard errors in ( ) & t-statistics in [ ] |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Cointegrating Eq: | CointEq1 |  |  |  |  |  |
| D(RGDP(-1)) | 1.000000 |  |  |  |  |  |
| FGBD(-1) | -0.019560 |  |  |  |  |  |
|  | (0.00793) |  |  |  |  |  |
|  | [-2.46654] |  |  |  |  |  |
| D(FGDD(-1)) | -0.006302 |  |  |  |  |  |
|  | (0.00851) |  |  |  |  |  |
|  | [-0.74097] |  |  |  |  |  |
| FOXD(-1) | -0.072187 |  |  |  |  |  |
|  | (0.07502) |  |  |  |  |  |
|  | [-0.96224] |  |  |  |  |  |
| FOER(-1) | -0.119885 |  |  |  |  |  |
|  | (0.05386) |  |  |  |  |  |
|  | [-2.22604] |  |  |  |  |  |
| BRMS(-1) | 0.090388 |  |  |  |  |  |
|  | (0.02004) |  |  |  |  |  |
|  | [ 4.50991] |  |  |  |  |  |
| C | 0.825513 |  |  |  |  |  |
| Error Correction: | D(RGDP) | D(FGBD) | D(FGDD,2) | D(FOXD) | D(FOER) | D(BRMS) |
| CointEq1 | -1.008910 | 7.134645 | -12.42074 | -0.500602 | -1.387684 | -3.191463 |
|  | (0.45539) | (4.86576) | (10.0765) | (0.29642) | (1.06367) | (1.53441) |
|  | [-2.21551] | [ 1.46630] | [-1.23264] | [-1.68884] | [-1.30462] | [-2.07992] |
| D(RGDP(-1) | -0.372495 | -6.064272 | 9.303397 | 0.511330 | 1.174961 | 3.249881 |
|  | (0.36513) | (3.90143) | (8.07947) | (0.23767) | (0.85287) | (1.23031) |
|  | [-1.02016] | [-1.55437] | [ 1.15149] | [ 2.15140] | [ 1.37766] | [ 2.64151] |
| D(FGBD(-1)) | -0.026368 | -0.096267 | -0.037601 | -0.000898 | 0.007784 | 0.027093 |
|  | (0.01297) | (0.13854) | (0.28691) | (0.00844) | (0.03029) | (0.04369) |
|  | [-2.03359] | [-0.69484] | [-0.13105] | [-0.10638] | [ 0.25702] | [ 0.62011] |
| D(FGBD(-2)) | -0.020111 | -0.124591 | -0.104792 | 0.002990 | -0.020889 | 0.004712 |
|  | (0.01355) | (0.14474) | (0.29975) | (0.00882) | (0.03164) | (0.04564) |
|  | [-1.48464] | [-0.86078] | [-0.34960] | [ 0.33906] | [-0.66019] | [ 0.10324] |
| D(FGDD(-1),2) | 0.020107 | 0.104556 | -0.718985 | -0.010469 | -0.017000 | -0.031098 |
|  | (0.01437) | (0.15356) | (0.31800) | (0.00935) | (0.03357) | (0.04842) |
|  | [ 1.39911] | [ 0.68090] | [-2.26098] | [-1.11911] | [-0.50642] | [-0.64220] |
| D(FGDD(-2),2) | 0.020785 | 0.097103 | -0.606487 | -0.018380 | -0.032034 | -0.186904 |
|  | (0.01634) | (0.17462) | (0.36162) | (0.01064) | (0.03817) | (0.05507) |
|  | [ 1.27181] | [ 0.55609] | [-1.67716] | [-1.72785] | [-0.83921] | [-3.39421] |
| D(FOXD(-1)) | 0.035489 | 2.029714 | -0.818925 | 0.340312 | -1.406839 | -1.690422 |
|  | (0.37777) | (4.03643) | (8.35905) | (0.24590) | (0.88238) | (1.27289) |
|  | [ 0.09394] | [ 0.50285] | [-0.09797] | [ 1.38396] | [-1.59437] | [-1.32802] |
| D(FOXD(-2)) | -0.432156 | -3.613790 | -3.287616 | -0.088015 | 0.131674 | 0.069841 |
|  | (0.34103) | (3.64391) | (7.54619) | (0.22198) | (0.79657) | (1.14911) |
|  | [-1.26720] | [-0.99173] | [-0.43567] | [-0.39649] | [ 0.16530] | [ 0.06078] |
| D(FOER(-1)) | -0.162284 | 1.081898 | -3.077699 | -0.143499 | -0.094653 | -1.014146 |
|  | (0.13675) | (1.46116) | (3.02592) | (0.08901) | (0.31942) | (0.46078) |
|  | [-1.18672] | [ 0.74044] | [-1.01711] | [-1.61211] | [-0.29633] | [-2.20095] |
| D(FOER(-2)) | -0.047897 | -5.229796 | -1.760799 | -0.052394 | -0.185722 | -0.100261 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | (0.11519) | (1.23083) | (2.54892) | (0.07498) | (0.26906) | (0.38814) |
|  | [-0.41580] | [-4.24901] | [-0.69080] | [-0.69877] | [-0.69026] | [-0.25831] |
| D(BRMS(-1)) | -0.049917 | -1.303250 | 1.687878 | 0.104047 | 0.276246 | 0.837802 |
|  | (0.08995) | (0.96113) | (1.99041) | (0.05855) | (0.21011) | (0.30309) |
|  | [-0.55493] | [-1.35595] | [ 0.84801] | [ 1.77701] | [ 1.31479] | [ 2.76418] |
| D(BRMS(-2)) | 0.067425 | -0.089690 | 1.638391 | 0.038634 | 0.137450 | 0.467544 |
|  | (0.06621) | (0.70743) | (1.46501) | (0.04310) | (0.15465) | (0.22309) |
|  | [ 1.01839] | [-0.12678] | [ 1.11835] | [ 0.89647] | [ 0.88881] | [ 2.09579] |
| C | -0.005420 | -0.243795 | 0.251080 | 0.016478 | 0.072145 | 0.073411 |
|  | (0.02681) | (0.28642) | (0.59315) | (0.01745) | (0.06261) | (0.09032) |
|  | [-0.20219] | [-0.85118] | [ 0.42330] | [ 0.94438] | [ 1.15226] | [ 0.81276] |
| R-squared | 0.725195 | 0.719319 | 0.411224 | 0.467056 | 0.252159 | 0.622759 |
| Adj. R-squared | 0.515049 | 0.504681 | -0.039017 | 0.059511 | -0.319719 | 0.334281 |
| Sum sq. resids | 0.293469 | 33.50455 | 143.6887 | 0.124341 | 1.601097 | 3.331872 |
| S.E. equation | 0.131388 | 1.403872 | 2.907279 | 0.085523 | 0.306891 | 0.442710 |
| F-statistic | 3.450921 | 3.351312 | 0.913342 | 1.146024 | 0.440932 | 2.158775 |
| Log likelihood | 28.24246 | -45.19135 | -67.75885 | 41.55300 | 1.944026 | -9.415076 |
| Akaike AIC | -0.918869 | 3.818797 | 5.274765 | -1.777613 | 0.777805 | 1.510650 |
| Schwarz SC | -0.271261 | 4.466404 | 5.922372 | -1.130006 | 1.425412 | 2.158257 |
| Mean dependent | 0.003710 | -0.402200 | -0.001162 | 0.009231 | 0.052334 | 0.004764 |
| S.D. dependent | 0.188672 | 1.994734 | 2.852170 | 0.088187 | 0.267143 | 0.542593 |
| Determinant resid covariance (dof adj.) | | 6.73E-06 |  |  |  |  |
| Determinant resid covariance | | 1.83E-07 |  |  |  |  |
| Log likelihood |  | -23.45168 |  |  |  |  |
| Akaike information criterion | | 7.319464 |  |  |  |  |
| Schwarz criterion |  | 11.48265 |  |  |  |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Dependent Variable: D(RGDP,2) | | | | |
| Method: Least Squares (Gauss-Newton / Marquardt steps) | | | | |
| Date: 09/09/21 Time: 04:11 | | | | |
| Sample (adjusted): 1990 2020 | | | | |
| Included observations: 31 after adjustments | | | | |
| D(RGDP,2) = C(1)\*( D(RGDP(-1)) - 0.0195600197652\*FGBD( | | | | |
| -1) - 0.006302234104\*D(FGDD(-1)) - 0.0721867496489\*FOXD(-1) - | | | | |
| 0.11988509888\*FOER(-1) + 0.0903883912737\*BRMS(-1) + | | | | |
| 0.825513395218 ) + C(2)\*D(RGDP(-1),2) + C(3)\*D(LOG(RGDP( | | | | |
| -2)),2) + C(4)\*D(FGBD(-1)) + C(5)\*D(FGBD(-2)) + C(6)\*D(FGDD( | | | | |
| -1),2) + C(7)\*D(FGDD(-2),2) + C(8)\*D(FOXD(-1)) + C(9)\*D(FOXD( | | | | |
| -2)) + C(10)\*D(FOER(-1)) + C(11)\*D(FOER(-2)) + C(12)\*D(BRMS( | | | | |
| -1)) + C(13)\*D(BRMS(-2)) + C(14) | | | | |
|  | Coefficient | Std. Error | t-Statistic | Prob. |
| C(1) | -1.008910 | 0.455386 | -2.215506 | 0.0407 |
| C(2) | -0.372495 | 0.365134 | -1.020160 | 0.3220 |
| C(3) | -0.335349 | 0.259102 | -1.294272 | 0.2129 |
| C(4) | -0.026368 | 0.012966 | -2.033586 | 0.0579 |
| C(5) | -0.020111 | 0.013546 | -1.484636 | 0.1559 |
| C(6) | 0.020107 | 0.014371 | 1.399114 | 0.1798 |
| C(7) | 0.020785 | 0.016342 | 1.271815 | 0.2206 |
| C(8) | 0.035489 | 0.377769 | 0.093943 | 0.9263 |
| C(9) | -0.432156 | 0.341034 | -1.267196 | 0.2222 |
| C(10) | -0.162284 | 0.136750 | -1.186722 | 0.2517 |
| C(11) | -0.047897 | 0.115193 | -0.415796 | 0.6828 |
| C(12) | -0.049917 | 0.089952 | -0.554932 | 0.5862 |
| C(13) | 0.067425 | 0.066208 | 1.018385 | 0.3228 |
| C(14) | -0.005420 | 0.026806 | -0.202195 | 0.8422 |
| R-squared | 0.725195 | Mean dependent var | | 0.003710 |

|  |  |  |  |
| --- | --- | --- | --- |
| Adjusted R-squared | 0.515049 | S.D. dependent var | 0.188672 |
| S.E. of regression | 0.131388 | Akaike info criterion | -0.918869 |
| Sum squared resid | 0.293469 | Schwarz criterion | -0.271261 |
| Log likelihood | 28.24246 | Hannan-Quinn criter. | -0.707765 |
| F-statistic | 3.450921 | Durbin-Watson stat | 2.089772 |
| Prob(F-statistic) | 0.009310 |  |  |

FULLY MODIFIED

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Dependent Variable: RGDP | | | | |
| Method: Fully Modified Least Squares (FMOLS) | | | | |
| Date: 09/09/21 Time: 03:53 | | | | |
| Sample (adjusted): 1987 2020 | | | | |
| Included observations: 34 after adjustments | | | | |
| Cointegrating equation deterministics: C | | | | |
| Long-run covariance estimate (Bartlett kernel, Newey-West fixed | | | | |
| bandwidth = 4.0000) | | | | |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| FGBD | -0.023671 | 0.006348 | -3.728991 | 0.0009 |
| FGDD | -0.007921 | 0.006595 | -1.201132 | 0.2398 |
| FOER | 0.076051 | 0.040861 | 1.861216 | 0.0732 |
| FOXD | 0.053950 | 0.079096 | 0.682084 | 0.5008 |
| BRMS | 0.065731 | 0.017394 | 3.778945 | 0.0008 |
| C | 8.547993 | 0.966866 | 8.840926 | 0.0000 |
| R-squared | 0.819531 | Mean dependent var | | 10.25580 |
| Adjusted R-squared | 0.787304 | S.D. dependent var | | 0.217842 |
| S.E. of regression | 0.100467 | Sum squared resid | | 0.282619 |
| Long-run variance | 0.006353 |  | |  |

WALD TEST

|  |  |  |  |
| --- | --- | --- | --- |
| Wald Test: |  |  |  |
| Equation: Untitled | | | |
| Test Statistic | Value | df | Probability |
| F-statistic | 20.40664 | (4, 28) | 0.0000 |
| Chi-square | 81.62655 | 4 | 0.0000 |
| Null Hypothesis: C(1)=C(2)=C(3)=C(4)=C(5) | | | |
| Null Hypothesis Summary: | | | |
| Normalized Restriction (= 0) | | Value | Std. Err. |
| C(1) - C(5) |  | -0.089402 | 0.020639 |
| C(2) - C(5) |  | -0.073652 | 0.020302 |
| C(3) - C(5) |  | 0.010321 | 0.049988 |
| C(4) - C(5) |  | -0.011780 | 0.084233 |
| Restrictions are linear in coefficients. | | |  |

**APPENDIX 7: PANEL DATA REGRESSION**

UNIT ROOT TEST

**RGDP AT LEVEL**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Panel unit root test: Summary |  |  |  |  |
| Series: RGDP |  |  |  |  |
| Date: 09/09/21 Time: 05:02 |  |  |  |  |
| Sample: 1986 2020 |  |  |  |  |
| Exogenous variables: Individual effects | | | | |
| User-specified lags: 1 |  |  |  |  |
| Newey-West automatic bandwidth selection and Bartlett kernel | | | | |
| Balanced observations for each test | | | | |
|  |  |  | Cross- |  |
| Method | Statistic | Prob.\*\* | sections | Obs |
| Null: Unit root (assumes common unit root process) | | | | |
| Levin, Lin & Chu t\* | -1.15178 | 0.1247 | 4 | 132 |
| Null: Unit root (assumes individual unit root process) | | | | |
| Im, Pesaran and Shin W-stat | 0.95770 | 0.8309 | 4 | 132 |
| ADF - Fisher Chi-square | 4.86628 | 0.7718 | 4 | 132 |
| PP - Fisher Chi-square | 7.47754 | 0.4861 | 4 | 136 |
| \*\* Probabilities for Fisher tests are computed using an asymptotic Chi | | | |  |
| -square distribution. All other tests assume asymptotic normality. | | | |  |

RGDP AT FIRST DIFFERENCE

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Panel unit root test: Summary |  |  |  |  |
| Series: D(RGDP) |  |  |  |  |
| Date: 09/09/21 Time: 05:04 |  |  |  |  |
| Sample: 1986 2020 |  |  |  |  |
| Exogenous variables: Individual effects | | | | |
| User-specified lags: 1 |  |  |  |  |
| Newey-West automatic bandwidth selection and Bartlett kernel | | | | |
| Balanced observations for each test | | | | |
|  |  |  | Cross- |  |
| Method | Statistic | Prob.\*\* | sections | Obs |
| Null: Unit root (assumes common unit root process) | | | | |
| Levin, Lin & Chu t\* | 0.81239 | 0.7917 | 4 | 128 |
| Null: Unit root (assumes individual unit root process) | | | | |
| Im, Pesaran and Shin W-stat | -0.05264 | 0.4790 | 4 | 128 |
| ADF - Fisher Chi-square | 19.5669 | 0.0121 | 4 | 128 |
| PP - Fisher Chi-square | 57.5387 | 0.0000 | 4 | 132 |
| \*\* Probabilities for Fisher tests are computed using an asymptotic Chi | | | |  |
| -square distribution. All other tests assume asymptotic normality. | | | |  |

FGBD AT LEVEL

|  |
| --- |
| Null Hypothesis: Unit root (individual unit root process) |
| Series: FGBD |
| Date: 09/09/21 Time: 05:05 |
| Sample: 1986 2020 |
| Exogenous variables: Individual effects |
| Newey-West automatic bandwidth selection and Bartlett kernel |
| Total (balanced) observations: 136 |
| Cross-sections included: 4 |

|  |  |  |  |
| --- | --- | --- | --- |
| Method |  | Statistic | Prob.\*\* |
| PP - Fisher Chi-square |  | 13.2733 | 0.1028 |
| PP - Choi Z-stat |  | -0.49727 | 0.3095 |
| \*\* Probabilities for Fisher tests are computed using an | | | |
| asymptotic Chi-square distribution. All other tests | | | |
| assume asymptotic normality. | | | |
| Intermediate Phillips-Perron test results FGBD | | | |
| Cross |  |  |  |
| Section | Prob. | Bandwidth | Obs |
| 1 | 0.9041 | 0.0 | 34 |
| 2 | 0.0055 | 0.0 | 34 |
| 3 | 0.3638 | 6.0 | 34 |
| 4 | 0.7224 | 1.0 | 34 |

FGBD AT FIRST DIFFERENCE

|  |  |  |  |
| --- | --- | --- | --- |
| Null Hypothesis: Unit root (individual unit root process) | | | |
| Series: D(FGBD) |  |  |  |
| Date: 09/09/21 Time: 05:06 | | | |
| Sample: 1986 2020 |  |  |  |
| Exogenous variables: Individual effects | | | |
| Newey-West automatic bandwidth selection and Bartlett kernel | | | |
| Total (balanced) observations: 132 | | | |
| Cross-sections included: 4 | | | |
| Method |  | Statistic | Prob.\*\* |
| PP - Fisher Chi-square |  | 80.1378 | 0.0000 |
| PP - Choi Z-stat |  | -7.44660 | 0.0000 |
| \*\* Probabilities for Fisher tests are computed using an | | | |
| asymptotic Chi-square distribution. All other tests | | | |
| assume asymptotic normality. | | | |
| Intermediate Phillips-Perron test results D(FGBD) | | | |
| Cross |  |  |  |
| Section | Prob. | Bandwidth | Obs |
| 1 | 0.0000 | 0.0 | 33 |
| 2 | 0.0414 | 1.0 | 33 |
| 3 | 0.0000 | 18.0 | 33 |
| 4 | 0.0001 | 2.0 | 33 |

FGDD AT LEVEL

|  |  |  |
| --- | --- | --- |
| Null Hypothesis: Unit root (individual unit root process) | | |
| Series: FGDD |  |  |
| Date: 09/09/21 Time: 05:06 |  |  |
| Sample: 1986 2020 |  |  |
| Exogenous variables: Individual effects | | |
| Newey-West automatic bandwidth selection and Bartlett kernel | | |
| Total (balanced) observations: 136 | | |
| Cross-sections included: 4 |  |  |
| Method | Statistic | Prob.\*\* |
| PP - Fisher Chi-square | 8.55375 | 0.3813 |
| PP - Choi Z-stat | 0.67231 | 0.7493 |
| \*\* Probabilities for Fisher tests are computed using an | | |
| asymptotic Chi-square distribution. All other tests | | |
| assume asymptotic normality. | | |

|  |  |  |  |
| --- | --- | --- | --- |
| Intermediate Phillips-Perron test results FGDD | | | |
| Cross |  |  |  |
| section | Prob. | Bandwidth | Obs |
| 1 | 0.5421 | 0.0 | 34 |
| 2 | 0.2161 | 5.0 | 34 |
| 3 | 0.9993 | 4.0 | 34 |
| 4 | 0.1186 | 1.0 | 34 |

FGDD AT FIRST DIFFERENCE

|  |  |  |  |
| --- | --- | --- | --- |
| Null Hypothesis: Unit root (individual unit root process) | | | |
| Series: D(FGDD) |  |  |  |
| Date: 09/09/21 Time: 05:07 | | | |
| Sample: 1986 2020 |  |  |  |
| Exogenous variables: Individual effects | | | |
| Newey-West automatic bandwidth selection and Bartlett kernel | | | |
| Total (balanced) observations: 132 | | | |
| Cross-sections included: 4 | | | |
| Method |  | Statistic | Prob.\*\* |
| PP - Fisher Chi-square |  | 73.1099 | 0.0000 |
| PP - Choi Z-stat |  | -7.26635 | 0.0000 |
| \*\* Probabilities for Fisher tests are computed using an | | | |
| asymptotic Chi-square distribution. All other tests | | | |
| assume asymptotic normality. | | | |
| Intermediate Phillips-Perron test results D(FGDD) | | | |
| Cross |  |  |  |
| section | Prob. | Bandwidth | Obs |
| 1 | 0.0000 | 4.0 | 33 |
| 2 | 0.0035 | 13.0 | 33 |
| 3 | 0.0004 | 1.0 | 33 |
| 4 | 0.0001 | 3.0 | 33 |

**FGXD AT LEVEL**

|  |  |  |  |
| --- | --- | --- | --- |
| Null Hypothesis: Unit root (individual unit root process) | | | |
| Series: FGXD |  |  |  |
| Date: 09/09/21 Time: 05:08 | | | |
| Sample: 1986 2020 |  |  |  |
| Exogenous variables: Individual effects | | | |
| Newey-West automatic bandwidth selection and Bartlett kernel | | | |
| Total (balanced) observations: 136 | | | |
| Cross-sections included: 4 | | | |
| Method |  | Statistic | Prob.\*\* |
| PP - Fisher Chi-square |  | 7.41607 | 0.4925 |
| PP - Choi Z-stat |  | -0.22013 | 0.4129 |
| \*\* Probabilities for Fisher tests are computed using an | | | |
| asymptotic Chi-square distribution. All other tests | | | |
| assume asymptotic normality. | | | |
| Intermediate Phillips-Perron test results FGXD | | | |
| Cross |  |  |  |
| section | Prob. | Bandwidth | Obs |
| 1 | 0.7197 | 0.0 | 34 |
| 2 | 0.6215 | 13.0 | 34 |
| 3 | 0.1323 | 0.0 | 34 |
| 4 | 0.4145 | 3.0 | 34 |

FGXD AT FIRST DIFFERENCE

|  |  |  |  |
| --- | --- | --- | --- |
| Null Hypothesis: Unit root (individual unit root process) | | | |
| Series: D(FGXD) |  |  |  |
| Date: 09/09/21 Time: 05:09 | | | |
| Sample: 1986 2020 |  |  |  |
| Exogenous variables: Individual effects | | | |
| Newey-West automatic bandwidth selection and Bartlett kernel | | | |
| Total (balanced) observations: 132 | | | |
| Cross-sections included: 4 | | | |
| Method |  | Statistic | Prob.\*\* |
| PP - Fisher Chi-square |  | 69.4640 | 0.0000 |
| PP - Choi Z-stat |  | -6.94856 | 0.0000 |
| \*\* Probabilities for Fisher tests are computed using an | | | |
| asymptotic Chi-square distribution. All other tests | | | |
| assume asymptotic normality. | | | |
| Intermediate Phillips-Perron test results D(FGXD) | | | |
| Cross |  |  |  |
| section | Prob. | Bandwidth | Obs |
| 1 | 0.0000 | 2.0 | 33 |
| 2 | 0.0000 | 23.0 | 33 |
| 3 | 0.0002 | 3.0 | 33 |
| 4 | 0.0288 | 4.0 | 33 |

FOER AT LEVEL

|  |  |  |  |
| --- | --- | --- | --- |
| Null Hypothesis: Unit root (individual unit root process) | | | |
| Series: FOER |  |  |  |
| Date: 09/09/21 Time: 05:09 | | | |
| Sample: 1986 2020 |  |  |  |
| Exogenous variables: Individual effects | | | |
| Newey-West automatic bandwidth selection and Bartlett kernel | | | |
| Total (balanced) observations: 136 | | | |
| Cross-sections included: 4 | | | |
| Method |  | Statistic | Prob.\*\* |
| PP - Fisher Chi-square |  | 3.81529 | 0.8734 |
| PP - Choi Z-stat |  | 0.92158 | 0.8216 |
| \*\* Probabilities for Fisher tests are computed using an | | | |
| asymptotic Chi-square distribution. All other tests | | | |
| assume asymptotic normality. | | | |
| Intermediate Phillips-Perron test results FOER | | | |
| Cross |  |  |  |
| section | Prob. | Bandwidth | Obs |
| 1 | 0.6430 | 2.0 | 34 |
| 2 | 0.3359 | 2.0 | 34 |
| 3 | 0.8315 | 2.0 | 34 |
| 4 | 0.8265 | 2.0 | 34 |

FOER AT FIRST DIFFERENCE

|  |
| --- |
| Null Hypothesis: Unit root (individual unit root process) |
| Series: D(FOER) |
| Date: 09/09/21 Time: 05:10 |
| Sample: 1986 2020 |
| Exogenous variables: Individual effects |
| Newey-West automatic bandwidth selection and Bartlett kernel |

|  |  |  |  |
| --- | --- | --- | --- |
| Total (balanced) observations: 132 | | | |
| Cross-sections included: 4 | | | |
| Method |  | Statistic | Prob.\*\* |
| PP - Fisher Chi-square |  | 81.8158 | 0.0000 |
| PP - Choi Z-stat |  | -7.74716 | 0.0000 |
| \*\* Probabilities for Fisher tests are computed using an | | | |
| asymptotic Chi-square distribution. All other tests | | | |
| assume asymptotic normality. | | | |
| Intermediate Phillips-Perron test results D(FOER) | | | |
| Cross |  |  |  |
| section | Prob. | Bandwidth | Obs |
| 1 | 0.0000 | 0.0 | 33 |
| 2 | 0.0016 | 1.0 | 33 |
| 3 | 0.0000 | 2.0 | 33 |
| 4 | 0.0007 | 1.0 | 33 |

BRMS AT LEVEL

|  |  |  |  |
| --- | --- | --- | --- |
| Null Hypothesis: Unit root (individual unit root process) | | | |
| Series: BRMS |  |  |  |
| Date: 09/09/21 Time: 05:11 | | | |
| Sample: 1986 2020 |  |  |  |
| Exogenous variables: Individual effects | | | |
| Newey-West automatic bandwidth selection and Bartlett kernel | | | |
| Total (balanced) observations: 136 | | | |
| Cross-sections included: 4 | | | |
| Method |  | Statistic | Prob.\*\* |
| PP - Fisher Chi-square |  | 10.7039 | 0.2190 |
| PP - Choi Z-stat |  | -0.97795 | 0.1640 |
| \*\* Probabilities for Fisher tests are computed using an | | | |
| asymptotic Chi-square distribution. All other tests | | | |
| assume asymptotic normality. | | | |
| Intermediate Phillips-Perron test results BRMS | | | |
| Cross |  |  |  |
| section | Prob. | Bandwidth | Obs |
| 1 | 0.6986 | 3.0 | 34 |
| 2 | 0.1499 | 1.0 | 34 |
| 3 | 0.1075 | 2.0 | 34 |
| 4 | 0.4210 | 1.0 | 34 |

BRMS AT FIRST DIFFERENCE

|  |  |  |
| --- | --- | --- |
| Null Hypothesis: Unit root (individual unit root process) | | |
| Series: D(BRMS) |  |  |
| Date: 09/09/21 Time: 05:11 |  |  |
| Sample: 1986 2020 |  |  |
| Exogenous variables: Individual effects | | |
| Newey-West automatic bandwidth selection and Bartlett kernel | | |
| Total (balanced) observations: 132 | | |
| Cross-sections included: 4 |  |  |
| Method | Statistic | Prob.\*\* |
| PP - Fisher Chi-square | 52.9285 | 0.0000 |
| PP - Choi Z-stat | -5.68931 | 0.0000 |
| \*\* Probabilities for Fisher tests are computed using an | | |
| asymptotic Chi-square distribution. All other tests | | |

|  |  |  |  |
| --- | --- | --- | --- |
| assume asymptotic normality. | | | |
| Intermediate Phillips-Perron test results D(BRMS) | | | |
| Cross |  |  |  |
| section | Prob. | Bandwidth | Obs |
| 1 | 0.1082 | 2.0 | 33 |
| 2 | 0.0051 | 1.0 | 33 |
| 3 | 0.0001 | 1.0 | 33 |
| 4 | 0.0001 | 3.0 | 33 |

COINTEGRATION TEST

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Pedroni Residual Cointegration Test | | | | | |
| Series: RGDP FGBD FGDD FOER FGXD BRMS | | | | | |
| Date: 09/09/21 Time: 04:58 | | | | | |
| Sample: 1986 2020 |  |  |  |  |  |
| Included observations: 140 | | | | | |
| Cross-sections included: 4 | | | | | |
| Null Hypothesis: No cointegration | | | | | |
| Trend assumption: No deterministic trend | | | | | |
| User-specified lag length: 1 | | | | | |
| Newey-West automatic bandwidth selection and Bartlett kernel | | | | | |
| Alternative hypothesis: common AR coefs. (within-dimension) | | | | | |
|  |  |  |  | Weighted |  |
|  |  | Statistic | Prob. | Statistic | Prob. |
| Panel v-Statistic |  | 0.955346 | 0.1697 | -0.299162 | 0.6176 |
| Panel rho-Statistic |  | 0.666519 | 0.7475 | 0.877668 | 0.8099 |
| Panel PP-Statistic |  | 0.383845 | 0.6495 | 0.243330 | 0.5961 |
| Panel ADF-Statistic |  | 1.908848 | 0.9719 | 0.879262 | 0.8104 |
| Alternative hypothesis: individual AR coefs. (between-dimension) | | | | | |
|  |  | Statistic | Prob. |  |  |
| Group rho-Statistic |  | 1.600939 | 0.9453 |  |  |
| Group PP-Statistic |  | 0.724935 | 0.7658 |  |  |
| Group ADF-Statistic |  | 1.383534 | 0.9167 |  |  |
| Cross section specific results | | | | | |
| Phillips-Peron results (non-parametric) | | | | | |
| Cross ID | AR(1) | Variance | HAC | Bandwidth | Obs |
| 1 | 0.540 | 0.000782 | 0.000902 | 2.00 | 34 |
| 2 | 0.468 | 0.004185 | 0.003743 | 3.00 | 34 |
| 3 | 0.510 | 0.050760 | 0.052739 | 1.00 | 34 |
| 4 | 0.596 | 0.004999 | 0.005067 | 2.00 | 34 |
| Augmented Dickey-Fuller results (parametric) | | | | | |
| Cross ID | AR(1) | Variance | Lag | Max lag | Obs |
| 1 | 0.429 | 0.000753 | 1 | -- | 33 |
| 2 | 0.371 | 0.004174 | 1 | -- | 33 |
| 3 | 0.378 | 0.051606 | 1 | -- | 33 |
| 4 | 0.611 | 0.005122 | 1 | -- | 33 |

PANEL VECTOR ERROR CORRECTION MODEL

|  |
| --- |
| Vector Error Correction Estimates |
| Date: 09/09/21 Time: 06:45 |
| Sample (adjusted): 1989 2020 |
| Included observations: 128 after adjustments |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Standard errors in ( ) & t-statistics in [ ] | | | | | | |
| Cointegrating Eq: | CointEq1 |  |  |  |  |  |
| RGDP(-1) | 1.000000 |  |  |  |  |  |
| FGBD(-1) | -0.322454 |  |  |  |  |  |
|  | (0.05655) |  |  |  |  |  |
|  | [-5.70221] |  |  |  |  |  |
| FGDD(-1) | 0.473412 |  |  |  |  |  |
|  | (0.08249) |  |  |  |  |  |
|  | [ 5.73916] |  |  |  |  |  |
| FGXD(-1) | -0.465584 |  |  |  |  |  |
|  | (0.10359) |  |  |  |  |  |
|  | [-4.49463] |  |  |  |  |  |
| FOER(-1) | -1.946048 |  |  |  |  |  |
|  | (0.26725) |  |  |  |  |  |
|  | [-7.28172] |  |  |  |  |  |
| BRMS(-1) | 0.886593 |  |  |  |  |  |
|  | (0.26601) |  |  |  |  |  |
|  | [ 3.33289] |  |  |  |  |  |
| C | -0.945752 |  |  |  |  |  |
| Error Correction: | D(RGDP) | D(FGBD) | D(FGDD) | D(FGXD) | D(FOER) | D(BRMS) |
| CointEq1 | -0.111697 | 0.244409 | -0.242637 | 0.018867 | 0.024816 | -0.215678 |
|  | (0.04672) | (0.19109) | (0.13179) | (0.09006) | (0.02538) | (0.04028) |
|  | [-2.39070] | [ 1.27905] | [-1.84104] | [ 0.20950] | [ 0.97788] | [-5.35403] |
| D(RGDP(-1)) | -0.279367 | 0.143349 | -0.159904 | -0.018079 | 0.034713 | -0.141077 |
|  | (0.25229) | (1.03185) | (0.71167) | (0.48631) | (0.13704) | (0.21753) |
|  | [-1.10731] | [ 0.13892] | [-0.22469] | [-0.03718] | [ 0.25332] | [-0.64855] |
| D(RGDP(-2)) | 1.371320 | 4.088069 | -2.596064 | -0.292248 | -0.096251 | 2.703844 |
|  | (0.75386) | (3.08321) | (2.12650) | (1.45312) | (0.40947) | (0.64998) |
|  | [ 1.81906] | [ 1.32591] | [-1.22081] | [-0.20112] | [-0.23506] | [ 4.15991] |
| D(FGBD(-1)) | 0.036123 | 0.024592 | -0.025943 | 0.020289 | 0.004717 | 0.000540 |
|  | (0.02778) | (0.11363) | (0.07837) | (0.05356) | (0.01509) | (0.02396) |
|  | [ 1.30012] | [ 0.21641] | [-0.33102] | [ 0.37885] | [ 0.31257] | [ 0.02252] |
| D(FGBD(-2)) | -0.006107 | -0.154342 | -0.014046 | 0.004056 | -0.004048 | -0.012046 |
|  | (0.02840) | (0.11614) | (0.08010) | (0.05473) | (0.01542) | (0.02448) |
|  | [-0.21507] | [-1.32898] | [-0.17536] | [ 0.07410] | [-0.26243] | [-0.49203] |
| D(FGDD(-1)) | 0.087950 | -0.111456 | 0.126394 | -0.048668 | 0.003553 | 0.126289 |
|  | (0.03897) | (0.15938) | (0.10993) | (0.07512) | (0.02117) | (0.03360) |
|  | [ 2.25686] | [-0.69929] | [ 1.14979] | [-0.64789] | [ 0.16784] | [ 3.75862] |
| D(FGDD(-2)) | 0.015418 | -0.063701 | -0.143189 | -0.019955 | -0.020363 | -0.042530 |
|  | (0.02878) | (0.11769) | (0.08117) | (0.05547) | (0.01563) | (0.02481) |
|  | [ 0.53579] | [-0.54125] | [-1.76400] | [-0.35975] | [-1.30283] | [-1.71416] |
| D(FGXD(-1)) | -0.033102 | 0.132520 | 1.081159 | -0.064694 | 0.012497 | -0.107144 |
|  | (0.05446) | (0.22275) | (0.15363) | (0.10498) | (0.02958) | (0.04696) |
|  | [-0.60779] | [ 0.59493] | [ 7.03741] | [-0.61625] | [ 0.42245] | [-2.28169] |
| D(FGXD(-2)) | -0.092762 | 0.115210 | -0.210236 | 0.042958 | -0.007995 | -0.154153 |
|  | (0.06742) | (0.27574) | (0.19018) | (0.12995) | (0.03662) | (0.05813) |
|  | [-1.37590] | [ 0.41783] | [-1.10548] | [ 0.33057] | [-0.21833] | [-2.65194] |
| D(FOER(-1)) | -0.124080 | 0.016652 | -0.633920 | -0.060636 | 0.124987 | -0.406774 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | (0.19513) | (0.79805) | (0.55042) | (0.37612) | (0.10598) | (0.16824) |
|  | [-0.63589] | [ 0.02087] | [-1.15171] | [-0.16121] | [ 1.17929] | [-2.41785] |
| D(FOER(-2)) | -0.089336 | -2.309493 | -0.070649 | 0.178775 | 0.045845 | -0.279360 |
|  | (0.19028) | (0.77821) | (0.53674) | (0.36677) | (0.10335) | (0.16406) |
|  | [-0.46950] | [-2.96768] | [-0.13163] | [ 0.48743] | [ 0.44358] | [-1.70282] |
| D(BRMS(-1)) | -0.471838 | -0.088568 | 0.078926 | 0.086148 | 0.036994 | -0.429947 |
|  | (0.13740) | (0.56197) | (0.38759) | (0.26486) | (0.07463) | (0.11847) |
|  | [-3.43392] | [-0.15760] | [ 0.20363] | [ 0.32526] | [ 0.49567] | [-3.62916] |
| D(BRMS(-2)) | 0.075665 | 0.208690 | 1.275678 | 0.009641 | 0.024477 | 0.046657 |
|  | (0.14701) | (0.60124) | (0.41468) | (0.28336) | (0.07985) | (0.12675) |
|  | [ 0.51470] | [ 0.34710] | [ 3.07631] | [ 0.03402] | [ 0.30654] | [ 0.36811] |
| C | -0.014279 | -0.330370 | 0.101972 | 0.114475 | 0.035034 | -0.027535 |
|  | (0.05282) | (0.21601) | (0.14899) | (0.10181) | (0.02869) | (0.04554) |
|  | [-0.27034] | [-1.52939] | [ 0.68444] | [ 1.12442] | [ 1.22122] | [-0.60464] |
| R-squared | 0.169149 | 0.141105 | 0.462777 | 0.012164 | 0.039607 | 0.349345 |
| Adj. R-squared | 0.074402 | 0.043160 | 0.401514 | -0.100484 | -0.069911 | 0.275147 |
| Sum sq. resids | 17.98704 | 300.8725 | 143.1228 | 66.83082 | 5.306559 | 13.37126 |
| S.E. equation | 0.397217 | 1.624571 | 1.120474 | 0.765660 | 0.215752 | 0.342479 |
| F-statistic | 1.785281 | 1.440664 | 7.554019 | 0.107983 | 0.361649 | 4.708310 |
| Log likelihood | -56.03189 | -236.3221 | -188.7712 | -140.0327 | 22.09341 | -37.05307 |
| Akaike AIC | 1.094248 | 3.911283 | 3.168300 | 2.406761 | -0.126460 | 0.797704 |
| Schwarz SC | 1.406189 | 4.223224 | 3.480240 | 2.718702 | 0.185481 | 1.109645 |
| Mean dependent | 0.000983 | -0.206653 | 0.106464 | 0.099912 | 0.041553 | 0.035129 |
| S.D. dependent | 0.412873 | 1.660807 | 1.448355 | 0.729868 | 0.208584 | 0.402262 |
| Determinant resid covariance (dof adj.) | | 0.000674 |  |  |  |  |
| Determinant resid covariance |  | 0.000336 |  |  |  |  |
| Log likelihood |  | -577.9008 |  |  |  |  |
| Akaike information criterion |  | 10.43595 |  |  |  |  |
| Schwarz criterion |  | 12.44128 |  |  |  |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Dependent Variable: D(RGDP) | | | | |
| Method: Panel Least Squares | | | | |
| Date: 09/09/21 Time: 06:46 | | | | |
| Sample (adjusted): 1989 2020 | | | | |
| Periods included: 32 |  |  |  |  |
| Cross-sections included: 4 | | | | |
| Total panel (balanced) observations: 128 | | | | |
| D(RGDP) = C(1)\*( RGDP(-1) - 0.322453771118\*FGBD(-1) + | | | | |
| 0.473411902963\*FGDD(-1) - 0.465583597989\*FGXD(-1) - | | | | |
| 1.94604791714\*FOER(-1) + 0.886592511759\*BRMS(-1) - | | | | |
| 0.945752368744 ) + C(2)\*D(RGDP(-1)) + C(3)\*D(RGDP(-2)) + | | | | |
| C(4)\*D(FGBD(-1)) + C(5)\*D(FGBD(-2)) + C(6)\*D(FGDD(-1)) + | | | | |
| C(7)\*D(FGDD(-2)) + C(8)\*D(FGXD(-1)) + C(9)\*D(FGXD(-2)) + | | | | |
| C(10)\*D(FOER(-1)) + C(11)\*D(FOER(-2)) + C(12)\*D(BRMS(-1)) + | | | | |
| C(13)\*D(BRMS(-2)) + C(14) | | | | |
|  | Coefficient | Std. Error | t-Statistic | Prob. |
| C(1) | -0.111697 | 0.046722 | -2.390696 | 0.0185 |
| C(2) | -0.279367 | 0.252294 | -1.107309 | 0.2705 |
| C(3) | 1.371320 | 0.753861 | 1.819061 | 0.0715 |
| C(4) | 0.036123 | 0.027784 | 1.300124 | 0.1962 |
| C(5) | -0.006107 | 0.028396 | -0.215065 | 0.8301 |
| C(6) | 0.087950 | 0.038970 | 2.256859 | 0.0259 |
| C(7) | 0.015418 | 0.028776 | 0.535791 | 0.5931 |
| C(8) | -0.033102 | 0.054463 | -0.607794 | 0.5445 |
| C(9) | -0.092762 | 0.067419 | -1.375903 | 0.1715 |
| C(10) | -0.124080 | 0.195127 | -0.635893 | 0.5261 |
| C(11) | -0.089336 | 0.190278 | -0.469504 | 0.6396 |
| C(12) | -0.471838 | 0.137405 | -3.433923 | 0.0008 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| C(13) | 0.075665 | 0.147006 | 0.514703 | 0.6078 |
| C(14) | -0.014279 | 0.052817 | -0.270344 | 0.7874 |
| R-squared | 0.169149 | Mean dependent var | | 0.000983 |
| Adjusted R-squared | 0.074402 | S.D. dependent var | | 0.412873 |
| S.E. of regression | 0.397217 | Akaike info criterion | | 1.094248 |
| Sum squared resid | 17.98704 | Schwarz criterion |  | 1.406189 |
| Log likelihood | -56.03189 | Hannan-Quinn criter. | | 1.220991 |
| F-statistic | 1.785281 | Durbin-Watson stat | | 1.480064 |
| Prob(F-statistic) | 0.053568 |  | |  |

WALD TEST

|  |  |  |  |
| --- | --- | --- | --- |
| Wald Test: |  |  |  |
| Equation: Untitled | | | |
| Test Statistic | Value | Df | Probability |
| F-statistic | 2.808770 | (4, 114) | 0.0288 |
| Chi-square | 11.23508 | 4 | 0.0240 |
| Null Hypothesis: C(1)=C(2)=C(3)=C(4)=C(5) | | | |
| Null Hypothesis Summary: | | | |
| Normalized Restriction (= 0) | | Value | Std. Err. |
| C(1) - C(5) |  | -0.105590 | 0.050802 |
| C(2) - C(5) |  | -0.273260 | 0.252114 |
| C(3) - C(5) |  | 1.377426 | 0.756172 |
| C(4) - C(5) |  | 0.042229 | 0.039852 |
| Restrictions are linear in coefficients. | | |  |

PANEL COINTEGRATION TEST

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Kao Residual Cointegration Test | | | | |
| Series: RGDP FGBD FGDD FGXD FOER BRMS | | | | |
| Date: 09/09/21 Time: 04:59 | | | | |
| Sample: 1986 2020 |  |  |  |  |
| Included observations: 140 | | | | |
| Null Hypothesis: No cointegration | | | | |
| Trend assumption: No deterministic trend | | | | |
| User-specified lag length: 1 | | | | |
| Newey-West automatic bandwidth selection and Bartlett kernel | | | | |
|  |  |  | t-Statistic | Prob. |
| ADF |  |  | -2.863084 | 0.0021 |
| Residual variance |  |  | 0.083775 |  |
| HAC variance |  |  | 0.059530 |  |
| Augmented Dickey-Fuller Test Equation | | | | |
| Dependent Variable: D(RESID) | | | | |
| Method: Least Squares |  |  |  |  |
| Date: 09/09/21 Time: 04:599 | | | | |
| Sample (adjusted): 1989 2020 | | | | |
| Included observations: 128 after adjustments | | | | |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| RESID(-1) | -0.371291 | 0.087605 | -4.238221 | 0.0000 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| D(RESID(-1)) | -0.012532 | 0.102967 | -0.121707 | 0.9033 |
| R-squared | 0.152180 | Mean dependent var | | 0.000986 |
| Adjusted R-squared | 0.145451 | S.D. dependent var | | 0.324842 |
| S.E. of regression | 0.300289 | Akaike info criterion | | 0.447362 |
| Sum squared resid | 11.36189 | Schwarz criterion |  | 0.491925 |
| Log likelihood | -26.63116 | Hannan-Quinn criter. | | 0.465468 |
| Durbin-Watson stat | 1.784182 |  | |  |

PANEL HAUSMAN PANEL DATA

**POOLED OLS**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Dependent Variable: RGDP | | | | |
| Method: Panel Least Squares | | | | |
| Date: 09/09/21 Time: 04:38 | | | | |
| Sample: 1986 2020 |  |  |  |  |
| Periods included: 35 |  |  |  |  |
| Cross-sections included: 4 | | | | |
| Total panel (balanced) observations: 140 | | | | |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| C | -0.256808 | 0.245638 | -1.045476 | 0.2977 |
| FGBD | 0.130254 | 0.016860 | 7.725528 | 0.0000 |
| FGDD | -0.170877 | 0.026626 | -6.417666 | 0.0000 |
| FOER | 0.857008 | 0.086867 | 9.865745 | 0.0000 |
| FGXD | 0.246228 | 0.037892 | 6.498094 | 0.0000 |
| BRMS | 0.162126 | 0.084334 | 1.922436 | 0.0567 |
| R-squared | 0.967085 | Mean dependent var | | 7.799541 |
| Adjusted R-squared | 0.965857 | S.D. dependent var | | 3.590984 |
| S.E. of regression | 0.663538 | Akaike info criterion | | 2.059449 |
| Sum squared resid | 58.99780 | Schwarz criterion |  | 2.185519 |
| Log likelihood | -138.1614 | Hannan-Quinn criter. | | 2.110680 |
| F-statistic | 787.4179 | Durbin-Watson stat | | 1.549077 |
| Prob(F-statistic) | 0.000000 |  | |  |

RANDOM EFFECT MODEL

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Dependent Variable: RGDP | | | | |
| Method: Panel EGLS (Period random effects) | | | | |
| Date: 09/09/21 Time: 04:43 | | | | |
| Sample: 1986 2020 |  |  |  |  |
| Periods included: 35 |  |  |  |  |
| Cross-sections included: 4 | | | | |
| Total panel (balanced) observations: 140 | | | | |
| Swamy and Arora estimator of component variances | | | | |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| C | -0.256808 | 0.272565 | -0.942192 | 0.3478 |
| FGBD | 0.130254 | 0.018709 | 6.962311 | 0.0000 |
| FGDD | -0.170877 | 0.029545 | -5.783655 | 0.0000 |
| FOER | 0.857008 | 0.096390 | 8.891092 | 0.0000 |
| FGXD | 0.246228 | 0.042046 | 5.856137 | 0.0000 |
| BRMS | 0.162126 | 0.093578 | 1.732515 | 0.0855 |
|  | Effects Specification | |  |  |
|  |  |  | S.D. | Rho |

|  |  |  |  |
| --- | --- | --- | --- |
| Period random |  | 0.000000 | 0.0000 |
| Idiosyncratic random |  | 0.736275 | 1.0000 |
| Weighted Statistics | | | |
| R-squared | 0.967085 | Mean dependent var | 7.799541 |
| Adjusted R-squared | 0.965857 | S.D. dependent var | 3.590984 |
| S.E. of regression | 0.663538 | Sum squared resid | 58.99780 |
| F-statistic | 787.4179 | Durbin-Watson stat | 0.549077 |
| Prob(F-statistic) | 0.000000 |  |  |
| Unweighted Statistics | | | |
| R-squared | 0.967085 | Mean dependent var | 7.799541 |
| Sum squared resid | 58.99780 | Durbin-Watson stat | 0.549077 |

HAUSMAN TEST

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Correlated Random Effects - Hausman Test | | | | |
| Equation: Untitled |  |  |  |  |
| Test period random effects | | | | |
| Test Summary |  | Chi-Sq. Statistic | Chi-Sq. d.f. | Prob. |
| Period random |  | 2.355263 | 5 | 0.7981 |
| \*\* WARNING: estimated period random effects variance is zero. | | | | |
| Period random effects test comparisons: | | | | |
| Variable | Fixed | Random | Var(Diff.) | Prob. |
| FGBD | 0.121628 | 0.130254 | 0.000294 | 0.6149 |
| FGDD | -0.175142 | -0.170877 | 0.000219 | 0.7732 |
| FOER | 0.863037 | 0.857008 | 0.002465 | 0.9033 |
| FGXD | 0.259302 | 0.246228 | 0.000269 | 0.4258 |
| BRMS | 0.155031 | 0.162126 | 0.001891 | 0.8704 |
| Period random effects test equation: | | | | |
| Dependent Variable: RGDP | | | | |
| Method: Panel Least Squares | | | | |
| Date: 09/09/21 Time: 04:41 | | | | |
| Sample: 1986 2020 |  |  |  |  |
| Periods included: 35 |  |  |  |  |
| Cross-sections included: 4 | | | | |
| Total panel (balanced) observations: 140 | | | | |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| C | -0.244633 | 0.279990 | -0.873723 | 0.3844 |
| FGBD | 0.121628 | 0.025379 | 4.792452 | 0.0000 |
| FGDD | -0.175142 | 0.033047 | -5.299864 | 0.0000 |
| FOER | 0.863037 | 0.108423 | 7.959882 | 0.0000 |
| FGXD | 0.259302 | 0.045137 | 5.744804 | 0.0000 |
| BRMS | 0.155031 | 0.103188 | 1.502417 | 0.1361 |
| Effects Specification | | | | |
| Period fixed (dummy variables) | | | | |
| R-squared | 0.969756 | Mean dependent var | | 7.799541 |
| Adjusted R-squared | 0.957961 | S.D. dependent var | | 3.590984 |
| S.E. of regression | 0.736275 | Akaike info criterion | | 2.460531 |
| Sum squared resid | 54.21014 | Schwarz criterion | | 3.301000 |

|  |  |  |  |
| --- | --- | --- | --- |
| Log likelihood | -132.2372 | Hannan-Quinn criter. | 2.802073 |
| F-statistic | 82.21650 | Durbin-Watson stat | 1.566260 |
| Prob(F-statistic) | 0.000000 |  |  |

FIXED EFFECT ESTIMATES

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Dependent Variable: RGDP | | | | |
| Method: Panel Least Squares | | | | |
| Date: 09/09/21 Time: 04:44 | | | | |
| Sample: 1986 2020 |  |  |  |  |
| Periods included: 35 |  |  |  |  |
| Cross-sections included: 4 | | | | |
| Total panel (balanced) observations: 140 | | | | |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| C | 3.097991 | 0.670855 | 4.617971 | 0.0000 |
| FGBD | 0.046899 | 0.012668 | 3.702148 | 0.0004 |
| FGDD | -0.001632 | 0.018849 | -0.086582 | 0.9312 |
| FOER | 0.282843 | 0.082121 | 3.444201 | 0.0008 |
| FGXD | -0.038541 | 0.026719 | -1.442475 | 0.1524 |
| BRMS | 0.349191 | 0.053392 | 6.540182 | 0.0000 |
| Effects Specification | | | | |
| Cross-section fixed (dummy variables) | | | | |
| Period fixed (dummy variables) | | | | |
| R-squared | 0.994723 | Mean dependent var | | 7.799541 |
| Adjusted R-squared | 0.992438 | S.D. dependent var | | 3.590984 |
| S.E. of regression | 0.312280 | Akaike info criterion | | 0.757521 |
| Sum squared resid | 9.459322 | Schwarz criterion |  | 1.661026 |
| Log likelihood | -10.02648 | Hannan-Quinn criter. | | 1.124678 |
| F-statistic | 435.3174 | Durbin-Watson stat | | 1.064481 |
| Prob(F-statistic) | 0.000000 |  | |  |

POOLED OLS

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Dependent Variable: RGDP | | | | |
| Method: Panel Least Squares | | | | |
| Date: 09/09/21 Time: 04:50 | | | | |
| Sample: 1986 2020 |  |  |  |  |
| Periods included: 35 |  |  |  |  |
| Cross-sections included: 4 | | | | |
| Total panel (balanced) observations: 140 | | | | |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| C | -0.256808 | 0.245638 | -1.045476 | 0.2977 |
| FGBD | 0.130254 | 0.016860 | 7.725528 | 0.0000 |
| FGDD | -0.170877 | 0.026626 | -6.417666 | 0.0000 |
| FOER | 0.857008 | 0.086867 | 9.865745 | 0.0000 |
| FGXD | 0.246228 | 0.037892 | 6.498094 | 0.0000 |
| BRMS | 0.162126 | 0.084334 | 1.922436 | 0.0567 |
| R-squared | 0.967085 | Mean dependent var | | 7.799541 |
| Adjusted R-squared | 0.965857 | S.D. dependent var | | 3.590984 |
| S.E. of regression | 0.663538 | Akaike info criterion | | 2.059449 |
| Sum squared resid | 58.99780 | Schwarz criterion |  | 2.185519 |
| Log likelihood | -138.1614 | Hannan-Quinn criter. | | 2.110680 |
| F-statistic | 787.4179 | Durbin-Watson stat | | 1.549077 |
| Prob(F-statistic) | 0.000000 |  | |  |